SCIENTIFIC PROGRAM

Annual Conference of the Canadian Blood and Marrow Transplant Group

VANCOUVER
APRIL 24-27, 2016

The Westin Bayshore Vancouver • 1601 Bayshore Drive, Vancouver, BC, V6G 2V4, Canada

CBMTG

570 West 7th Avenue, Suite 400 Vancouver, BC V5Z 1B3
T: 604-874-4944 F: 604-874-4378 E: cbmtg@malachite-mgmt.com W: www.cbmtg.org

PRIME MINISTER · PREMIER MINISTRE

April 24-27, 2016

Dear Friends:

I am delighted to extend my warmest greeting to everyone attending the Annual Conference of the Canadian Blood and Marrow Transplant Group (CBMTG).

This event gives experts working in the rapidly evolving field of blood and marrow transplant (BMT) a forum in which to exchange information about the latest developments in clinical and laboratory research and patient care. I am sure that delegates will make the most of the educational sessions being offered at this meeting, as well as the unrivalled opportunities for networking with colleagues committed to making Canada a world leader in blood and marrow transplantation.

I would like to commend CBMTG for their dedication to promoting excellence in research, clinical care, and education in the field of BMT. Your expertise is helping to save lives every day. I would also like to thank the organizing committee for their hard work in putting together such a stimulating conference for delegates.

Please accept my best wishes for an enjoyable and productive meeting in Vancouver.

Sincerely,

The Rt. Hon. Justin P.J. Trudeau, P.C., M.P.
Prime Minister of Canada

CITY OF VANCOUVER

Mayor Gregor Robertson
Le maire Gregor Robertson
羅品信市長
ਗਰੈਗਰ ਰੌਬਰਟਸਨ, ਮੇਅਰ
Punong-bayan Gregor Robertson

niʔ ct xaɬəməṯaɬ, tə ɬnimaɬ, tə təməxʷ ʔiʔ tə k̓ʷaƛ̓kʷə 1 *
We watch over the land and sea and in turn they watch over us.

April, 2016

A Message from the Mayor

On behalf of my colleagues on Vancouver City Council and the citizens of Vancouver, I want to extend my warmest welcome to the delegates attending the 2016 Annual Conference of the Canadian Blood and Marrow Transplant Group.

The City of Vancouver has a proud reputation as one of the world's most beautiful and unique meeting destinations. We are honoured to be welcoming delegates from across the country with expertise in the fields of medicine, nursing, pharmacy, social work and many others. I know that the organizers will ensure your time here in Vancouver is special, and I hope that in addition to attending the conference you are able to experience the many cultural and recreational activities the city has to offer.

I want to extend my best wishes for a successful conference and welcome all of the participants to the City of Vancouver.

Yours truly,

Gregor Robertson
MAYOR

604.873.7621 604.873.7685 gregor.robertson@vancouver.ca vancouver.ca
Office of the Mayor, City of Vancouver, 453 West 12th Avenue, Vancouver, British Columbia, Canada V5Y 1V4

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CBMTG

A message from the CBMTG president

Dear Colleagues,

On behalf of the Board of Directors I am happy to welcome you to the Canadian Blood and Marrow Transplant Group (CBMTG) 2016 Annual Conference!

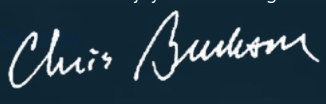
The conference planning committee, led by Dr. Raewyn Broady and Dr. Kirk Schultz, and supported by our CBMTG office team, have worked diligently to put together a scientific program addressing topics of interest to all disciplines in the field of the blood and marrow transplantation. I think you will agree, they have been very successful.

I encourage you to participate in as many activities as possible while at the conference. In particular, I wish to highlight a few CBMTG events that we hope all members will support:

1. Annual General Meeting: The annual general meeting of the CBMTG will be held on Tuesday, April 26, 2016 from 10:20am to 11:20am. At this meeting, we hear reports on the activities of the association for the last year, recognize awardees and craft the direction for our future. This is your opportunity to provide feedback or offer suggestions to the CBMTG Board. Don't miss your chance to tell us what to do!
2. CBMTG Social: Please join me and your colleagues to celebrate! The social event is a time for you to network and get to know your colleagues "A Mari Usque Ad Mare" better while enjoying a stunning view of Vancouver's city skyline and mountains at Seasons in the Park!
3. Patient and Family Day: This year we will be hosting our very first CBMTG Patient and Family Day. In keeping with our vision of being the voice of blood and marrow transplant in Canada and our mission of education, on Wednesday, April 27, 2016 we will be taking our first step at engaging our patients and families in the mission of the CBMTG. In addition, as many of you know, this session will be available for live streaming over the internet. I encourage all who are able to, attend in person or join on your portable devices.

Lastly, I would like to thank the sponsors. Without their support, our meeting would not be possible. Please take the time to visit with them during breaks, ask them what is in their pipeline and express your appreciation.

Dive in and enjoy the meeting.



Christopher Bredeson, *MD, MSc (Clin Epi), FRCPC*
President, Canadian Blood and Marrow Transplant Group

A message from the conference chairs

Dear Colleagues,

On behalf of the conference planning committee and the Vancouver BMT community, we are pleased to welcome you to our beautiful city of Vancouver.

The conference planning committee has worked hard over the past year to put together an exciting program that informs on the latest developments in BMT patient care, clinical research, and laboratory research. The program will address complications of autologous and allogeneic transplant and other disease-specific sessions. We are proud to welcome speakers from across the country and the world here to share their expertise. I hope that you will find our conference to be a valuable learning and networking experience.

I suggest you take the time to explore our vibrant city during your stay. Vancouver is recognized as one of the world's greenest and most beautiful cities. You can enjoy the city and its surroundings by taking leisure walks around downtown, bike rides along the sea wall, as well as short trips to the surrounding mountains.

We hope you will enjoy the conference and your stay!

Raewyn Broady, *MBChB, FRACP, FRCPC*
Conference Planning Committee Co-Chair

Kirk Schultz, *MD*
Conference Planning Committee Co-Chair

CBMTG Board of Directors

President,
Christopher Bredeson, MD, MSc

Past President,
Silvy Lachance, MD, FRCPC, CSPQ

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Treasurer,
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Secretary,
Jennifer Wiernikowski, MN, NP-Adult, CON(C)

Director-at-Large, Research
Donna Wall, MD

Director-at-Large, Education
Kylie Lepic, MD

Conference Planning Committee

Co-Chairs:

Raewyn Broady, *MBChB, FRACP, FRCPC*

Kirk Schultz, *MD*

Committee members:

Christopher Bredeson, *MD, MSc*

Giovanna Cameron, *MLT*

Stephen Couban, *MD, FRCPC*

Andrew Daly, *MD, FRCPC*

Jean-Sebastien Delisle, *MD, PhD*

Maarten Egeler, *MD, PhD*

Ronan Foley, *MD, FRCPC*

Elie Haddad, *MD, PhD*

Angela Hall, *BSc*

Silvy Lachance, *MD, FRCPC, CSPQ*

Kirstjan Paulson, *MD*

Gizelle Popradi, *MD, FRCPC*

Juliana Roden, *MN, NP(P)*

Jan Storek, *MD, PhD*

Dawn Warkentin, *Pharm. D.*

Jennifer Wiernikowski, *MN, NP-Adult, CON(C)*

Accreditation

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This event is an Accredited Group Learning Activity eligible for up to 14.0 Section 1 credits as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada. This program has been reviewed and approved by UBC Division of Continuing Professional Development. Each physician should claim only those credits he/she actually spent in the activity.

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Disclosures

John Bell, *Speaker*

- Ownership Interest – Turnstone Biologics

Catherine Bollard, *Speaker*

- Clinical Trial Participation – Cellmedica
- Honoraria – Cellmedica, Celgene

Christopher Bredeson, *Speaker, Planning Committee Member*

- Research Support – Celgene, Sanofi, Otsuka
- Clinical Trial Participation – Sanofi, Otsuka
- Honoraria – Otsuka, Sanofi, Celgene, Lundbeck

Timothy Caulfield, *Speaker*

- Speaker's Bureau – Speakers' Spotlight

Kenneth Cooke, *Speaker*

- Advisory Board – Jazz Pharmaceuticals
- Honorarium – Jazz Pharmaceuticals

Andrew Daly, *Speaker, Planning Committee Member*

- Research support – Gilead
- Clinical Trial Participation – Gilead
- Clinical Study Involvement – Mesoblast

Jean-Sebastian Delisle, *Speaker*

- Clinical Trial Participation – Hopital Maisonneuve-Rosemont

Steven Devine, *Speaker*

- Advisory Board – Incyte
- Research Support – Sanofi, Celldex

Kari Kolm, *Speaker*

- Honoraria – Roche, Janssen

Megan Levings, *Speaker*

- Research Support – Bristol-Myers Squibb

Kristjan Paulson, *Speaker, Planning Committee Member*

- Advisory Board – Lundbeck, Sanofi

Tanya Petraszko, *Speaker*

- Honorarium – Canadian Blood Services Medical Director

Chantal Proulx, *Speaker*

- Honorarium: Stemcell Technologies Inc.

James Russell, *Speaker*

- Honorarium - Otsuka

Heather Symons, *Speaker*

- Research Support – Otsuka

Alissa Wright, *Speaker*

- Advisory Board – Merck
- Clinical Trial Participation – Gilead

Invited Speakers, Chairs, and Panelists

Imran Ahmad, *MD, MSc, Hôpital Maisonneuve Rosemont, Montreal, QC, Canada*

Hui-Sheng Ai, *MD, Affiliated Hospital of the Academy of Military Medical Sciences, Fengtai, Beijing, China*

John Bell, *PhD, The Ottawa Hospital, University of Ottawa, Ottawa, ON, Canada*

Catherine Bollard, *MD, FRACP, FRCPA, Children's National Health System, The George Washington University, School of Medicine and Health Sciences, Washington, DC, USA*

Christopher Bredeson, *MD, MSc, The Ottawa Hospital, Ottawa, ON, Canada*

Raewyn Broady, *MBChB, FRACP, FRCPC, Leukemia/BMT Program of BC, Vancouver, BC, Canada*

Giovanna Cameron, *MLT, Clinical Cell Therapy Laboratory, Leukemia/BMT Program of BC, Vancouver, BC, Canada*

Timothy Caulfield, *LLM, FRSC, FCAHS, Health Law Institute, University of Alberta, Edmonton, AB, Canada*

Kenneth Cooke, *MD, The Sidney Kimmel Comprehensive Cancer Center, The Johns Hopkins University School of Medicine, Baltimore, MD, USA*

Geoff Cuvelier, *MD, FRCPC, CancerCare Manitoba, University of Manitoba, Winnipeg, MB, Canada*

Andrew Daly, *MD, FRCPC, Alberta Bone Marrow Transplant Program, Calgary, AB, Canada*

Jean-Sebastien Delisle, *MD, PhD, University of Montreal, Montreal, QC, Canada*

Steven Devine, *MD, The Ohio State University Comprehensive Cancer Center, Columbus, OH, USA*

Connie Eaves, *PhD, FRSC, Terry Fox Laboratory, BC Cancer Agency, Vancouver, BC, Canada*

Julie Frketich, *MLT, Vancouver Coastal Health Authority, Vancouver, BC, Canada*

Angeline Giftakis, *BA, MLT, CancerCare Manitoba, Winnipeg, MB, Canada*

Martin Giroux, *PhD, Hôpital Maisonneuve Rosemont, Montreal, QC, Canada*

Angela Hall, *BSc, BC Children's Hospital, Vancouver, BC, Canada*

Mike Halpenny, *MLT (CMLTD), Canadian Blood Services, Ottawa, ON, Canada*

Debbie Hanson, *RNBN, Health Sciences Centre, Children's Hospital, Winnipeg, MB, Canada*

Andrea Johnson, *PhD, RSW, BC Children's Hospital, Vancouver, BC, Canada*

Kari Kolm, *RN(EC), MN NP, Juravinski Hospital and Cancer Centre, Hamilton, ON, Canada*

Katie Lacaria, *Pharm, Vancouver General Hospital, Leukemia/BMT Program of BC*

Silvy Lachance, *MD, FRCPC, CSPQ, Hôpital Maisonneuve Rosemont, Montreal, PQ, Canada*

Kylie Lepic, *MD, FRCPC, McMaster University, Juravinski Hospital and Cancer Centre Hamilton, ON, Canada*

Megan Levings, *PhD, The University of British Columbia, Child and Family Research Institute, Vancouver, BC, Canada*

Locksley McGann, *PhD, Edmonton Autologous Stem Cell Transplant Laboratory, Canadian Blood Services, University of Alberta, Edmonton, AB, Canada*

Fotios (Frank) Michelis, *MD, PhD, Princess Margaret Cancer Centre, Toronto, ON, Canada*

Thomas Nevill, *MD, FRCPC , Leukemia/Bone Marrow Transplant Program of BC, Vancouver, BC, Canada*

Kristjan Paulson, *MD, FRCPC, Health Sciences Centre, CancerCare Manitoba, University of Manitoba, Winnipeg, MB, Canada*

Edith Pituskin, *PhD, University of Alberta, Edmonton, AB, Canada*

Tanya Petraszko, *MD, FRCPC, CBS Cord Blood Bank, Vancouver, BC, Canada*

Nicole Prokopishyn, *PhD, Calgary Laboratory Services, Foothills Medical Centre, Calgary, AB, Canada*

Chantal Proulx, *PhD, STEMCELL Technologies Inc., Vancouver, BC, Canada*

Doug Rizzo, *MD, MS, Medical College of Wisconsin, Milwaukee, WI, USA*

Juliana Roden, *MN, NP(P), BC Children's Hospital, Vancouver, BC, Canada*

James Russell, *MA, MB. BChir, FRCP, Tom Baker Cancer Centre, Calgary, AB, Canada*

Tal Schechter-Finkelstein, *MD, The Hospital for Sick Children, University of Toronto, Toronto, ON, Canada*

Kirk R. Schultz, *MD, Michael Cuccione Childhood Cancer Research Program, B.C. Children's Hospital, Vancouver, BC, Canada*

Carl Simard, *MSc, Héma-Québec, Quebec, QC, Canada*

Heather Symons, *MD, MHS, The Johns Hopkins Hospital, Baltimore, MD, USA*

Jason Tan, *BSc (Pharm), ACPR, Faculty of Pharmaceutical Sciences, The University of British Columbia, Vancouver, BC, Canada*

Donna Wall, *MD, University of Manitoba, CancerCare Manitoba, Winnipeg, MB, Canada*

Irwin Walker, *MBBS, FRACP, FRCPC, McMaster University, Juravinski Hospital and Cancer Centre, Hamilton, ON, Canada*

Lori West, *MD, Dphil, FRCPC, Canadian Academy of Health Sciences, Canadian National Transplant Research Program, Alberta Transplant Institute, University of Alberta, Edmonton, AB, Canada*

Jennifer Wiernikowski, *RN (EC), MN, NP(A), CON(C), Juravinski Hospital, Hamilton, ON, Canada*

Joachim Wiskemann, *PhD, National Center for Tumor Diseases (NCT), Heidelberg University Hospital, Heidelberg, Germany*

Alissa Wright, *MD, MSc, FRCPC, Transplant Infectious Disease Program, Division of Infectious Disease, Vancouver, BC, Canada*

CBMTG

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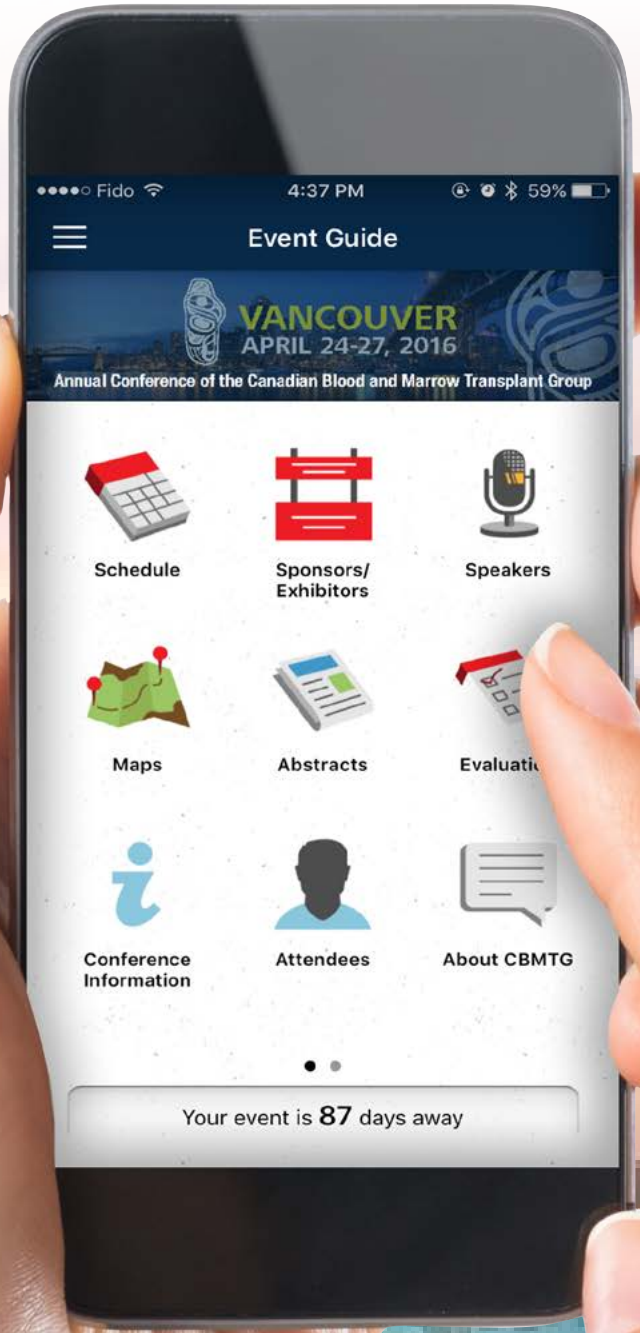
Introducing the CBMTG 2016 Conference App!

Did you know that there is a conference app that you can download that lists all of the session information, speakers, speaker bios, abstracts, venue maps, and other important conference information?

Download the app onto your iPhone, iPad, Android, or Blackberry by scanning the QR code below or searching for "CBMTG" in your phone's app store.



Conference-at-a-Glance

Sunday, April 24, 2016

	4:00pm – 7:00pm	Conference Registration	*Coat Check/ Foyer*
	4:00pm – 7:00pm	Speaker Services	*Thompson*
	7:00pm – 8:30pm	**Nursing Special Interest Group Networking Session** **Facilitator:** Jennifer Wiernikowski, *RN (EC), MN, NP(A), CON(C),* Juliana Roden, *MN, NP(P)*	*Salon 2*

Monday, April 25, 2016

	7:30am – 6:30pm	Conference Registration	*Coat Check/ Foyer*
	8:00am – 4:00pm	Speaker Service	*Thompson*
	8:30am – 8:45am	**Welcome Remarks** **Chair:** Chris Bredeson, *MD, MS, FRCPC*	*Salon E/F*
	8:45am – 11:45am	**Session 1A: Canadian Blood and Marrow Transplant Group (CBMTG) – Canadian National Transplant Research Program (CNTRP) Joint Session** **Chair:** Kirk Schultz, *MD* **Introduction and Overview of CNTRP Activities and its Impact on BMT** – Donna Wall, *MD* **Policy Challenges and BMT: Building a Research and Public Engagement Agenda** – Timothy Caulfield, *LLM, FRSC, FCAHS* **Endothelial Biology in BMT and GVHD: What Have We Learned from Solid Organ Transplant?** – Kirk Schultz, *MD* **ABO Incompatibility Biology: What Can Solid Organ Transplant Teach Us About GVHD and BMT Outcomes?** – Lori West, *MD, DPhil, FRCPC* **Update on the CARE Trial for cGVHD Treatment** – Imran Ahmad, *MD* **From the Bench to the Clinical Flow Lab: Implementation of Standardized Flow Cytometry in Multi-Center Clinical Trials** – Megan Levings, *PhD* **Summary** – Kirk Schultz, *MD*	*Salon E/F*
		Session 1B: Nursing/Allied Health Session – Survivorship Panel **Chairs:** Juliana Roden, *MN, NP(P),* Jennifer Wiernikowski, *RN (EC), MN, NP(A), CON(C)* **Let Us Help You, Help Us Better – Moderator:** Andrea Johnson, *PhD, RSW*	*Mackenzie*
		Session 1C: Laboratory Technologists – Cell Therapy Basics **Chairs:** Giovanna Cameron, *MLT,* Angela Hall, *BSc* **Cryobiology 101: Principles of Cryobiology** – Locksley McGann, *PhD* **Standardization of the Hematopoietic Colony Forming Unit (CFU) Assay** – Chantal Proulx, *PhD* **Thawing for Success!** – Angeline Giftakis, *MLT*	*Seymour*
	10:15am - 10:35am	**Health Break and Poster Group 1 Presentations** Health break located in Salon A/D. Poster group presentations located in Bayshore Ballroom Foyer.	

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Monday, April 25, 2016

	1:45pm – 2:45pm	**Session 2: Exercise Symposium** **Chair:** Raewyn Broady, *MBChB, FRACP, FRCPC* **Capability of Exercise in Hematopoietic Stem Cell Transplantation** – Joachim Wiskemann, *PhD*	*Salon E/F*
	3:00pm – 6:00pm	**Session 3A: New Topics in Cutting Edge Research** **Chair:** Irwin Walker, *MBBS, FRACP, FRCPC* **Novel Strategies for Donor Stem Cell Mobilization** – Steven Devine, *MD* **International Multi-center Clinical Research of Microtransplantation: Current and Future** – Hui-Sheng Ai, *MD* **Cutting Edge Research from ASH and ASBMT Meetings** – Kirk Schultz, *MD*	*Salon E/F*
		Session 3B: BMT 101 **Chair:** Andrew Daly, *MD, FRCPC* **How Does the Cellular Content of Stem Cell Grafts Influence the Outcome of Transplant?** – Andrew Daly, *MD, FRCPC* **Choosing the Best Haploidentical Donor** – Kylie Lepic, *MD, FRCPC* **Haploidentical Transplantation: The Post Transplant Cyclophosphamide Experience** – Heather Symons, *MD, MHS*	*Mackenzie*
	3:45pm - 4:05pm	**Health Break and Poster Group 2 Presentations** Health break located in Salon A/D. Poster group presentations located in Bayshore Ballroom Foyer.	
	6:15pm – 7:15pm	**Session 4: Debate: If You Don't Have a Sibling Donor Then What?** **Moderator:** Thomas Nevill, *MD, FRCPC* **Haploidentical Transplant** – Kristjan Paulson, *MD, FRCPC* **Umbilical-cord Blood** – Donna Wall, *MD* **Unrelated Donor Transplant** – Andrew Daly, *MD, FRCPC* *A light meal will be served.*	*Salon E/F*
	7:15pm – 8:30pm	**Welcome Reception**	*Salon A/D/Foyer*

Tuesday, April 26, 2016

	7:00am – 5:00pm	Conference Registration	*Coat Check/ Foyer*
	8:30am – 4:30pm	Speaker Service	*Thompson*
	9:00am – 10:00am	**Session 5: Till and McCulloch Lectureship** **Chair:** Chris Bredeson, *MD, MS, FRCPC* **Hematopoietic Stem Cells: 50 Years Later** – Connie Eaves, *PhD, FRC(C)*	*Salon E/F*
	10:00am – 10:20am	**Health Break and Poster Group 3 Presentations** Health break located in Salon A/D. Poster group presentations located in Bayshore Ballroom Foyer.	
	10:20am-11:20am	**CBMTG Annual General Meeting**	*Salon E/F*

Tuesday, April 26, 2016

	1:15pm-3:15pm	**Session 6A: Long-Term Follow-Up** **Chair:** Donna Wall, *MD* **Development of a Dedicated Long Term Follow-up Clinic for BMT Survivors** – Debbie Hanson, *RNBN* **Transitioning from a Pediatric to an Adult Transplant Centre** – Donna Wall, *MD* **Care From a Distance** – Doug Rizzo, *MD, MS*	*Salon E/F*
		Session 6B: Nursing/Allied Health – New Approaches to Treatment **Chairs:** Juliana Roden, *MN, NP(P)*, Jennifer Wiernikowski, *RN (EC), MN, NP(A), CON(C)* **Case Review: CMV Disease after Haploidentical Transplant** – Kari Kolm, *RN(EC), MN NP* **Car T Cell Therapy** – Catherine Bollard, *MD*	*Mackenzie*
		Session 6C: Laboratory Technologists – Quality 101 **Chairs:** Giovanna Cameron, *MLT*, Angeline Giftakis, *BA, MLT* **What Does a Quality Program Look Like?** – Julie Frketich, *MLT, QIS (BCPSQC)* **Validation of DMSO** – Nicole Prokopishyn, *PhD* **Stability Program** – Mike Halpenny, *MLT (CMLTD)*	*Seymour*
	3:15pm – 3:30pm	**Health Break and Poster Group 4 Presentations** Health break located in Salon A/D. Poster group presentations located in Bayshore Ballroom Foyer.	
	3:30pm – 5:00pm	**BMT Registry Meeting and Clinical Trials Network**	*Salon E/F*
	5:00pm – 6:15pm	**Session 7: Oral Abstract Presentations** **Chair:** Raewyn Broady, *MBChB, FRACP, FRCPC* For more information, see page 25.	*Salon E/F*
	7:00pm Onwards	**Social Event** *Pre-registration is required* Bus Departures: First bus from hotel to social: 6:15pm; last bus 6:45pm First bus back to hotel: 8:45pm; last bus 11:30pm	*Seasons in the Park*

Wednesday, April 27, 2016

	7:00am – 6:00pm	Conference Registration	*Coat Check/ Foyer*
	8:30am – 2:30pm	Speaker Services	*Thompson*
	9:00am – 10:45am	**Session 8: Pediatric Clinical** **Chair:** Tal Schechter-Finkelstein, *MD* **Haploidentical Transplantation in Pediatric BMT: What is the Current State of the Art and Where is the Field Going?** – Heather Symons, *MD, MHS* **Haploidentical Transplant in Non-Malignant Pediatric Diseases** – Geoff Cuvelier, *MD, FRCPC* **Lung Complications After BMT: New Advances in Diagnosis and Treatment** – Kenneth Cooke, *MD*	*Salon E/F*
	10:45am – 11:00am	Health Break	*Salon A/D/Foyer*

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Wednesday, April 27, 2016

	11:00am – 12:00pm	**Session 9: Hans Messner Lectureship** **Chair:** Chris Bredeson, *MD, MS, FRCPC* **Conditioning in the Wild West: History of Transplants in Calgary** – James Russell, *MD*	*Salon E/F*
	1:45pm – 2:00pm	Health Break	*Salon A/D/Foyer*
	2:00pm – 4:00pm	**Session 10A: Canadian Blood and Marrow Transplant Group (CBMTG) – International Society for Cellular Therapy (ISCT) Joint Session** **Chair:** Jean-Sebastien Delisle, *MD, PhD* **CD19-CAR T Cells: Their Role in 2016** – Catherine Bollard, *MD* **Oncolytic Viruses as an Alternative Approach for Treatment of Leukemia and Lymphoma** – John Bell, *PhD* **Anti-Viral Adoptive Immunotherapy; Moving to the Front Seat?** – Jean-Sebastien Delisle, *MD, PhD*	*Salon E/F*
		Session 10B: Nursing/Allied Health – Post-Transplant Care **Chairs:** Juliana Roden, *MN, NP(P)*, Jennifer Wiernikowski, *RN (EC), MN, NP(A), CON(C)* **Graft-versus-Host Disease: An Overview** – Fotios Michelis, *MD, PhD* **Multidisciplinary Cardiovascular Support in Stem Cell Transplantation: Are We Doing Enough?** – Edith Pituskin, *PhD*	*Mackenzie*
		Session 10C: Laboratory Technologists – Cord Blood Update **Chairs:** Mike Halpenny, *MLT (CMLTD)*, Angela Hall, *BSc* **Canadian Blood Services Cord Blood Bank Update** – Tanya Petraszko, *MD, FRCPC* **Validation of Thawing Media Without Dextran for Cord Blood** – Carl Simard, *MSc* **Cord Blood Stem Cell Expansion: from Translation to GMP** – Martin Giroux, *PhD*	*Seymour*
		Session 10D: Pharmacists **Chair:** Katie Lacaria, *Pharm* **Defibrotide from the Canadian Perspective** – Jason Tan, *BSc, ACP* **Going Viral: CMV and Stem Cell Transplant** – Alissa Wright, *MD, MSc, FRCPC* **The Skinny on Obesity and Drug Dosing in Hematopoietic Cell Transplantation** – Christopher Bredeson, *MD, MSc*	*Salon B/C*
	4:00pm – 5:00pm	**Special Interest Group Meeting: Laboratory Technologists** **Chair:** Angela Hall, *BSc*	*Oak 1*
		Special Interest Group Meeting: Pharmacy **Chair:** Katie Lacaria, *Pharm*	*Oak 2*
	5:00pm – 9:00pm	**Patient Symposium** **Facilitator:** Andrew Daly, *MD, FRCPC* and Vincent Dumez	*Salon B/C*

Business Meetings and Special Interest Group Details

NURSING SPECIAL INTEREST GROUP AND NETWORKING SESSION

Sunday, April 24, 2016, 7:00pm – 8:30pm • *Salon 2*

The Nursing Special Interest Group(SIG) and networking session is a valuable opportunity for all nurses attending the conference to connect. Whether your stem cell transplant nursing practice involves in patients, out patients, transplant coordination, education, clinical trials or advanced practice nursing/nurse practitioner responsibilities this session will be a great way to kick off the 2016 conference experience.

This 90 minute dinner session will include light facilitation by Jennifer Wiernikowski and Juliana Roden, co-chairs of the nursing and allied health program at the conference, an opportunity for group feedback related to the nursing related activities of CBMTG and some informal time built in to encourage nurses to do some national networking.

CBMTG ANNUAL GENERAL MEETING AND Q&A

Tuesday, April 26, 2016, 10:20am – 11:20am • *Salon E/F*

The CBMTG Board of Directors invites all CBMTG members to attend this meeting. At this meeting, we hear reports on the activities of the association for the last year, and craft the direction for our future. This is your opportunity to provide feedback or offer suggestions to the CBMTG Board. Don't miss your chance to tell us what to do!

BMT REGISTRY MEETING AND CLINICAL TRIALS NETWORK

Tuesday, April 26, 2016, 3:30pm – 5:00pm • *Salon E/F*

Dr. Kristjan Paulson, Lead of the CBMTG National Registry, will discuss the current status of the registry as well as upcoming projects.

Dr. Donna Wall, Chair of the CBMTG-CTN, will discuss current projects of the CBMTG-CTN as well as the future of the network.

All conference delegates are invited to attend this session.

LABORATORY SPECIAL INTEREST GROUP MEETING

Wednesday, April 27, 2016, 4:00pm – 5:00pm • *Oak 1*

The laboratory technologist special interest group is a networking/resource opportunity for laboratory professionals. It focuses on technical and regulatory issues. The group currently has 40 members from across Canada and continues to grow along with the CBMTG.

All laboratory technologist conference delegates are invited to join this special interest group and attend this face-to-face meeting at the annual conference.

PEDIATRIC SPECIAL INTEREST GROUP

The pediatric interest group is a dynamic collaboration between the 6 pediatric allogeneic transplant programs in Canada and interested parties. The group represents the Canadian pediatric interests in the Pediatric Blood and Marrow Transplant Group, BMT CTN, Canadian National Transplant Research Group (CNTRP), as well as the CBMTG (Kirk Schultz is the medical officer for Health Canada compliance facilitated by C17). For more information, please contact Dr. Donna Wall or Dr. Kirk Schultz.

PHARMACY SPECIAL INTEREST GROUP

Wednesday, April 27, 2016, 4:00pm – 5:00pm • *Oak 2*

All pharmacist conference delegates are invited to join this special interest group and attend this face-to-face meeting at the annual conference. For more information, please contact Katie Lacaria at katie.lacaria@vch.ca.

Session Summaries

SESSION 1A: CANADIAN BLOOD AND MARROW TRANSPLANT GROUP (CBMTG) – CANADIAN NATIONAL TRANSPLANT RESEARCH PROGRAM (CNTRP) JOINT SESSION

Monday, April 25, 2016 • 8:45am – 11:45am

INTRODUCTION AND OVERVIEW OF CNTRP ACTIVITIES AND ITS IMPACT ON BMT

Donna Wall, *MD, University of Manitoba, CancerCare Manitoba, Winnipeg, MB, Canada*

Policy Challenges and BMT: Building a Research and Public Engagement Agenda

Timothy Caulfield, *LLM, FRSC, FCAHS, Health Law Institute, University of Alberta, Edmonton, AB, Canada*

The transplantation process is associated with some of the most contested legal, ethical and social issues, especially in the context donation. For example, there is increasing discussion about providing compensation to increase donation rates, a strategy that remains legally questionable and socially controversial. Similarly, the issues of public solicitation and the use of social media have garnered conflicting responses from academics, policymakers and the general public. To date, these debates have played out differently in the context of organ and blood marrow donations. In this talk, Professor Caulfield will review these issues in the context of both BMT and organ donation. What can we learn from each domain and how can we move forward?

Endothelial Biology in BMT and GVHD: What Have We Learned from Solid Organ Transplant?

Kirk R. Schultz, *MD, Michael Cuccione Childhood Cancer Research Program, B.C. Children's Hospital, Vancouver, BC, Canada*

In this session, we will update attendees on the role of endothelial inflammation in chronic GVHD. The goals will be to update the role of endothelial inflammation on cGVHD, discuss the overlap in the biology of endothelial inflammation solid organ rejection, and to discuss how low grade inflammation after BMT may be increasing long term complications in patients with or without cGVHD.

ABO Incompatibility Biology: What Can Solid Organ Transplant Teach Us About GVHD and BMT Outcomes?

Lori West, *MD, Dphil, FRCPC, Canadian Academy of Health Sciences, Canadian National Transplant Research Program, Alberta Transplant Institute, University of Alberta, Edmonton, AB, Canada*

This presentation will discuss the immunobiology of the ABO system in the setting of ABO-incompatible solid organ transplantation and the relevance of this to bone marrow transplantation. New glyconanotechnology tools have allowed study of the fine structure of ABO antigens and their expression in different cells and tissues. This has led to new evidence regarding the immune response to ABO antigens and its potential impact ontransplantation.

Update on the CARE Trial for cGVHD Treatment

Imran Ahmad, *MD, MSc, Hôpital Maisonneuve Rosemont, Montreal, QC, Canada*

The CARE trial is a nationwide clinical trial on cell therapy for chronic graft-versus-host disease. It is funded by Project number 4 of the Canadian National Transplant Research Program, aiming at improving strategies for immunomodulation and transplant tolerance. After a collaborative effort the trial obtained approvals from Health Canada and local research ethics committees by the end of 2015 and is currently enrolling patients. The phase II CARE trial involves a novel modality of photodynamic therapy, which leads to the selective depletion of alloreactive cells and the expansion of regulatory T cells.

From the Bench to the Clinical Flow Lab: Implementation of Standardized Flow Cytometry in Multi-Center Clinical Trials

Megan Levings, *PhD, The University of British Columbia, Child and Family Research Institute, Vancouver, BC, Canada*

Immune cellular networks are comprised of multiple cell types and states that can be characterized on the basis of lineage defining markers and expression of functionally relevant proteins. Studying how immune cell networks change over the disease or in response to therapy is important to understanding pathogenesis and treatment mechanisms. Measurement of immune networks using multi-colour flow cytometry is standard in research labs, but not often integrated into clinical practice. The presentation will focus on the logistics and methodology used to implement standardized multi-colour flow cytometry in the context of a multi-centre clinical trial being run by the Canadian National Transplant Research Program.

Summary

Kirk R. Schultz, *MD, Michael Cuccione Childhood Cancer Research Program, B.C. Children's Hospital, Vancouver, BC, Canada*

SESSION 1B: NURSING/ALLIED HEALTH – SURVIVORSHIP

Monday, April 25, 2016 • 8:45am – 11:45am

Let Us Help You, Help Us Better

Andrea Johnson, *PhD, RSW, BC Children's Hospital, Vancouver, BC, Canada*

Adolescents and young adults with cancer have internationally been recognized as a unique patient cohort. They have distinct medical and psychosocial needs throughout the cancer trajectory and these have significant implications for clinical practice with this population. In order to best support adolescents and young adults who have had stem cell or bone marrow transplants, it is essential to psychosocially understand and contextualize their developmental experiences.

Diagnosis and extended treatment for adolescents and young adults impacts and interrupts typical psychosocial development. The intersection of their developmental stage and disease often results in a complex experience for this group of patients and it is essential to examine their unique psychosocial care needs in efforts to best care for them. The first part of this presentation will provide a review of literature within identified psychosocial areas of development. These identified areas will be presented and discussed specifically as applied to blood and marrow transplantation.

Although awareness of the needs of adolescents and young adults continues to be heightened world-wide, there remains a dearth of research guiding the unique care of this population. The second part of this presentation will include a panel of older adolescent and young adult patients who have received bone marrow transplants. They will discuss various aspects of their medical experiences and living life following transplant. The use of adolescent and young adult voice will be encouraged as a potential knowledge development strategy within health care.

SESSION 1C: LABORATORY TECHNOLOGISTS – CELL THERAPY BASICS

Monday, April 25, 2016 • 8:45am – 11:45am

Cryobiology 101: Principles of Cryobiology

Locksley McGann, *PhD, Edmonton Autologous Stem Cell Transplant Laboratory, Canadian Blood Services, University of Alberta, Edmonton, AB, Canada*

The conversion of water to ice triggers physical and biophysical responses in biological systems. This presentation will describe changes in the extracellular and intracellular environments as ice forms, and the responses of the cells to these changes. Depending on the cooling rate, cells can be damaged by exposure to the increasing concentration of solutes during slow cooling, or to the consequences of ice formation inside the cells during rapid cooling. Permeating cryoprotective compounds, such as dimethyl sulfoxide, reduce the intracellular and extracellular concentrations of electrolytes, allowing cells to survive slow cooling. However, as solute concentrations increase at low temperatures, so does the potential of toxicity from increased concentrations of the cryoprotectant. This presentation will show how the concentrations of cryprotectants influence the cooling rate required for maximum cell survival, and consequences of cooling faster or slower than the optimal rate. This information is valuable in managing exceptions related to cryopreservation, and essential for developing protocols for new products, new cryoprotectant cocktails and for modifying existing protocols.

Standardization of the Hematopoietic Colony Forming Unit (CFU) Assay

Chantal Proulx, *PhD, STEMCELL Technologies Inc., Vancouver, BC, Canada*

The colonyforming unit (CFU) assay is an in vitro functional assay for enumerating multipotential and lineagecommitted hematopoietic progenitor cells (HPCs) in bone marrow, blood and other hematopoietic tissues. Since its introduction over four decades ago, the CFU assay has become the benchmark in vitro functional assay to study hematopoietic progenitor cells. The number of CFUs in a graft has been shown to correlate with time to neutrophil and platelet engraftment, and overall survival after transplantation. Thus the CFU assay is a useful surrogate assay to predict graft quality and has proven particularly useful in facilitating selection of CB units containing high numbers of viable and functional progenitor cells prior to unrelated allogeneic transplantation. The CFU assay allows the identification and enumeration of erythroid (CFUE and BFUE), granulocyte/macrophage (CFUGM, CFUG and CFUM) and multilineage (CFUGEMM) progenitor cells, as cells of different lineages and maturity produce colonies that differ in size, morphology and cellular composition. Each colony is derived from a single progenitor cell or CFU. This session will provide an overview of the CFU assay and enumeration of these hematopoietic progenitor cells. This session will also cover technical tips and standardization tools available to increase confidence and proficiency in colony identification.

Thawing for Success!

Angeline Giftakis, *BA, MLT, CancerCare Manitoba, Winnipeg, MB, Canada*

The success of a transplant is dependent on the quality of the hematopoietic stem/progenitor cells infused. Transplanting products that have been cryopreserved presents a unique set of challenges for the technologist. This

talk will cover the routine bedside thaw and the potential complications that can occur at time of thaw. Routine filtration of products, issues unique to cord blood, and lab-based thaw strategies will be discussed.

SESSION 2: EXERCISE SYMPOSIUM

Monday, April 25, 2016 • 1:45pm – 2:45pm

Capability of Exercise in Hematopoietic Stem Cell Transplantation

Joachim Wiskemann, *PhD, National Center for Tumor Diseases (NCT), Heidelberg University Hospital, Heidelberg, Germany*

Prior, during, and after hematopoietic stem cell transplantation HSCT, patients experience considerable physical and psychosocial distress. In light of the increasing number of successfully treated patients, the need is growing for evidence-based adjuvant therapy options, which are able to reduce treatment-related side effects and enhance the rehabilitation process. Exercise constitutes to be a promising intervention in this setting due to its multidimensional effectiveness. The purpose of the talk is to provide an overview on the current knowledge in the field of exercise and HSCT. Studies suggest that exercise training is an important therapeutic approach in the supportive care for transplant patients. Significant benefits from the exercise interventions have been reported for physical performance, quality of life (QoL), and fatigue status. Several other benefits, such as a more rapid immune recovery or alleviation of treatment-related side effects have been reported in some studies. Recent observational an interventional studies in HSCT patients also suggest a potential effect of physical performance respectively exercise on survival.

SESSION 3A: NEW TOPICS IN CUTTING EDGE RESEARCH

Monday, April 25, 2016 • 3:00pm – 6:00pm

Novel Strategies for Donor Stem Cell Mobilization

Steven Devine, *MD, The Ohio State University Comprehensive Cancer Center, Columbus, OH, USA*

Either bone marrow or G-CSF mobilized peripheral blood stem cells are used as graft sources to reconstitute hematopoiesis following transplantation from a suitable donor. The choice of graft source depends on several factors including donor and recipient age, donor histocompatibility, recipient disease, and other factors. Recent data suggest G-CSF mobilized grafts are associated with a higher risk of chronic graft versus host disease compared with bone marrow. Thus, the optimum graft source is subject to debate and there is interest in studying alternative methods of stem cell mobilization including use of the CXCR4 antagonist plerixafor. In this presentation, Dr Devine will discuss some of these alternative mobilization strategies and early clinical results obtained.

International Multi-center Clinical Research of Microtransplantation: Current and Future

Hui-Sheng Ai, *MD, Affiliated Hospital of the Academy of Military Medical Sciences, Fengtai, Beijing, China*

The outcome of acute myeloid leukemia in elderly acute myeloid leukemia patients is still unsatisfactory with a low complete remission (CR) rate and a poor overall survival due to prolonged pancytopenia and intrinsic resistance of leukemic blasts to therapeutic. Microtransplantation (MST) could improve the outcome of elderly acute myeloid leukemia and without graft-versus-host disease. Microtransplantation shows anti-leukemia effects and has no limited to donors, and the mechanism study is ongoing. Microtransplantation is now used to AML patients, MDS, non-Hodgkin's lymphoma and others. In the future, Microtransplantation offers the benefit of allo-reactivity and hardly any GVHD. Further studies will focus on the mechanism of microtransplantation and multicentre cooperation study. It may become a standard weapon for EAML infuture.

Cutting Edge Research from ASH and ASBMT Meetings

Kirk R. Schultz, *MD, Michael Cuccione Childhood Cancer Research Program, B.C. Children's Hospital, Vancouver, BC, Canada*

Please see the program updates or conference app for more information regarding this session.

SESSION 3B: BMT 101

Monday, April 25, 2016 • 3:00pm – 6:00pm

How Does the Cellular Content of Stem Cell Grafts Influence the Outcome of Transplant?

Andrew Daly, *MD, FRCPC, Alberta Bone Marrow Transplant Program, Calgary, AB, Canada*

The history of Hematopoietic Cell Transplantation is notable for the systematic evaluation of different cell sources to carry out transplants. These cell sources differ in the biological properties of hematopoietic progenitor and immune cells contained in the final graft. These biological properties are exploited clinically, leading to differences in clinical outcomes. This talk will describe the differences between progenitor and immune cells in different stem cell sources and the clinical application of these differences will be explored in clinical examples.

Choosing the Best Haploidentical Donor

Kylie Lepic, *MD, FRCPC, McMaster University, Juravinski Hospital and Cancer Centre Hamilton, ON, Canada*

Haploidentical transplantation is an option for patients who do not have a related or an unrelated blood or marrow donor. Recipients may have several relatives who are possible haploidentical donor options. The optimal choice of donor for haploidentical transplant depends on several factors including the presence of donor specific antibodies, non-inherited maternal antigens and killer-cell immunoglobulin-like receptor typing.

Haploidentical Transplantation: The Post Transplant Cyclophosphamide Experience

Heather Symons, *MD, MHS, The Johns Hopkins Hospital, Baltimore, MD, USA*

In this presentation, Dr. Symons will discuss the brief history of haploBMT and the most recent results using post transplantation cyclophosphamide in the US and around the world. In addition, she will compare haploBMT to HLA matched and cord BMT.

SESSION 4: DEBATE: IF YOU DON'T HAVE A SIBLING DONOR THEN WHAT?

Monday, April 25, 2016 • 6:15pm – 7:15pm

Haploidentical Transplant

Kristjan Paulson, *MD, FRCPC, Health Sciences Centre, CancerCare Manitoba, University of Manitoba, Winnipeg, MB, Canada*

Blood and marrow transplant is a potentially life saving treatment for patients with blood cancers and other blood disorders. Unfortunately, many patients who could otherwise benefit from BMT are not able to undergo transplant due to lack of an available donor. Haploidentical donors are nearly universally available, but historically high rates of graft versus host disease (GVHD) had limited the utilization of haploidentical donors. Newer strategies have effectively limited rates of GVHD, and have resulted in more widespread adoption of haploidentical transplant.

Umbilical-cord Blood

Donna Wall, *MD, University of Manitoba, CancerCare Manitoba, Winnipeg, MB, Canada*

Hematopoietic stem/progenitor cells contained within cord blood are enriched with primitive progenitors that ultimately provide robust life long hematopoiesis from the youngest of donors. The passenger lymphocytes in the graft are accepting of major HLA mismatches between donor and recipient - resulting in low rates of graft-vs-host disease. In fact for the past decade cord blood has been the go-to graft choice in the transplant of small children without HLA matched siblings. This graft source, which has as close to zero donor risk as possible and which will be available on day of transplant, is the HSC source that we should be developing in the long term for transplant eligible patients without a matched sibling donor.

Unrelated Donor Transplant

Andrew Daly, *MD, FRCPC, Alberta Bone Marrow Transplant Program, Calgary, AB, Canada*

Are MUD's dead? Definitely not. Matched or mismatched adult donors are widely available, offer outcomes comparable to those of HLA-matched siblings and have a proven track record. Should we stop doing MUD's because we have alternatives? Should the baby be thrown out with the bathwater? Absolutely not!

SESSION 5: TILL AND MCCULLOCH LECTURESHIP

Tuesday, April 26, 2016 • 9:00am – 10:00am

Hematopoietic Stem Cells: 50 Years Later

Connie Eaves, *PhD, FRSC, Terry Fox Laboratory, BC Cancer Agency, Vancouver, BC, Canada*

The concept of primitive "uncommitted" hematopoietic cells that are responsible for the lifelong production of mature blood cells dates back over a century, but was launched into reality by two important discoveries 50 years ago. The first was the finding by scientists in the UK that transplants of mouse bone marrow cells could regenerate a complete and permanent blood-forming system in otherwise lethally recipients – an observation that became the foundation of the now worldwide clinical use of hematopoietic stem cell transplants. The second, made shortly thereafter in Canada, was the development of a clonal assay that allowed a subset of these cells to be quantified, their growth and differentiation properties characterized, and then later purified. The last 50 years has seen these foundational observations to be extensively refined and applied to normal and leukemic cells from humans as well as mice. This presentation will summarize some of the subsequent highlights, recent insights, and exciting new frontiers and challenging complexities now being investigated.

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SESSION 6A: LONG-TERM FOLLOW-UP

Tuesday, April 26, 2016 • 1:15pm – 3:15pm

Development of a Dedicated Long Term Follow-up Clinic for BMT Survivors

Debbie Hanson, *RNBN, Health Sciences Centre, Children's Hospital, Winnipeg, MB, Canada*

The number of blood and marrow transplant (BMT) survivors is increasing due to expanding indications in malignant and nonmalignant diseases, alternative donor sources and improvements in supportive care. Chronic health conditions are commonly reported in childhood BMT survivors. BMT survivors are reported to have a decreased life expectancy than the general population. Co-morbidities pre-BMT, treatment received pre-transplant, age, conditioning for BMT, and early complications post transplant all impact the risk of developing late effects. Growth and development, endocrinopathies, ophthalmologic, dental, hepatic, gastrointestinal, renal, pulmonary, cardiac, bone health/orthopedic, and reproductive risks are all identified as late effects. It is imperative that BMT survivors have access to long term specialized care for teaching of long term effects, preventative care and monitoring. Establishment of a long term follow-up (LTFU) clinic may improve overall survival rates in BMT survivors. Limited published data is available on the development of a BMT LTFU clinic with successful care models. Several published guidelines are available on the screening recommendations post BMT for children and adults. This presentation will review one approach to developing a dedicated LTFU clinic for BMT survivors. Key members of the LTFU team and their roles in the survivorship care plan are identified. Available resources and specialty services are outlined. The survivor and their family are provided with a treatment summary with long term screening guidelines and healthy living recommendations. The establishment of the CancerCare Manitoba Aftercare Program provides the survivor with lifelong care that is adaptable and evolving with increased knowledge and research in BMT survivorship.

Transitioning from a Pediatric to an Adult Transplant Centre

Donna Wall, *MD, University of Manitoba, CancerCare Manitoba, Winnipeg, MB, Canada*

The transition from the pediatric nest to the adult clinic is one that is often anticipated with much anxiety by patients, parents, and their care teams. This talk will present an analysis of the differences between pediatric and adult program approaches to care and suggest strategies for successful transition.

Care From a Distance

Doug Rizzo, *MD, MS, Medical College of Wisconsin, Milwaukee, WI, USA*

Please see the program updates or conference app for more information regarding this session.

SESSION 6B: NURSING/ALLIED HEALTH – NEW APPROACHES TO TREATMENT

Tuesday, April 26, 2016 • 1:15pm – 3:15pm

Case Review: CMV Disease after Haploidentical Transplant

Kari Kolm, *RN(EC), MN NP, Juravinski Hospital and Cancer Centre, Hamilton, ON, Canada*

A case study of a 58 year old man who developed CMV disease following Haploidentical transplant for acute myeloid leukemia will be used to discuss haploidentical transplantation, the common infections post haploidentical transplant while specifically focusing on CMV. The various treatment approaches which were utilized with this specific patient will be reviewed.

Car T Cell Therapy

Catherine Bollard, *MD, FRACP, FRCPA, Children's National Health System, The George Washington University, School of Medicine and Health Sciences, Washington, DC, USA*

Chimeric antigen receptor (CAR)-modified T cells have been used as both a bridge to transplant and as treatment for relapsed disease or as an adjuvant therapy for high risk patients post-HSCT. CAR-modified T cells as first described by Eshhar et al. can theoretically recognize any target (i.e. not only proteins) in an HLA-independent manner with significantly enhanced potency . These receptors are composed of an extracellular recognition domain (usually derived from the variable regions of an antibody) coupled to intracellular signaling domains that combine both signal 1 (T cell receptor complex) and signal 2 (costimulatory molecule signaling) from the T cells. As discussed during this session, the clinical utility of the CAR approach is highlighted by remarkable clinical responses using CD19- CAR modified T cells especially for the treatment of pediatric patients with acute lymphoblastic leukemia (ALL). However, major concerns exist including significant and potentially life-threatening toxicities associated especially with CAR-CD19 T cell mediated cytokine release syndrome in patients with high disease burden and the risk of tumor antigen loss when targeting a single TAA leading to relapse.

SESSION 6C: LABORATORY TECHNOLOGISTS – QUALITY 101

Tuesday, April 26, 2016 • 1:15pm – 3:15pm

What Does a Quality Program Look Like?

Julie Frketich, *MLT, Vancouver Coastal Health Authority, Vancouver, BC, Canada*

In cellular therapy, the quality program has one deliverable, ensuring that the program can consistently deliver safe, efficacious, and evidence-based patient care.

In order to be effective the quality program should, at a minimum, include a management structure, a documentation system, a system for employing qualified personnel, process and change controls for all activities, a method to ensure traceability of all activities performed, a method to evaluate service suppliers, a method to investigate and resolve adverse events, and a method to continually seek and implement improvement opportunities.

The quality program should continuously and systematically evaluate the adequacy and appropriateness of the program's ability to provide safe, efficacious, and evidence-based patient care by utilizing measurement tools. A regular review of the quality program by staff responsible for affecting change, is necessary to determine whether the elements in the program are relevant and effective, and necessary actions are taken in a timely manner.

The quality program acts as a system of "checks and balances", if you will, for the program, and drives the cellular therapy program in terms of the delivery of quality care. Also to note the quality program cannot be a static process, but a dynamic one that changes with necessity.

Validation of DMSO

Nicole Prokopishyn, *PhD, Calgary Laboratory Services, Foothills Medical Centre, Calgary, AB, Canada*

All autologous blood and marrow transplants and many allogeneic transplants rely on effective cryopreservation of the blood stem/progenitor cells in the transplant product. Cryopreservation allows for safe and effective short and long-term storage of these transplant products. Considerable effort has been employed by laboratories to ensure the optimal processes, supplies, and reagents are utilized for the best recovery of the blood stem/progenitor cells post thaw. There are a variety of different cryopreservation mediums and processes that are very effective at maintaining cell viability, but they all have in come a key component — Dimethyl Sulfoxide (DMSO). So what do you do when the reagent supply dries up and your trusted supply of DMSO is no longer available either temporarily or permanently? How do you select a new source? How do you ensure it gives you the same desired results? How do you ensure the same robust clinical outcomes?

In this presentation we will provide our experience on changing sources of DMSO and assessing the validity of those new sources in our specific cryopreservation process. Information will be presented on the structure of our validation protocol and our findings. As well, the presentation will provide key information on ensuring validation processes meets regulatory compliance and accreditation standards. Finally, we will discuss the importance of combining laboratory and clinical data to ensure the changed process does not impact clinical outcome.

Stability Program

Mike Halpenny, *MLT (CMLTO), Canadian Blood Services, Ottawa, ON, Canada*

Stability Program — defined as the capacity of a drug product to remain within established specifications to maintain its identity, strength, quality, and purity throughout the retest or expiration dating periods[(1)]. Cellular therapy programs are expected to have "some form" of a stability program implemented. No standardized program, or even specific testing program details are offered within the regulations or standards. This presentation will provide an overview of the critical elements within a stability program, including: testing methods, sampling time points, sampling size and justification to methods chosen. Attributes reviewed will include Sterility, Identity, Purity, Potency and Quality. Stability program and the relationship to expiry date will be reviewed.

[1] FDA,"Draft Guidance for Industry, Stability Testing of Drug Substances and Drug Products" (FDA, Rockville,MD, June 1998), glossary.

SESSION 7: ORAL ABSTRACT PRESENTATIONS

Tuesday, April 26, 2016 • 5:00pm – 6:15pm

For more information regarding the oral abstract presentations, please see page 25.

SESSION 8: PEDIATRIC CLINICAL

Wednesday, April 27, 2016 • 9:00am – 10:45am

Haploidentical Transplantation in Pediatric BMT: What is the Current State of the Art and Where is the Field Going?

Heather Symons, *MD, MHS, The Johns Hopkins Hospital, Baltimore, MD, USA*

This presentation will address the most recent data on haploidentical BMT including haplo technologies, regimens, immune reconstitution, and outcomes data. A comparison to other alternative donor transplants will be

highlighted. Haploidentical BMT for malignant and nonmalignant disorders will be discussed including current and future strategies.

Haploidentical Transplant in Non-Malignant Pediatric Diseases

Geoff Cuvelier, *MD, FRCPC, CancerCare Manitoba, University of Manitoba, Winnipeg, MB, Canada*

The last decade has seen a transformation in the indications for pediatric allogeneic hematopoietic stem cell transplant, with a movement increasingly away from malignant disease and more towards the cure of severe non-malignant conditions, including hemoglobinopathies / hematologic disorders and primary immunodeficiency / immunodysregulatory conditions. With recent successes in the use of haploidentical transplant for malignant disease, primarily in adults but also in children, the idea that haploidentical transplant might have an increasing role to play in non-malignant disease is enticing. This presentation will review the history of haploidentical transplant for non-malignant disease and provide a look into the future of this expanding graft source.

Lung Complications After BMT: New Advances in Diagnosis and Treatment

Kenneth Cooke, *MD, The Sidney Kimmel Comprehensive Cancer Center, The Johns Hopkins University School of Medicine, Baltimore, MD, USA*

At the BMT CTN 2014 "State of the Science Symposium," the regimen-related toxicity committee found that pulmonary dysfunction remains one of the greatest challenges to the optimization of care following BMT. Almost half of the pneumonias observed after BMT are non infectious in origin. When occurring early in the post-BMT period, non-infectious lung disease is defined as idiopathic pneumonia syndrome (IPS). Months and years later, non-infectious lung injury can be characterized by chronic, progressive fibrosis that is often believed to be a manifestation of chronic GVHD. My translational research program has had a long-standing interest in identifying mechanisms of inflammation that contribute to endothelial cell (EC) apoptosis, activation and leak that characterizes the IPS, and to dysregulated repair and collagen deposition during the development of fibrotic lung injury at later time points. Our group and others have demonstrated that both cellular and soluble effectors contribute to the development of IPS and GVHD in experimental mouse models. Specifically we have demonstrated that TNFα functions as both an effector and facilitator of lung inflammation during experimental IPS, and that lung damage and dysfunction can be mitigated with TNFα neutralization. Moreover, laboratory data suggest that TNFα may be a common thread between acute and chronic pulmonary inflammation. These observations led to the development of clinical trials, wherein neutralization of TNFα has provided a therapeutic benefit to BMT recipients with severe IPS and a subset of patients with chronic, fibrotic pulmonary dysfunction.

The proposed lecture will define syndromes associated with acute and chronic pulmonary dysfunction after BMT and discuss inflammatory mechanisms responsible for pulmonary injury in each setting. The presentation will illustrate how laboratory insights were translated back to the bedside in the form of novel clinical trials to treat lung inflammation after BMT and ultimately Identify challenges associated with the conduct of translational research.

SESSION 9: HANS MESSNER LECTURESHIP

Wednesday, April 27, 2016 • 11:00am – 12:00pm

Conditioning in the Wild West: History of Transplants in Calgary

James Russell, *MA, MB. BChir, FRCP, Tom Baker Cancer Centre, Calgary, AB, Canada*

The Calgary program started doing autotransplants in 1980 using a relatively primitive regimen of melphalan and non-cryopreserved bone marrow. For the first allotransplants, starting in 1983, we used the protocol employed in Toronto with cyclophosphamide and single-fraction TBI at 500cGy, later moving to BuCy and VP-16/TBI. Routine protective isolation was abandoned for all transplants in 1988. In the early 1990s we investigated the feasibility of collecting mobilized blood cells from related donors. These were employed first for second transplants before moving to routine application for first transplants. Following preliminary data from Europe, ATG was used from 1995 as GVHD prophylaxis for unrelated donor transplants. The results were sufficiently encouraging that ATG has been used for all allogeneic SCT since 1999. The benefits appeared to include improved incidence of and mortality from GVHD in general and improved quality of life of patients who develop cGVHD while maintaining some graft-vs-malignancy effect. The incidence of cGVHD was no different between recipients of blood or marrow from unrelated donors. In vitro studies have demonstrated relationships between exposure to the components of ATG, immune reconstitution and some clinical outcomes. When IV busulfan (Bu) became available in 1999 we developed a myeloablative regimen of daily IV Bu with Fludarabine to be used in all allotransplants for hematologic malignancy. Thus no non-myeloablative or reduced-intensity regimens were used and patients were treated up to age 65. 400cGy TBI was initially added for ALL patients and subsequently for those with AML in whom it appeared to decrease relapse. Pharmacokinetic studies of IV Bu allowed the identification of threshold exposures for excessive non-relapse mortality and subsequently of optimal Bu exposure depending on whether TBI was given. It seems that the diagnosis is one factor affecting clearance of Bu with ALL patients having the lowest clearance, thus the potential for higher exposures if targeting is not used.

SESSION 10A: CANADIAN BLOOD AND MARROW TRANSPLANT GROUP (CBMTG) AND INTERNATIONAL SOCIETY FOR CELLULAR THERAPY (ISCT) SESSION

Wednesday, April 27, 2016 • 2:00pm – 4:00pm

CD19-CAR T Cells: Their Role in 2016

Catherine Bollard, *MD, FRACP, FRCPA, Children's National Health System, The George Washington University, School of Medicine and Health Sciences, Washington, DC, USA*

Chimeric antigen receptor (CAR)-modified T cells have been used as both a bridge to transplant and as treatment for relapsed disease or as an adjuvant therapy for high risk patients post-HSCT. CAR-modified T cells as first described by Eshhar et al. can theoretically recognize any target (i.e. not only proteins) in an HLA-independent manner with significantly enhanced potency. These receptors are composed of an extracellular recognition domain (usually derived from the variable regions of an antibody) coupled to intracellular signaling domains that combine both signal 1 (T cell receptor complex) and signal 2 (costimulatory molecule signaling) from the T cells. As discussed during this session, the clinical utility of the CAR approach is highlighted by remarkable clinical responses using CD19- CAR modified T cells especially for the treatment of pediatric patients with acute lymphoblastic leukemia (ALL). However, major concerns exist including significant and potentially life-threatening toxicities associated especially with CAR-CD19 T cell mediated cytokine release syndrome in patients with high disease burden and the risk of tumor antigen loss when targeting a single TAA leading to relapse.

Oncolytic Viruses as an Alternative Approach for Treatment of Leukemia and Lymphoma

John Bell, *PhD, The Ottawa Hospital, University of Ottawa, Ottawa, ON, Canada*

The development of Oncolytic Viruses (Ovs) for the treatment of cancer has been under development in earnest for the last two decades and recently an engineered herpes virus, called Imlygic, has been approved for the treatment of advanced melanoma. Our group has focussed on the development of OVs based on the pox and rhabdovirus families. We have found that these viruses attack tumours in multiple different ways including direct tumour lysis, anti-vascular activity and perhaps most important, stimulation of anti-tumour immunity. Examples of each of these types of activity from our experience in the laboratory and in the clinic will be presented.

Anti-Viral Adoptive Immunotherapy; Moving to the Front Seat?

Jean-Sebastien Delisle, *MD, PhD, University of Montreal, Montreal, QC, Canada*

Viral reactivations are common following hematopoietic cell transplantation, carrying a high clinical and financial burden. With the development of potent immunosuppression to prevent GVHD and increasing use of alternative cord blood or haploidentical donors, immunosurveillance to latent viruses and the capacity to mount immune reaction to primo-infection is increasingly compromised in our patient population. Over the last two decades, several reports have shown that adoptive T-cell immunotherapy targeting viral antigens after ex vivo manipulations is highly effective across several indications post-transplantation. With such solid proofs of concept and constantly refined manufacturing protocols, can adoptive immunotherapy find its way into mainstream post-transplantation care? And for what role? Should it be used as a heroic measure, or as part of routine care to assist immunoreconstitution? Can targeting viral antigens through adoptive immunotherapy be further expanded to treat virus-associated cancers, or other cancers? What are the scientific, logistical and financial challenges in the field that need to be addressed to fully harness the promises of theses cell therapies? The presentation will focus on these essential questions by summarizing the available data and by presenting current trends in the field.

SESSION 10B: NURSING/ALLIED HEALTH – POST-TRANSPLANT CARE

Wednesday, April 27, 2016 • 2:00pm – 4:00pm

Graft-Versus-Host Disease: An Overview

Fotios (Frank) Michelis, *MD, PhD, Princess Margaret Cancer Centre, Toronto, ON, Canada*

Graft versus host disease (GVHD) constitutes a major cause of morbidity and mortality post allogeneic hematopoietic cell transplantation. This phenomenon occurs due to the presence of immunologically competent cells in the graft which launch an immune response targeted towards the host. GVHD can present as acute or chronic, depending on timing of presentation, however these clinical entities may overlap. The frequency and severity of GVHD correlates with a variety of factors, such as the type of donor and the source of hematopoietic cells. GVHD prophylaxis is an essential component of allogeneic transplantation, however for hematological malignancies the balance must be maintained between prevention of GVHD and prevention of disease relapse.

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Multidisciplinary Cardiovascular Support in Stem Cell Transplantation: Are We Doing Enough?

Edith Pituskin, *PhD, University of Alberta, Edmonton, AB, Canada*

It is well established that before, during and after high-dose chemotherapy / hematopoietic stem cell transplantation (HSCT), patients are at high risk of multiple cardiovascular sequelae. These survivors therefore represent a group with complex and challenging supportive care needs, best met by a team of multidisciplinary providers.

SESSION 10C: LABORATORY TECHNOLOGISTS – CORD BLOOD UPDATE

Wednesday, April 27, 2016 • 2:00pm – 4:00pm

Canadian Blood Services Cord Blood Bank Update

Tanya Petraszko, *MD, FRCPC, CBS Cord Blood Bank, Vancouver, BC, Canada*

Canadian Blood Services Cord Blood Bank began operations in September 2013 with full national operations commencing January 2015. An update of cord units collected and stored in inventory will be provided with respect to number, quality and ethnic diversity. An update on accessing units from the bank will be provided.

Validation of Thawing Media Without Dextran for Cord Blood

Carl Simard, *MSc, Héma-Québec, Quebec, QC, Canada*

There is an ongoing worldwide shortage of clinical grade Dextran 40, which is needed for the dilution and washing of thawed cord blood units. As a cord blood bank, we have to validate a protocol for the thawing of cord blood units. Since Dextran 40 isn't available, we had to evaluate differentthawing solutions.. After the first series of experiments, Plasmalyte-A supplemented with 5% HSA was chosen as the most suitable replacement for Dextran 40 and was elected to undergo a full validation. This solution was validated based on recovery, viability and potency of the unit after dilution or washing. Based on our results, the Plasmalyte-A HSA solution should be regarded as a safe and efficient replacement for the dextran-based solution.

Cord Blood Stem Cell Expansion: From Translation to GMP

Martin Giroux, *PhD, Hôpital Maisonneuve Rosemont, Montreal, QC, Canada*

Cord blood transplantation is widely used in the pediatric setting but the low number of stem cells contained in cords is a limitation in adult transplantation. Using proprietary small molecules and sophisticated culture systems, cord blood stem cells can be expanded in vitro to obtain the quantity required for grafting even heavy recipients, or preparing multiple doses.

Translation of such research discoveries can be a real logistical and technical challenge and extremely time-consuming if not carefully planned. Interactions with Health Canada need to be frequent and many teams need to be coordinated to advance the project into the clinic.

The clinical trial with cord blood expansion system using UM171 has been accepted by Health Canada at the end of 2015. This project will be used as an example to provide the walkthrough from basic research, translation toward clinical trial and GMP setup.

SESSION 10D: PHARMACISTS

Wednesday, April 27, 2016 • 2:00pm – 4:00pm

Defibrotide from the Canadian Perspective

Jason Tan, *BSc (Pharm), ACPR, Faculty of Pharmaceutical Sciences, The University of British Columbia, Vancouver, BC, Canada*

Sinusoidal obstruction syndrome (SOS), previously known as veno-occlusive disease, is a potentially fatal form of hepatic injury that occurs as a complication of chemotherapy given for bone marrow transplant. Defibrotide is a relatively novel drug used for the treatment and prevention of SOS. During this presentation, an overview of SOS will be provided, including its pathophysiology, etiology, risk factors, signs and symptoms, diagnostic criteria, and complications. Furthermore, the use of defibrotide for SOS will be reviewed. Areas of focus will include debrotide's pertinent pharmacokinetic/pharmacodynamic properties, monitoring parameters, evidence for use in SOS, and current role in Canada.

Going Viral: CMV and Stem Cell Transplant

Alissa Wright, *MD, MSc, FRCPC, Transplant Infectious Disease Program, Division of Infectious Disease, Vancouver, BC, Canada*

Cytomegalovirus (CMV) is one of the common viral infections affecting the stem cell transplant population. Despite improvements in medical care for other complications, CMV is still associated with significant morbidity and mortality in this patient population. Some of this is due to shifts in the population undergoing transplantation resulting in alterations in the presentation or course of disease. However, there are a number of recent advances in diagnostics and therapeutics which are beginning to change the way CMV is managed. CMV PCR has made it possible to screen and treat patients for reactivation prior to the development of end-organ disease. In the future, we may have methods to determine whether the immune system of an individual patient will control the infection in the

absence of therapy. For patients who do require therapy, several new drugs are now entering late stage clinical trials for prevention or treatment of CMV. These medications aim to be effective while avoiding the toxicities of current conventional therapies. Immunotherapy is also emerging as a feasible therapeutic strategy. How these newer treatments will best be utilized in this patient population is yet to be determined.

The Skinny on Obesity and Drug Dosing in Hematopoietic Cell Transplantation

Christopher Bredeson, *MD, MSc, The Ottawa Hospital, Ottawa, ON, Canada*

Along with increasing age, increasing patient weight is one of the main clinical characteristics that has changed over the past 15 years in hematopoietic cell transplantation. While patient weight has generally increased, it is the growing number of obese patients (BMI >30 kg/m2) that have caused the greatest concern for transplant teams. While there are many medical issues associated with obesity, to date, data does not support an overall negative effect on transplant outcomes in this patient population. One area of particular concern however, is drug dosing in these patients, particularly with regards to dosing the pre-transplant conditioning regimen. Recent reviews in the literature have not provided meaningful guidance on this issue. As a result, practice varies widely between programmes and even within programmes. This presentation will review the above issues using in part case discussions. A recommended approach to addressing this issue within our programmes and how to prospectively evaluate our choice will be discussed. It will be interesting to see if we can reach consensus on an optimal approach! Is there a research question the CBMTG could answer?

Oral Abstract Index

Tuesday, April 26, 2016 • 5:00pm – 6:15pm • *Salon E/F*

#	Title	Topic	Presenting Author
01	Replacement of Pentaspan with Hetastarch for Cryopreservation of Hematopoietic Progenitor Cells, Apheresis	Clinical: Laboratory/Quality	**Mike Halpenny,** *MLT (CMLTO)*
02	Carmustine-Free Conditioning Regimens Offer Comparable Efficacy to BEAM: The First Report of the Canadian Blood and Marrow Transplant Group Registry	Clinical: Clinical Trials/ Observations	**Kristjan Paulson,** *MD, FRCPC*
03	Implementation of a Physician-Prescribed Exercise Program as Standard of Care in Allogeneic Stem Cell Transplant (alloSCT) Patients in British Columbia (BC): A Pilot Study	Clinical: Pharmacy/Nursing/ Other transplant support	**Pamela Plantinga,** *BSc*
04	The Onset of Chronic Graft-Versus-Host Disease is Associated With a Lower Percentage of an Activated B Cell Population that Correlates with Autoimmunity	Research: Basic/Translational	**Jacob Rozmus,** *MD*
05	Effective Prevention of Acute Graft-versus-Host Disease in Unrelated Donor Allogeneic Hematopoietic Cell Transplants by Using a Combination of Anti-thymocyte Globulin, Post-transplant Cyclophosphamide and Cyclosporine.	Clinical: Clinical Trials/ Observations	**Uday Deotare,** *MD*

01. REPLACEMENT OF PENTASPAN WITH HETASTARCH FOR CRYOPRESERVATION OF HEMATOPOIETIC PROGENITOR CELLS, APHERESIS

Elmoazzen H[1], Giulivi A[1], Martin L[1], Perron D[1], Bredeson C[2], Halpenny M[1], Yang L[1], McGann L[1], Birch P[1], Acker JP[1]

[1]Canadian Blood Services, Ottawa, Ontario, [2]The Ottawa Hospital, Ottawa, Ontario

Background: Canadian Blood Services Stem Cell Manufacturing program in Ottawa provides services to three clinical transplant programs; The Ottawa Hospital, Sudbury Regional Hospital and the Kingston General Hospital. A critical aspect of manufacturing is the cryopreservation process. The Ottawa program uses a "dump" freeze method consisting of product placement directly into liquid nitrogen vapour after addition of a cryopreservation solution containing DMSO (5% final concentration) and HES (Hydroxyethyl Starch). Pentaspan (HES source) a critical component of the cryoprotectant formulation was discontinued by the commercial vendor. This required that an alternative cryoprotectant formulation be sourced and validated for use by the Ottawa program that would minimize the risk to patient safety without compromising engraftment quality.

Study Design and Methods: The validation study consisted of 3 phases; first - evaluation of the efficacy of four different cryoprotectant formulations (including the Hetastarch formulation of 5% DMSO and 1.7% HES), second - evaluation of full scale production and crypreservation and third - a pilot study / concurrent validation for clinical transplant.

Phase I – Samples from four different cryoprotectant formulations were tested for total nucleated cell count (TNC), CD34+, viability and CFU at three points during manufacturing (fresh, post processing and post thaw).

Phase II – Mock HPC, Apheresis units were used for a side-by-side comparison of freezing curves for the control Pentaspan and replacement Hetastarch formulations. Freezing curves were assessed with specific attention to the nucleation temperature, cooling rates and latent heat generation.

Phase III – Five clinical transplants were performed at The Ottawa Hospital with HPC, Apheresis products cryopreserved using the recommended replacement for Pentaspan (Hetastarch).

Results: Phase I – Results indicate that aliquots of HPC, Apheresis cryopreserved in final concentration of 5% DMSO and 1.7% HES (Hetastarch) did not behave significantly different than cells cryopreserved in the control (Pentaspan) in terms of cell recovery, viability or cell proliferation assay (CFU).

Phase II – The majority of freezing profiles displayed typical or expected bulk freezing profiles for both formulations.

Phase III – Transplants performed resulted in a mean engraftment time of 12.6 days for ANC500 with no adverse patient reactions observed. Engraftment times using the new Hetastarch formula were compared to the previous Pentaspan engraftment times with no significant difference from the study transplants.

Since the formulation replacement, analysis of transplant data pre and post Pentaspan replacement was 11.5 days (n=83) vs 11.8 days (n=82) for ANC500.

Summary/Conclusion: A change in the formulation of a cryoprotectant solution used in the cryopreservation of HPC, Apheresis products represents a major change that could have a significant impact on quality. In addition, maintaining the current 5% DMSO final concentration was critical as post thaw washing is not performed at the clinical site, history demonstrating a very low toxicity rate with the existing formulation/process. This study demonstrated the acceptability of the Hetastarch formulation using 5%

DMSO and 1.7% Hetastarch to replace Pentaspan in the cryoprotectant formulation used for cryopreservation of HPC, Apheresis products.

02. CARMUSTINE-FREE CONDITIONING REGIMENS OFFER COMPARABLE EFFICACY TO BEAM: THE FIRST REPORT OF THE CANADIAN BLOOD AND MARROW TRANSPLANT GROUP REGISTRY

Paulson K[1], Kuruvilla J[2], Bredeson C[3], Couture F[4], Cantin G[5], Crump M[2], Daly A[6], Foley R, Gerrie A[8], Hasegawa W[9], Lachance S[10], Seftel MD[1], Popradi G[11], Wall DA[1], Stewart D[6]

[1]University of Manitoba/CancerCare Manitoba, [2]University of Toronto/Princess Margaret Hospital, [3]University of Ottawa/The Ottawa hospital, [4]l'Université Laval/L'Hôtel-Dieu de Québec, [5]CHA-Hopital Enfant-Jesus, [6]University of Calgary/ Tom Baker Cancer Centre, [7]McMaster University/Juravinski Hospital, [8]University of British Columbia/BC Cancer Agency, [9]Dalhousie University, [10]Hôpital Maisonneuve-Rosemont/Université de Montréal, [11]McGill University

Objective/Rationale: Autologous hematopoietic cell transplant (autoHCT) is the standard of care for relapsed or refractory diffuse large B-cell lymphoma (DLBCL) and Hodgkin Lymphoma (HL). While there is no defined standard conditioning regimen, BEAM (carmustine, etoposide, cytarabine, melphalan) is widely used. In Canada, the price of carmustine has increased 5000% over the past 5 years. Single agent melphalan (200 mg/m2) (Mel200) and a combination of melphalan (180 mg/m2) and etoposide (60 mg/kg) (Mel/Etop) are alternatives commonly used in Canada. Using data from the Canadian Blood and Marrow Transplant Group Registry (CBMTG-R), we sought to understand how these alternatives compared to BEAM in terms of efficacy and safety.

Methodology: The CBMTG-R contains data on consecutive patients undergoing autologous and allogeneic HCT in Canadian HCT centres. Patients who had a first peripheral blood autoHCT between 01/2003 and 01/2014 for either relapsed HL or relapsed DLBCL were identified (1299 patients). Conditioning regimens other than BEAM, Mel200, or Mel/Etop were rarely used, and were excluded (302 patients). Mel200 was used after intensive diCEP reinduction for HL at one centre. Mel200 was uncommonly used for DLBCL, and these patients were excluded, resulting in 788 patients (444 with DLBCL and 344 with HL). Kaplan-Meier analysis was used for univariable analysis, and Cox regression models were used for multivariable analysis. Separate models were constructed for DLBCL and HL, with the primary endpoint of overall survival (OS) for DLBCL, and progression free survival (PFS) for HL. Characteristics reviewed were age, transplant centre, gender, performance status, transplant year, disease status at the time of transplant, and chemosensitivity.

Results: Median follow-up from date of transplant for surviving patients was 1.9 years. For DLBCL, there was no significant difference in any characteristics between BEAM (n=299) and Mel/Etop (n=145). In both univariable and multivariable analysis there was no difference in OS or PFS between groups (Figure 1 and Table 1). There was no difference in non-relapse mortality (NRM) at 3 years (4.9% for BEAM, 5.4% in Mel/Etop).

For the patients with HL, there was no difference in any covariates between BEAM (n=160), Mel/Etop (n=130), and Mel200 (n=54). There was also no difference in OS or PFS between groups (Figures 2/3). While disease status at the time of HCT and chemosensitivity were predictive of PFS and OS in HL in univariable models, in multivariable models with conditioning regimen included, they were no longer statistically significant. NRM was low, and comparable in all three groups at 3 years (1.3% in BEAM, 0.8% in Mel/ Etop, and 1.9% in Mel200).

Conclusions: In both HL and DLBCL, there was no difference in OS, PFS, or NRM following autoHCT using BEAM or non-BEAM regimens. These regimens appear to be safe and effective alternatives to BEAM.

Figure 1: Overall Survival, Diffuse Large B-Cell Lymphoma

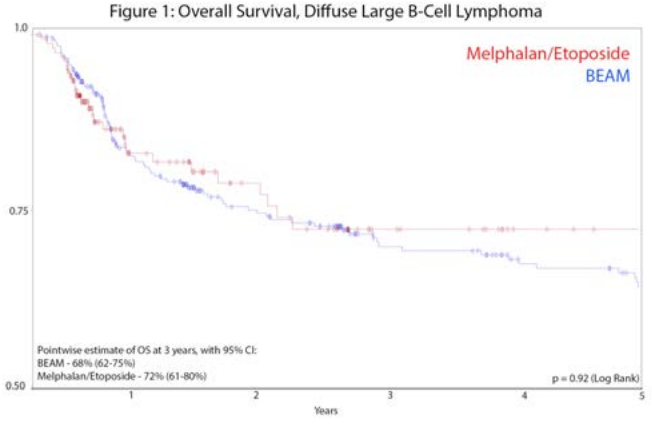

Figure 2: Overall Survival, Hodgkin Lymphoma

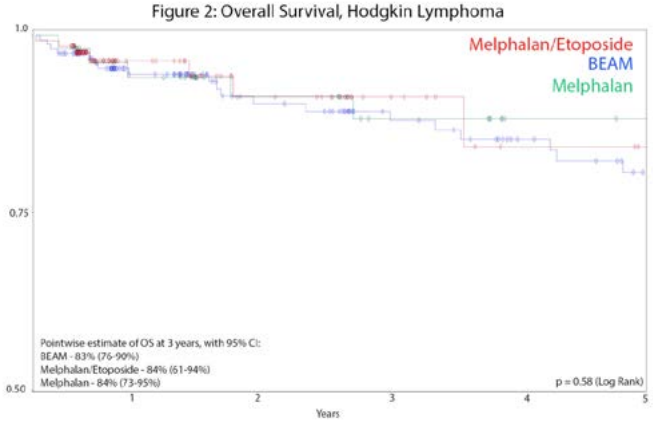

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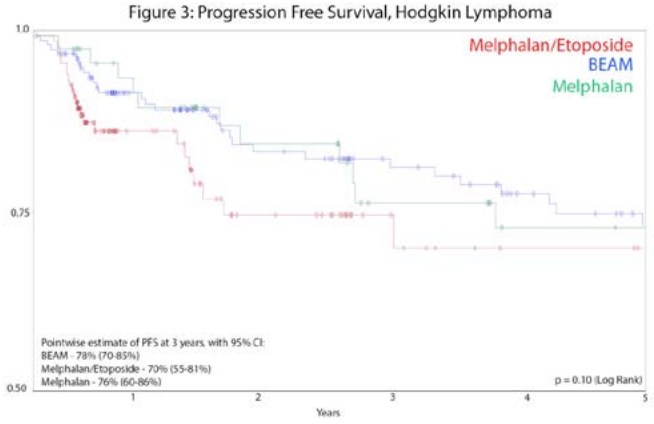
Figure 3: Progression Free Survival, Hodgkin Lymphoma



03. IMPLEMENTATION OF A PHYSICIAN-PRESCRIBED EXERCISE PROGRAM AS STANDARD OF CARE IN ALLOGENEIC STEM CELL TRANSPLANT (ALLOSCT) PATIENTS IN BRITISH COLUMBIA (BC): A PILOT STUDY.

Pamela Plantinga[1,7], Stanley Hung MSc[2], Kei Nishikawa PT[1,2,3], Kristin L. Campbell PT PhD[2], Jennifer Kadgien PT[3], Valerie Burke[1], David Kendler MD, FRCPC[4], Don C. McKenzie MD, PhD[5], Raewyn Broady MBChB, FRACP[1,6], Alina S. Gerrie MD MPH FRCPC[1,6]

[1]Leukemia/ Bone Marrow Transplant Program of BC, BC Cancer Agency; [2]Department of Physical Therapy , University of BC; [3]Department of Physiotherapy, Vancouver General Hospital; [4]Division of Endocrinology, University of BC; [5]School of Kinesiology, University of BC; [6]Division of Hematology, University of BC; [7] Department of Biomedical Physiology and Kinesiology, Simon Fraser University

Objective: To determine the feasibility of delivering a physician-referred, supervised exercise program post-alloSCT. We hypothesize that this intervention will result in significant improvements in quality of life (QoL), physical functioning, body composition, immune recovery, and therapy-related toxicity.

Rationale: There is compelling evidence that physical activity is a modifiable lifestyle factor that positively influences QoL, muscle mass, physical functioning, and other health-related outcomes in cancer survivors. Currently, Canadian alloSCT patients have little access to exercise programs that address the unique barriers within this population, particularly during the early post-transplant where the need is greatest.

Methodology: In August 2015, we initiated a prospective, pre-post test, single-arm study to evaluate the feasibility of a 12-week exercise program, partially-supervised by a physiotherapist, consisting of 3 progressive endurance (stationary bike, walking) and 2 resistance (resistance bands) training sessions/week, from hospital discharge until Day-100 post-alloSCT, including 1 supervised and 2 home-based sessions. Outcome measures include QoL, aerobic fitness, muscle strength, DXA body composition (mineral, lean, fat), pulmonary function, and immune reconstitution, evaluated pre-alloSCT, at discharge, Day-60, and Day-100. Feasibility was defined as the ability to recruit 20 participants in 4 months, ≥70% retention to Day-100, and ≥70% adherence to the exercise prescription. Interim results are presented here.

Results: As of January 2016, 48 participants have been assessed for eligibility, of which 29 (60%) entered the study: 16 males, 13 females, median age 47 years. Indications for alloSCT include: acute leukemia n=15 (myeloid n=8, lymphoblastic n=5, undifferentiated n=2), NHL n=5, CML n=3, MDS n=3, myelofibrosis n=2, ATLL n=1. Transplants characteristics are: related n=5; unrelated n=24; peripheral blood n=27; double-cord n=2; myeloablative n=23; reduced-intensity n=6. Of the 29 participants, 24 (83%) remain enrolled. Reasons for withdrawal include changed mind (n=2), relocation (n=1), not discharged by Day-100 (n=1), and deceased (n=1). To date, 15 participants have completed the post-SCT discharge assessment, 14 have entered the exercise program, 6 have completed Day-60, and 5 Day-100 assessments (Figure 1, CONSORT diagram). Of the 14 participants who entered the exercise program, adherence is 95% and 97% for the supervised and unsupervised sessions, respectively. Two participants had cardiac complications requiring cessation of exercise. The majority of participants had decreased muscle strength (30-second chair stand, 11.8 to 11.6 stands) and aerobic capacity (6-min walk test, 516m to 480m) post-discharge compared to pre-BMT. In the 5 patients who completed Day-100 assessments, these measures increased to an average of 16.8 stands and 606m, respectively. Data collection is ongoing for Day-60 and Day-100 assessments and will be updated.

Conclusion: Interim results of this pilot study demonstrate the feasibility of a partially-supervised exercise program in this post-alloSCT population deemed by achieving the targeted recruitment rate, >70% adherence to both the supervised and unsupervised exercise programs, and >70% retention thus far. Post-transplant cardiac issues have limited exercise in 2 participants (7%). This program represents an innovative clinical intervention for health-care providers to address an unmet need for alloSCT programs and should be further evaluated in a larger clinical trial with a multidisciplinary approach, including involvement of a cardiac specialist.

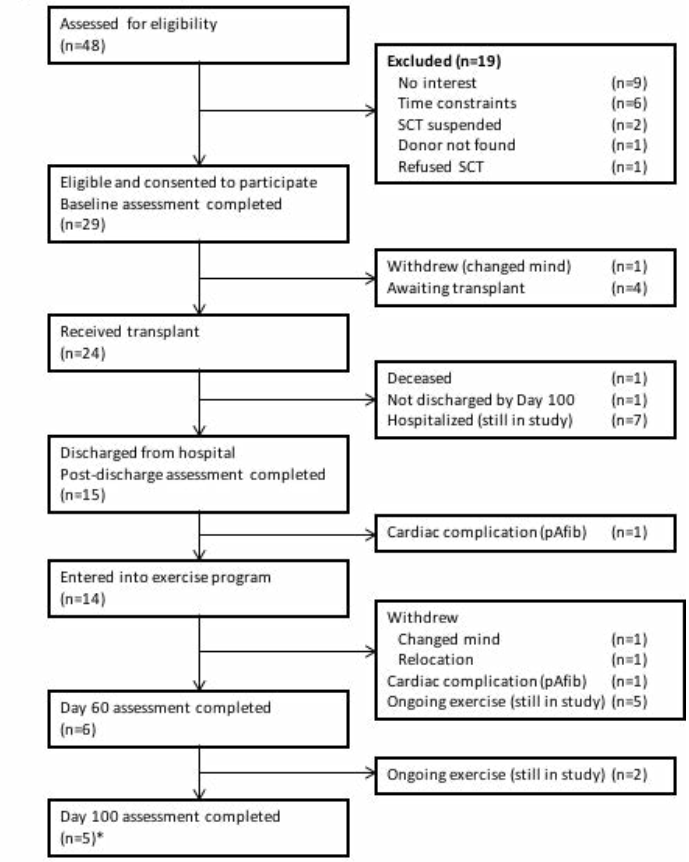
04. THE ONSET OF CHRONIC GRAFT-VERSUS-HOST DISEASE IS ASSOCIATED WITH A LOWER PERCENTAGE OF AN ACTIVATED B CELL POPULATION THAT CORRELATES WITH AUTOIMMUNITY

Jacob Rozmus, Amina Kariminia, Kirk R. Schultz

Michael Cuccione Childhood Cancer Research Program, Child & Family Research Institute, BC Children's Hospital, Vancouver, BC

Background: Chronic graft-versus-host disease (cGVHD) is a leading cause of morbidity and mortality after allogeneic hematopoietic stem cell transplantation. Chronic activation of the immune system, autoimmunity, release of inflammatory cytokines and chemokines and alterations in immune

Figure 1. CONSORT Diagram



*Includes 1 participant who ceased exercise due to atrial fibrillation, however was cleared to conduct the Day-100 assessment.

cell populations are established elements of the complex pathophysiology of cGVHD. Activated donor B cell populations have been found to play an important role in the pathogenesis of cGVHD, which our group has shown to be highly responsive to TLR9. Little is known about which activated B cell subpopulations are most important in cGVHD. A unique population of TLR9 responsive activated B cells characterized by very low expression of CD21 (CD21lo B cells) have previously been found in other diseases associated with chronic immune activation and autoimmunity such as systemic lupus erythematosus, common variable immunodeficiency, rheumatoid arthritis and HIV viremia. This activated B cell population has higher expression of CD19, CD22 and IgM; lower expression of CD21, CD24, CD38 and BAFF-R; no CD23 and CD27, In addition, its activation status is indicated by high levels of CD69, CD86 and CD95. This B cell population preferentially homes to inflamed peripheral tissues due to increased surface expression of inflammatory type chemokine receptors such as CXCR3. We hypothesized that this CD21lo subpopulation is the TLR9 responsive B cell population we had previously observed in cGVHD.

Methods: We performed comprehensive flow cytometric analysis of B cell subpopulations in the peripheral blood of healthy controls (no HSCT; N=8), patients' post-HSCT with onset of cGVHD (N=35) compared to patients post-HSCT (N=35) who never experienced cGVHD.

Results: The onset of cGVHD post-HSCT was associated with a significantly lower percentage of CD21 lo B cells in the total lymphocyte population compared to patients without cGVHD post-HSCT (1.24 ± 0.28% vs. 4.02 ± 0.99% (mean ± SEM); $p = 0.003$) with an area under the receiver operating curve of 0.71 (95% CI, 0.59-0.83; $p = 0.003$). Both categories of patients' post-HSCT had a significantly higher level of CD21 lo B cells then healthy controls (0.24 ± 0.07% (mean ± SEM)). This population of CD21 lo B cells expresses higher levels of CD19, IgM and lower levels of CD21, CD24, CD38 and CD27 and is CD10 negative similar to the previously described CD21lo B cell population.

Discussion: This study supports a possible role for activated CD21lo B cells in the pathophysiology of cGVHD. The lower percentages of peripheral CD21 lo B cells in cGVHD compared to patients' post-HSCT without cGVHD may reflect an increased recruitment into inflamed tissues. Future studies evaluating the functional characteristics of this B cell subpopulation are needed.

05. EFFECTIVE PREVENTION OF ACUTE GRAFT-VERSUS-HOST DISEASE IN UNRELATED DONOR ALLOGENEIC HEMATOPOIETIC CELL TRANSPLANTS BY USING A COMBINATION OF ANTI-THYMOCYTE GLOBULIN, POST-TRANSPLANT CYCLOPHOSPHAMIDE AND CYCLOSPORINE

Uday Deotare, David Loach, Asma Azeem, Fotios V. Michelis, Dennis (Dong-Hwan) Kim, Jeffrey H. Lipton, Hans A. Messner and Auro Viswabandya

Allogeneic Blood and Marrow Transplant Program, Department of Medical Oncology and Hematology, Princess Margaret Cancer Centre, University Health Network, Toronto.

Background: Acute Graft-Versus-Host Disease (aGVHD) is an unavoidable complication of Allogeneic Hematopoietic cell transplants (Allo-HCT). Though it has a beneficial effect of Graft-Versus-Leukemia effect (GVL) in hematological malignancies aGVHD, especially Grade III-IV, can be lethal with increased morbidity and mortality and can occur in upto 40-50% of Allo-HCT. GVHD prophylaxis has been used for control of GVHD, with use of calcineurin inhibitors, anti-metabolites and anti T cell antibodies. Use of Post-transplant Cyclophosphamide (PTCy) has recently changed the scenario in haplo-identical transplants. Here we present a small cohort data using a combination of all these agents to effectively reduce aGVHD in hematological malignancies..

Methods: A total of 19 patients with hematological malignancies, who had an unrelated donor underwent allo-HCT at our center from 1 Oct 2015 to 31 Jan 2016. The characteristics of the patients are summarized

in Table 1. The conditioning regimen was either myeloablative (FBT400) or Reduced Intensity (FBT200) in patients with age < / =60 and >60 years, respectively. Peripheral blood was the stem cell source in all. Growth factor was used from day +7 onwards for 4 patients. Special emphasis was given to incidence of acute GVHD, infections, regimen related toxicities and engraftment.

Results: Out of total of 19 patients, aGVHD was seen in only 3 (15%) patients, two of which had skin involvement (Grade II) and one suspected liver involvement (Grade III), all responded rapidly to steroids. However, we did had increased toxicities such as sinusoidal obstruction syndrome (31%), Bacterial infections (58%) and Viral infections (26%). The overall survival of the entire cohort was 85% at a median duration of 60 days. On a subanalysis, the RIC regimen was found to be superior with less aGVHD, shorter hospitalization time, less bacterial and viral infections. Early complications such as Sinusoidal obstruction syndrome and organ damage were also less, with improved survival (100%) in the RIC arm.

Conclusion: Combination of ATG-PTCy-CsA is an effective strategy to reduce aGVHD in unrelated donor transplants, albiet with moderate increase in toxicities. RIC with this combination was associated with less organ damage and superior survival. However, a long term follow up is needed to assess the incidence of relapse and cGVHD.

Table 1: Patient Characteristics and outcomes

	Entire cohort	FBT400	FBT200
No of patients	19	11	8
Median age, years (range)	57 (19-67)	50 (19-60)	63 (26-67)
Disease characteristics			
AML CR1	5	2	3
AML CR2	4	3	1
ALL CR2	3	2	1
APL CR3	1	1	0
MDS	4	1	3
CMML	1	1	0
CML-BP	1	1	0
HR HLA matching			
10/10	16	10	6
9/10	3	1	2
Average days in hospital (range)	29 (15-59)	31 (19-74)	23 (9-52)
Median days for ANC Engraftment (range)	19 (13-31)	19 (13-31)	19 (13-28)
Not evaluable	3	2	1
Median days for Plt Engraftment (range)	21 (11-55)	20 (11-55)	21(13-45)
Not evaluable	4	3	1
Documented Infections			
Bacterial	11	6	5
Viral	5	5	0
CMV reactivation	9	4	5
Acute GVHD (all grades)	3	2	1
Sinusoidal Obstruction Syndrome	6	5	1
Mild	4	3	1
Severe	2	2	0
Organ dysfunction			
Both liver & kidney	5	3	2
Liver (>50 µmol/L)	11	8	3
Renal (>25% baseline)	9	5	4
Survival outcome	16 (85%)	8	8

Poster Group 1: Clinical Trials and Observations Abstracts

Monday, April 25, 2016 • 10:15am – 10:35am • *Bayshore Ballroom Foyer*

Abstract #	Abstract Title	Presenting Author
1	Autologous Stem Cell Transplant Consolidation Followed by Maintenance iIn Patients with Mantle Cell Lymphoma Receiving Cytarabine-Containing First-Line Chemotherapy. Long-Term Results	Umberto Falcone
2	Autologous Hematopoietic Cell Transplantation in a Patient with Relapsing-Remitting Multiple Sclerosis Following a Short Period of Fingolimod Washout; A Case Report	Mohamed Ali
3	Intrabone Infusion of Umbilical Cord Blood Stem Cells to Improve Hematopoietic Recovery After Allogeneic Umbilical Cord Blood Transplantation in Children	Michel Duval
4	Graft-Versus-Host Disease After Matched Sibling or Unrelated Donor Allografts; The Role of Ant-Thymocyte Globulin	Mats Brune
5	Eltrombopag After Allogeneic Hematopoietic Cell Transplantation In A Case of Poor Graft Function and Systematic Review of the Literature	David Allan
6	Heterogeneity in Studies of Mesenchymal Stromal Cells to Treat or Prevent GVHD: A Scoping Review of the Evidence	David Allan
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10	Cardiovascular (CV)-Related Hospitalization in Patients with Chronic-Phase Chronic Myeloid Leukemia (CP-CML) In SIMPLICITY, a Prospective Observational Study	Wendy Lam
11	Tyrosine Kinase Inhibitor (TKI) Switching: Experience from SIMPLICITY, a Prospective Observational Study of Chronic-Phase Chronic Myeloid Leukemia (CP-CML) Patients in Clinical Practice	Wendy Lam
12	A Pilot Project Comparing the Feasibility and Efficacy of Upfront Plerixafor Plus G-CSF to Chemotherapy Plus G-CSF for the Mobilization of Peripheral Blood Stem Cells for Autologous Transplantation in Patients with Lymphoma and Myeloma	Gizelle Popradi
13	Impact of Busulfan Systemic Exposure Prior to Hematopoietic Stem Cell Transplantation on Pulmonary Function Tests in Children	Valérie Arsenault

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Poster Group 2: Clinical Trials and Observations Abstracts

Monday, April 25, 2016 • 3:45pm – 4:05pm • *Bayshore Ballroom Foyer*

Abstract #	Abstract Title	Presenting Author
14	Successful Stem Cell Mobilization Using Ifosfamide, Gemcitabine and Vinorelbine (IGEV) Salvage Chemotherapy Prior to Autologous Stem Cell Transplantation for Relapsed and Refractory Pediatric Hodgkin Lymphoma	Kristin Marr
15	Successful Reduced Intensity Allogeneic Transplant with Full Donor Chimerism and Good Quality of Life in Adolescent Patient with Wiskott-Aldrich Syndrome	Salah Ali
16	Preliminary Results of FDG-PET Scanning after GDP chemotherapy prior to Autologous Stem Cell Transplantation (ASCT) for Relapsed/Refractory (RR) Lymphom	Matthew Cooper
17	In Elderly Patients with Lymphoma, Chemosensitive Disease rather than Age or Comorbidity Index Predicts Outcome Following Autologous Hematopoietic Stem Cell Transplantation.	Christopher Lemieux
18	An evaluation of Intravenous Immunoglobulin (IVIg) utilization among Hematopoietic Stem Cell Transplant Recipients in Vancouver, BC	Jennifer Goy
19	Outcomes of Pediatric HSCT Patients with Myeloid Malignancies treated with Busulfan-Fludarabine Based Conditioning Regimen	Tal Schechter
20	Treatment Modality Based on MRD Assessment for a High-risk Pediatric Acute Megakaryoblastic Leukemia Case	Raoul Santiago
21	Successful Myeloablative Matched Unrelated Donor Hematopoietic Stem Cell Transplant in a Young Girl with GATA2 Mutation and Emberger Syndrome.	Mohammed Ramzan
22	Dose Extended Total Body Irradiation Followed by Allogeneic Cell Transplantation for The Treatment of Refractory Acute Leukemia	Sultan Altouri
23	Post-transplant Administration of Donor Lymphocytes Depleted of Alloreactive T-cells (ATIR101) Improves Overall Survival and Reduces Transplant Related Mortality Following T-cell Depleted Haploidentical HSCT: Results from a Phase 2 Trial in Patients with AML and ALL	Silvy Lachance
24	Infection-related Complications after Allogeneic Hematopoietic Cell Transplants in Chronic Lymphocytic Leukemia in Comparison with Follicular Lymphoma	David Sytnik
25	Cytomegalovirus Reactivation Does Not Reduce the Risk of Disease Relapse after Allogeneic Hematopoietic Stem Cell Transplantation	Natasha Kekre
26	Venous Thromboembolism is Associated with Graft-versus-host Disease after Allogeneic Hematopoietic Stem Cell Transplantation	Natasha Kekre

Poster Group 3: Clinical Laboratory and Quality Abstracts / Basic and Translational Research Abstracts

Tuesday, April 26, 2016 • 10:00am – 10:20am • *Bayshore Ballroom Foyer*

Abstract #	Abstract Title	Topic:	Presenting Author
27	Validation Method for RBC Depletion of Marrow using the COBE 2991	Clinical Laboratory and Quality	Giovanna Cameron
28	Overexpression of c-MYC Enhances the Growth of Primitive Human Hematopoietic Cells and Induces a Human Leukemia De Novo in Transplanted Mice	Basic and Translational Research	Elizabeth Bulaeva
29	Validation and Implementation of the Credo Cube™ Container at The Ottawa Hospital for Transport of Allogeneic Cellular Therapy Products	Clinical Laboratory and Quality	Carey Landry
30	A Clinically Derived Algorithm to Estimate the Proportion of Acute Myeloid Leukemia Patients that Proceed to Transplant	Basic and Translational Research	Jonathan Wang
31	Improved Collection Efficiency of Peripheral Blood Stem Cell Collections in Pediatric Oncology Patients Undergoing Autologous Stem Cell Transplantation Utilizing the New Spectra Optia Apheresis Device	Clinical Laboratory and Quality	Ehud Even-Or
32	Canadian Blood Services' Cord Blood Bank Stem Cell National System Solution (SCNSS)	Clinical Laboratory and Quality	Mike Halpenny
33	Global Transcriptome Analysis of CD34+ Chronic-phase CML Cells	Basic and Translational Research	Colin Hammond
34	Canadian Blood Services' Cord Blood Bank: Building an Ethnically Diverse Cord Blood Bank	Clinical Laboratory and Quality	Mike Halpenny
35	Analysis of Human Hematopoietic Cells Generated from Human Induced Pluripotent Stem Cells Differentiating in Teratomas	Basic and Translational Research	Margarita MacAldaz
36	Presence of Immature Granulocytes in Mononuclear Cell Products Compromises Cell Function	Basic and Translational Research	Amina Kariminia
37	Quality Indicators for Cell Therapy Products Cryopreserved by "Dump" Freezing	Clinical Laboratory and Quality	Mileidys Alvarez
38	Enumerating Viable CD34+cells in the Auto- and Allo-Transplant Settings with ISHAGE Technology: Updates for Navios and Canto Cytometers	Clinical Laboratory and Quality	Rob Sutherland

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Poster Group 4: Pharmacy, Nursing, and Other Transplant Support Abstracts

Tuesday, April 26, 2016 • 3:15pm – 3:30pm • *Bayshore Ballroom Foyer*

Abstract #	Abstract Title	Presenting Author
39	Feasibility and Acceptability of Integrated Cardiac Rehabilitation in Lymphoma Patients Referred for Autologous Bone Marrow Transplantation	Nanette Cox-Kennett
40	Improving Central and Peripheral Vascular Access Care in a Hematology/HSCT Unit	Cheryl Page
41	Open Communication with Transplant Teams During the Search Process – Closing the Gaps	Susie Joron
42	Evaluating Prescribing Practice of Pneumocystis Jirovecii Pneumonia Prophylaxis in Allogeneic Bone Marrow Transplant Recipients	Ian Pang
43	Donor Advocacy in the Setting of Pediatric Stem Cell Transplantation	Christine Armstrong
44	Intravenous Line Occlusions as an Infusion-related Complication in Patients Undergoing Allogeneic Stem Cell Transplantation Receiving Bone Marrow as a Donor Source	Sarah Courtney
45	Genito-pelvic Health after Hematopoietic Cell Transplantation: Review of the Literature and Recommendations for Best Practice	Reanne Booker
46	When 'Goals of Care' Collide with 'Goals of Cure': Challenges of ACP in Hematology and Hematopoietic Cell Transplantation	Reanne Booker
47	Administration of Granulocyte-Colony Stimulating Factor Following Outpatient Autologous Stem Cell Transplantation: Effects on Hospitalization, Bacteremia, and Mortality	Julian Lee
48	Examining Novel Approaches to Reduce the Negative Impact Chemotherapy Drug Shortages Have in Adult Blood and Marrow Transplant Programs	Cherie Severson
49	Launch of Stem Cell Clubs at Four Medical Schools in Ontario	Warren Fingrut
50	Development of an Online Training Program for Stem Cell Drive Recruiters	Warren Fingrut
51	Development of Stem Cell Donation Procedure Diagrams to Facilitate Informed Consent	Warren Fingrut
52	Hematopoietic Stem/Progenitor Cell Transplantation for Severe Hereditary Spherocytosis Due to Alpha Spectrin Deficiency	Jennie Pitura
53	Prolonged Therapy with Low Dose Interleukin-2 is Associated with Improvement in Established Extensive Sclerotic Chronic GVHD	Walter Watral

Poster Abstracts

1. AUTOLOGOUS STEM CELL TRANSPLANT CONSOLIDATION FOLLOWED BY MAINTENANCE IN PATIENTS WITH MANTLE CELL LYMPHOMA RECEIVING CYTARABINE-CONTAINING FIRST-LINE CHEMOTHERAPY. LONG-TERM RESULTS

Umberto Falcone[1], Shaheena Bashir[2], Khalil Al-Farsi[1], Laurie Watkins[1], Denise Turvey[1], Norman Franke[1], Armand Keating[1], Michael Crump[1], John Kuruvilla[1]

[1]Division of Medical Oncology and Hematology, Princess Margaret Cancer Centre Department of Medicine, University of Toronto, [2]Department of Biostatistics, Princess Margaret Cancer Centre, Toronto Canada

Objective: Assessment of patients' outcome after first line treatment (PFS post-ASCT).

Rationale: Mantle cell lymphoma (MCL) remains incurable with standard therapies. First-line chemotherapy followed by consolidation with high-dose chemotherapy (HDT) and autologous stem cell transplant (ASCT) has become a standard of care in eligible patients (pts). Relapse remains the main cause of treatment failure. Intensifying induction therapy with high-dose cytarabine or adding rituximab maintenance (RM) have been tested to reduce the relapse rate (RR) post-ASCT.

Methodology: We conducted a retrospective analysis of consecutive MCL pts who underwent ASCT after first-line chemotherapy at the Princess Margaret Cancer Centre between 2000-2013. Pts received induction with CHOP, RCHOP, or RCHOP alternating with RDHAP (RCHOP/RDHAP), followed by HDT with or without total body irradiation (TBI). Response evaluation was per Cheson JCO 1999. After ASCT, pts received maintenance with single-agent rituximab 375 mg/m^2 or were simply observed.

Results: 98 MCL pts received induction treatment (Table 1). CR was obtained in 44%, PR in 56% pts. CR rates: CHOP 7 (50%), RCHOP 25 (44%), RCHOP/RDHAP 12 (44%) (P=ns). Post-ASCT responses: CR 92 pts (94%), PR 4 (4%), 2 (2%) PD. Hematopoietic recovery post-ASCT: 31% pts had normal blood counts at 3 months which improved to 52% at 1 year post-ASCT. RM was given to 72 pts (74%). 28 pts relapsed after ASCT (29%). Relapse occurred in 4 (15%) pts after RCHOP/RDHAP, 14 (26%) after RCHOP, and 10 (71%) after CHOP. Median time to relapse: 9 years (95%CI: 4.7-NR). The 2-year and 5-year PFS were 85.8% (76.7-91.5) and 52.2% (37.7-64.7), respectively. Median OS was 9.15 years (95%CI: 7.3-NR), 2-year OS was 88.8% (80.2-93.8), and 5-year OS was 74.9% (61.7-84.2%). For pts observed without treatment post-ASCT, median PFS was 2.87 years (1.22-4.63) and median OS 5.19 years (1.66-NR). For pts receiving RM, PFS was 9.06 years (4.97-NR, p<0.001) and median OS has not yet been reached (7.30- NR, p=0.009). RM remained significant in univariate (UVA) and multivariate (MVA) analyses for both PFS and OS.

Conclusions: Response rate and PFS were similar between different induction regimens. The outcomes of responding pts following ASCT appear superior to previous strategies. Our patients enjoyed a very long PFS, and long OS. Within the limits of a retrospective study, our data support the use of rituximab maintenance, showing a significant benefit in both PFS and OS.

Table 1. Patient characteristics	n=98
Age: median (Min-Max)	56 (36-66)
Subtype	
Blastoid variant	13 (13%)
Pleomorphic	2 (2%)
Stage IV at Diagnosis	89 (91%)
Bone Marrow Involvement	85 (87%)
MIPI	
Low risk	41 (42%)
Intermediate risk	19 (19%)
High risk	18 (19%)
Not available	20 (20%)
Ki-67 (available for 64/98 pts)	
<10%	9 (14%)
10-29%	24 (38%)
≥ 30%	31 (48%)
Time from Diagnosis to Transplant (months)	
Median (Min-Max)	7.5 (2.5-33.4)
Primary Chemotherapy	
CHOP	14 (14%)
RCHOP	57 (58%)
RCHOP/RDHAP	27 (28%)
TBI: Yes	77 (79%)
Conditioning Regimen	
Melphalan - VP16	62 (63%)
Cytarabine+melphalan	30 (31%)
Other	6 (6%)
Maintenance Rituximab	
Yes/No 23 (23%)/ 72 (74%)	
Not available	3 (3%)
Follow-up (years)	
Median (Min-Max)	3.2 (0.1-14.1)

2. AUTOLOGOUS HEMATOPOIETIC CELL TRANSPLANTATION IN A PATIENT WITH RELAPSING-REMITTING MULTIPLE SCLEROSIS FOLLOWING A SHORT PERIOD OF FINGOLIMOD WASHOUT; A CASE REPORT

Mohamed Ali, PharmD, Panayotis Kaloyannidis, MD, Hani Al-Hashmi, MD , Reem Bunyan, MD

King Fahad Specialist Hospital – Dammam, Dammam, Saudi Arabia

Background: Multiple sclerosis (MS) is a demyelinating, inflammatory disease of the central nervous system (CNS). It's a chronic and devastating autoimmune disease. Current management guidelines for relapsing forms of MS include monoclonal antibodies (e.g. natalizumab, alemtuzumab, rituximnab and daclizumab) and oral agents (e.g. fingolimod and cladribine) to target molecules or cells which are important in the immunopathogenesis of multiple sclerosis. These agents seem to have a considerable effect on relapsing-remitting multiple sclerosis (RRMS), but may also be associated with serious side effects, suboptimal response or breakthrough disease. The immunosuppression provided by high-dose chemotherapy with stem cells rescue has been studied only in small cohorts. The safety challenges associated with stem cells transplantation in MS patients are disease reactivation and rebound during the long washout period post discontinuation of immunomodulating drugs, in addition to disease flares during stem cell mobilization and the lymphocyte depletion incorporated into stem cell rescue procedures. There are also concerns of high-dose therapy toxicities unique to MS patients.

Results: We hereby report a case of 48 year old male with a diagnosis of RRMS for 14 years. He experienced neurological disability worsening on several treatments including natalizumab and fingolimod. He underwent autologus stem cells transplantation (ASCT). Fingolimod was discontinued three weeks prior to mobilization. Peripheral haematopoietic stem cells were mobilized with cyclophosphamide 2 g/m2 and filgrastim 10 µg/kg/day. The conditioning regimen was BEAM/ATG protocol (BCNU 300 mg/m2; etoposide 800 mg/m2; cytosine-arabinoside 800 mg/m2; melphalan 140 mg/m2; ATG 7.5 mg/kg). The patient tolerated the procedure well and had full engraftment by day 18. The early transplant course was associated with febrile urinary tract infection, CMV and EBV reactivations. These infectious complications were successfully managed with the use of antibiotics, valganciclovir and rituximab respectively. To date, and for more than nine months, the patient remains out of any immunosuppressive treatment with no clinical or radiological evidence of the disease.

Conclusions: We conclude that the quality of stem cells collection; efficacy and tolerability of high dose chemotherapy and time to engraftment were not affected by fingolimod prior treatment and the short washout period. To our knowledge this is the first case of ASCT for MS in Middle East.

3. INTRABONE INFUSION OF UMBILICAL CORD BLOOD STEM CELLS TO IMPROVE HEMATOPOIETIC RECOVERY AFTER ALLOGENEIC UMBILICAL CORD BLOOD TRANSPLANTATION IN CHILDREN

Henrique Bittencourt, Marie-France Vachon, Isabelle Louis, Marion Cortier, Edith Villenneuve, Pierre Teira, Sonia Cellot, Elie Haddad, Michel Duval

Hematology-Oncology Division, Centre de Cancérologie Charles Bruneau, Immunology Department, and Anestesiology Department, CHU Sainte-Justine, Montreal, QC.

Background: Umbilical cord blood transplantation (UCBT) offers advantages of easy procurement, immediate availability, and acceptable partial HLA mismatches. Still, patients after UCBT show delayed hematopoietic recovery, and have higher rates of infection.

Frassoni et al. published a study on the intrabone (IB) injection of a single unit of CB into 32 adult patients (Lancet Oncol. 2008) showing a neutrophil and platelet recovery with a median of 23 and 36 days, respectively, with a median transplantation cell dose of only 2.6 x 10^7 cells/kg. These results have been confirmed in a retrospective study in adult patients (Transplantation. 2013). Data on pediatric patients is scarce (case report of 5 patients on J Pediatr Hematol Oncol. 2012).

In order to confirm the role of IB infusion of CB to improve hematopoietic reconstitution after UCBT in children, we started a Phase II trial (NCT01711788). Our primary hypothesis is that IB infusion of CB reduces stem cell trapping seen with IV infusion, and providing a faster short- and long-term engraftment.

Methods: Inclusion criteria includes age < 21 years, diagnosis of hematopoietic disorders, availability of a single CB with > 3 x 10^7 NC/kg, and use of a myeloablative-conditioning regimen.

On day of UCBT, frozen CB unit is thawed, washed and aliquoted into syringes. After sedation, all aliquots are injected at different places in one or both iliac crests, depending on patient size. If patient requires two CB units, one unit is infused IB while the second unit is infused IV. G-CSF is given from D+7.

Results: Twelve patients has been included since Nov/2012. Eight were male, median age was 5.5 (1.8 - 15) years. Diagnosis were AML (n=6), ALL (n=4) and sickle cell anemia (n=2). Ten UCB were unrelated and 6/6, 5/6 and 4/6 HLA matching comprised four, five and three UCBT. Ten patients received a single unit UCB. Median NC infused was 3.5 (2.17-10.24) x 10^7/kg. There was no toxicity related to IB infusion.

Engraftment occurred in 10 out of 12 patients and median time to engraftment (neutrophil ≥ 0.5x10^9/L) was 14.5 days. Platelet recovery (≥ 50x10^9/L) occurred in just 6/12 patients (due mainly to early relapse) and median time to recovery was 41 (28-77) days. Eleven out of fourteen patients are alive; one patient died from UCBT complication (ARDS) and other from relapse.

Conclusion: IB infusion of UCB is feasible in pediatric patients without any particular toxicity and there is a positive impact on neutrophil recovery. Inclusion of more patients is needed to confirm the impact of IB-UCBT on platelet recovery, duration of hospitalisation, and survival. IB-UCBT might be a more affordable alternative to improve hematopoietic recovery comparing to other methods of UCB expansion.

4. GRAFT-VERSUS-HOST DISEASE AFTER MATCHED SIBLING OR UNRELATED DONOR ALLOGRAFTS; THE ROLE OF ANT-THYMOCYTE GLOBULIN

Mats Brune[1] Mikael Lisak[1], Mats Remberger[2], Malin Nicklasson[1], Ksenia Boroskina[3], Harald Anderson[4], Jonas Mattsson[2]

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Background: Chronic GVHD (cGVHD) is the main sequel after alloSCT affecting >50% of patients (pts). Pre-Tx anti-Tcell globulin (ATG) is widely used in matched unrelated transplants (MUD) with the aim to reduce incidence and severity of cGVHD. We retrospectively analyzed outcome of 4 years alloSCT in 2 Swedish centers (Huddinge & Sahlgrenska). Primary objective was to compare clinical outcome, in particular the prevalence of cGVHD, in pts transplanted from an HLA-identical sibling donor (MSD), or from a MUD. All MUD pts received ATG (Thymoglobuline® or ATG-Fresenius®). The endpoint for severity of cGVHD was ongoing glucocorticosteroid (GC) therapy at 12 & 24 mo post-Tx.

Methods: Thirty-eight pts with SAA, myeloma, MabC treatment or benign diseases were excluded, as well as 64 pts with mismatched donor, incomplete follow-up data or individualized GVHD prophylaxis. Remaining 269 consecutive pts, allografted 2011-2014, included 155 males and 114 females, age 52 (18-72) yrs). Donors were MSD (n=69) or MUD (≥9/10 match; n=200).

Diagnoses were 147 acute leukemia, 87 MDS/MPN, 21 lymphoma and 14 chronic leukemia. Disease status were CR1 (n=142), advanced disease (n=72), not defined (n=55). Pts received reduced (RIC; n=119), or myeloablative (MAC; n=150) conditioning, and in the MUD group also thymoglobuline (median 4.1 (2.5-8) mg/kg; n=187, or ATG-F (30-40 mg/kg; n=13). Post-Tx IS was CyA/Mtx (n=236), or tacrolimus/sirolimus (n=33). Chi-square tests were used to compare discrete variables between the MSD and MUD groups. For survival type variables Kaplan-Meier curves and cumulative incidence functions, log-rank tests and Cox regression were applied.

Results: As per 2015-12-01, median follow-up for living pts was 24 (1-55) mo. Comparisons between MSD and MUD groups revealed an even distribution of age and diagnoses, but significantly more males and RICs in the MUD group (61 vs 47%, and 60 vs 45%, respectively; p=0.03).

• Leukemia-free survival (LFS) at 24 mo post-Tx was 75% in the MSD and 51% in the MUD group (p=0.008). Overall survival (OS) showed a trend towards better OS in the MSD group (p=0.09). The cumulative incidence of relapse was higher in the MUD group (p=0.018); at 3 yrs 39% vs MSD 24%. The better results in the MSD group remained after adjusting for differences in prognostic factors.

• In the MSD and MUD groups the incidence of acute GVHD was similar (71 vs 63%; p=0.26). In contrast, the incidence of cGVHD the first year post-Tx was higher in the MSD group (68 vs 34%; p<0.001). At 12 mo the prevalence of ongoing GC therapy was 56% (27/48 pts) in the MSD group and 25% (30/119) in the MUD group (p<0.001). MSD patients had higher GC dose (p<0.001). At 24 mo, GC therapy was 48% and 17% in the MSD and MUD groups, respectively (p=0.004).

Conclusion: Due to lower relapse rate MSD pts had superior LFS, but significantly more cGVHD, compared to MUD/ATG pts. Studies are needed to define an expedient dose of ATG in MSD transplants.

5. ELTROMBOPAG AFTER ALLOGENEIC HEMATOPOIETIC CELL TRANSPLANTATION IN A CASE OF POOR GRAFT FUNCTION AND SYSTEMATIC REVIEW OF THE LITERATURE

Janique Dyba[1,2], Alan Tinmouth[2], Christopher Bredeson[2], John Matthews[1], David S. Allan[2]

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Background: Poor graft function after allogeneic hematopoietic cell transplantation (HCT) can result from failed engraftment of long-term engrafting cells. The use of thrombopoietin (TPO) receptor agonists (TRA) has been extensively studied and remains an important component of experimental ex vivo stem cell expansion protocols.

Methods: We describe the use of eltrombopag, a TRA, to stimulate rescue of poor graft function in a patient following allogeneic HCT and we performed a systematic review of published studies describing the use of TRAs following allogeneic transplantation.

Results: A 56 year old woman with acute leukemia in CR2 underwent myeloablative allogeneic HCT using peripheral blood progenitor cells (8.28 x 10^6 CD34+ cells/kg) from an unrelated HLA mismatched (6/8) donor. Despite initial engraftment, she developed graft failure and she was dependent on platelet and red blood cell transfusions in the ensuing months. She subsequently underwent a second transplant from the same donor (9.59 x 10^6 CD34+ cells/kg). Pre-transplant conditioning included tacrolimus, anti-thymocyte globulin, cyclophosphamide and 3 Gy total body irradiation. Although neutrophils engrafted (> 0.5 x 10^9/L) on day +23, she had prolonged anemia and thrombocytopenia and required ongoing red cell and platelet transfusions after transplant. On day +111, donor leukocyte chimerism was 99%. A bone marrow aspirate and biopsy, however, performed on day

121 was hypoplastic and consistent with failed engraftment. She suffered numerous infectious and bleeding complications resulting in repeated hospital admissions, including admission to the intensive care unit over the subsequent months. She was started on eltrombopag 50 mg daily on day +343 and she responded quickly, becoming transfusion independent with normal blood counts within several weeks. Moreover, she has had no further infections or bleeding complications and she has not been hospitalized in 460 days since starting elrombopag. A total of 8 publications were identified from our systematic search and included observational case studies (5 studies, total of 7 patients) that primarily addressed ITP or isolated thrombocytopenia at various time points after allogeneic HCT and prospective clinical trials (3 studies, total of 177 patients with 95 patients receiving TRAs). No studies reported specifically on the use of TRAs for the treatment of trilineage graft failure as a means of in vivo stem cell expansion. The use of TRAs following allogeneic HCT appears safe and promising.

Conclusion: The use of eltrombopag or other TRAs to treat poor graft function or failed engraftment after allogeneic HCT is intrigueing and warrants further study.

6. HETEROGENEITY IN STUDIES OF MESENCHYMAL STROMAL CELLS TO TREAT OR PREVENT GVHD: A SCOPING REVIEW OF THE EVIDENCE

Mina Rizk, Madeline Monaghan, Risa Shorr, Natasha Kekre, Christopher N. Bredeson, David S. Allan.

Blood and Marrow Transplantation, Department of Medicine, The Ottawa Hospital and University of Ottawa and Ottawa Hospital Research Institute, Ottawa ON

Background: Effective treatments are lacking for the treatment of steroid-refractory graft versus host disease (GVHD), a major cause of morbidity and mortality following allogeneic hematopoietic cell transplantation (HCT). Mesenchymal stromal cells (MSCs) have demonstrated promise but there is uncertainty regarding their clinical effectiveness.

Methods: A systematic scoping review of the literature was performed to characterize the heterogeneity of published studies using MSCs to treat and/or prevent GVHD and to identify opportunities for standardization of future studies. Actively recruiting registered clinical trials were also identified to provide insight regarding the extent to which heterogeneity has been addressed.

Results: Thirty studies were identified, including 19 studies (507 patients) addressing the treatment of acute or chronic GVHD and 11 prevention studies (277 patients). Significant heterogeneity was observed in the age and diagnoses of study subjects, the intensity and specifics of the conditioning regimens, degree of HLA-matching and source of hematopoietic cells. MSCs were derived from bone marrow (83% of studies), cord blood (13%), or adipose tissue (3%) and were cryopreserved from third party allogeneic donors in virtually all studies (91% of prevention studies and 63% of treatment studies). Culture conditions and media supplements were highly variable and characterization of MSCs did not conform to ISCT criteria in any study. MSCs were used at passage 1-7 of cell culture and the median dosage of MSCs ranged from 1 – 10x10^6/kg using varying schedules of administration. Treatment response criteria were not standardized and effectiveness in controlled treatment studies (5 studies) could not be demonstrated convincingly. Details of actively recruiting registered trials suggest heterogeneity will persist with only 53% of trials describing the use of standard GVHD response criteria and few detailing methods of MSC manufacturing.

Conclusion: Future studies will need to make substantial coordinated efforts to reduce study heterogeneity and clarify the role of MSCs in GVHD.

7. NETWORK GEOMETRY OF EVIDENCE FROM RANDOMIZED CONTROLLED TRIALS ADDRESSING DONOR SELECTION AND SOURCE OF CELLS USED IN ALLOGENEIC HSCT. A SYSTEMATIC SCOPING REVIEW.

Madeline Monaghan[1], Mina Rizk[1], Sophie Pilon[1], Abhinav Iyengar[1], Risa Shorr[2], Jason Tay[3], Dawn Sheppard[1,3], Christopher Bredeson[1,3], Brian Hutton[3], David S. Allan[1,3]

[1] Blood and Marrow Transplantation, Department of Medicine (Hematology), University of Ottawa; [2] Information Services, The Ottawa Hospital, and [3] Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, ON.

Background: Options regarding donor selection and sources of cells for hematopoietic cell transplantation (HCT) have continued to evolve. Creating a network of connections between direct comparisons made in randomized controlled trials permits an analysis of network geometry and identifies potential novel indirect comparisons that can inform best practices and drive cost-effective transplant care towards optimized patient outcomes. We performed a systematic scoping review of randomized controlled trials (RCTs) addressing the source of cells used in allogeneic transplant and choice of donors to study network geometry of the evidence supporting the selection of optimal stem cell products.

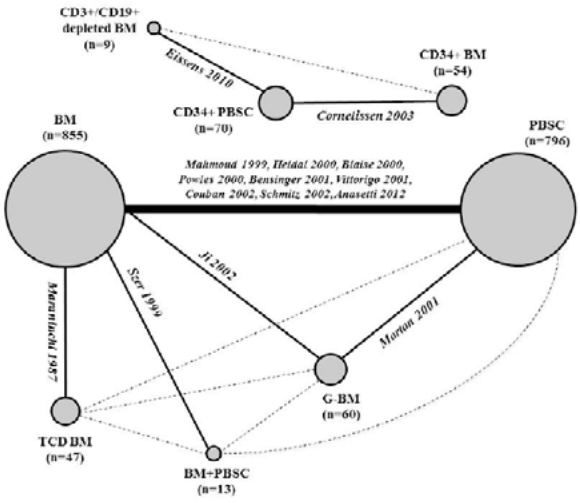
Methods: A scoping review of RCTs addressing all aspects of care in allogeneic HCT was performed. RCTs addressing the source of cells used in allogeneic HCT and choice of donors were included in this analysis to develop evidence networks. We searched Medline and EMBASE (1946 to May 2015) and extracted information regarding the donor and source of cells from each eligible study.

Results: A total of 17 eligible randomized controlled trials encompassing 2176 patients were identified. Across studies, patients were enrolled between 1987 – 2012 at ages ranging from 1 – 61, and reported median follow-up between 9 – 48 months following transplantation for a range of hematological malignancies and/or aplastic anemia. Eight studies (1015 patients) compared clinical outcomes following the use of peripheral blood progenitor cells (PBPCs) with bone marrow (BM) from matched related

donors. One study (551 patients) compared PBPCs and BM from matched unrelated donors. The remaining studies examined the impact of T cell depletion in BM grafts (1 study), the method of BM infusion (1 study), the addition of PBPCs to BM (1 study), G-CSF primed BM (2 studies), surface molecule-based selection and/or depletion (2 studies), and the optimal number of units for pediatric cord blood transplantation (1 study). There were no identified published RCTs that compared different types of donors (i.e. related vs. unrelated). Evidence network geometry was analyzed to identify opportunities for novel indirect comparisons for various transplant outcomes using different cell sources. No comparisons can be made using evidence from RCTs to compare different donor options but opportunities to expand the network were identified.

Conclusions: Analysis of network geometry from RCTs addressing source of cells used in HCT provides the basis for novel indirect comparisons for matched related donor transplants. Ongoing and future RCTs that compare different donor choices will leverage the existing evidence base and will expand the network.

Figure: Network diagram of RCTs reporting engraftment and acute GVHD. Nodes are sized to reflect the relative numbers of patients randomized to each study, while edges are sized to reflect the relative numbers of available RCTs. Dotted lines represent potential indirect comparisons that can be made using the network. Only studies that used HLA-matched related donors are included in the network.



8. BORTEZOMIB CONSOLIDATION AFTER ALLOGENEIC NMA TRANSPLANTATION TO IMPROVE OUTCOME IN POOR PROGNOSIS NEWLY DIAGNOSED MM PATIENTS: A PRELIMINARY SAFETY REPORT

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Background: Allogeneic hematopoietic stem cell transplantation (HSCT) has been shown to be potentially curative in some patients with multiple myeloma (MM). However, relapse remains common and chronic GVHD a frequent, morbid complication. We hypothesized that a tandem auto-nonmyeloablative (NMA) allogeneic HSCT followed by Bortezomib (Btz) consolidation would i) be safe ii) decrease the incidence/severity of chronic GVHD and iii) decrease the risk of relapse in patients with high-risk MM.

Methods: Newly diagnosed MM patients with either ISS stage III, plasma cell leukemia, unfavorable cytogenetics [t(4;14), (14;16), (14;20), 17p, 1p-, 1q+] or age ≤ 50 years and either an HLA matched sibling or unrelated donor (10/10) were prospectively enrolled in a phase II trial. After Btz-based induction and autologous HSCT, outpatient NMA allogeneic HSCT was performed following either a 5-day conditioning of fludarabine 30 mg/m^2 IV and cyclophosphamide 300 mg/m^2 IV (sibling donor) or fludarabine 30 mg/m^2 IV x 3 days with TBI 2 Gy (unrelated donor), followed by G-CSF mobilized stem cells. GVHD prophylaxis consisted of tacrolimus and mycophenolate mofetil. Btz 1.3 mg/m^2 SC every 2 weeks was initiated day +120 after allogeneic HSCT and continued for 1 year. Bone marrow aspirates before and after allogeneic HSCT were prospectively collected in order to assess the impact of Btz on minimal residual disease (MRD) evaluated by multiparametric flow cytometry using the 8-color Euroflow protocol.

Results: As of January 22/2016, 17 of 30 MM patients (M/F: 7/10) have been enrolled and 15 have undergone allogeneic HSCT (sibling: 7; unrelated: 8); median age is 55 years (range 35-63). Inclusion criteria were ISS stage III (n=9), unfavorable cytogenetics (n=6) or young age (n=5). Patients received 4-5 cycles of induction with VTD (n=7) or CyBorD (n=8), followed by autologous HSCT (melphalan 200 mg/m^2). Median time from autologous to allogeneic HSCT was 4 months (range: 3-7). With a median follow-up of 150 days (range: 31-402), 9 patients have received 79 injections of Btz. To date, 3 patients have developed acute GVHD (grade II: 1; grade III: 2) and 1 overlap syndrome. Side effects related to Btz include viral hemorrhagic cystitis (n=2), EBV reactivation requiring Rituximab administration (n=3), mucosal HSV reactivation despite appropriate prophylaxis (n=1), diarrhea

(n=1) and urticaria (n=1). None of the patients developed neuropathy. Five patients required hospitalization 13-146 days (median 17) following their transplant. Among the 6 patients with a longer follow-up, 4 complete responses (CRs) and 2 partial responses (PRs) by serum electrophoresis/immunofixation were noted before Btz consolidation. One patient converted from PR to CR during Btz consolidation, demonstrating improved quality of response. Importantly, 3 of the 4 patients in CR have successfully achieved a negative MRD status.

Conclusion: Although preliminary, our data suggest that administration of Btz 1.3 mg/m^2 SC every 2 weeks starting on day +120 after allogeneic HSCT is safe and well tolerated. Monitoring of Herpesviridae and other viruses should be performed prospectively in allogeneic HSCT recipients who receive a proteasome inhibitor in order to better assess the risk of viral reactivation.

9. UPDATED EFFICACY AND SAFETY DATA FROM THE AETHERA TRIAL OF CONSOLIDATION WITH BRENTUXIMAB VEDOTIN AFTER AUTOLOGOUS STEM CELL TRANSPLANT (ASCT) IN HODGKIN LYMPHOMA PATIENTS AT HIGH RISK OF RELAPSE

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Background: The AETHERA trial, a phase 3, randomized, placebo (PBO)-controlled trial (CT.gov #NCT01100502), evaluated whether post-ASCT consolidation treatment with brentuximab vedotin (BV) could prevent disease progression in Hodgkin lymphoma (HL) patients (pts) at high risk for relapse. The study met its primary endpoint: significant improvement in progression-free survival (PFS) per independent review with BV versus PBO (hazard ratio =0.57, P=0.001) (Moskowitz, 2015). The 2 most common adverse events in the BV arm were peripheral sensory neuropathy (56%) and neutropenia (35%). Here we present approximately 1 additional year of long-term follow-up (LTFU) data.

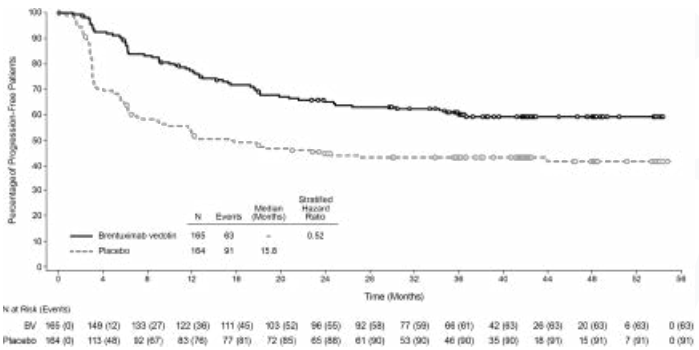
Methods: Pts were randomized to receive BV 1.8 mg/kg q3wk or PBO for 16 cycles (approximately 12 mos), 30–45 days after transplantation. During LTFU, CT scans were performed at 18 and 24 mos. Clinical lymphoma assessments were performed quarterly during the first year of LTFU, and then every 6 mos. Peripheral neuropathies and secondary malignancies were also followed.

Results: A total of 329 pts were randomized to BV (n=165) or PBO (n=164). Median PFS per investigator was not reached (95% CI not estimable [NE]–NE) in the BV arm and was 15.8 mos (95% CI 8.5–44.0) in the PBO arm (HR=0.52, 95% CI 0.37–0.71). A sustained plateau with substantial separation is evident between both treatment groups, with improved PFS at 3-years post-randomization with BV consolidation versus PBO (Fig). The 3-year PFS rate was 61% (95% CI 53–68) for the BV arm and 43% (95% CI 36-51) for the PBO arm. Six PFS events were recorded after the 24-mos visit in the BV arm and 3 in the PBO arm. The HR for PFS per independent review was 0.58 (95% CI 0.41–0.82).

The number of secondary malignancies was comparable between treatment arms (n=4 BV, n=2 PBO). A total of 99 of 112 pts (88%) on the BV arm who experienced treatment-emergent peripheral neuropathy had some improvement (23%) or complete resolution (65%) of symptoms. AE discontinuations occurred in 54 pts (33%) on the BV arm, most commonly due to peripheral sensory and motor neuropathies (14% and 7%, respectively). Pts on the BV arm who discontinued treatment because of AEs received a median of 9.5 cycles (range, 1 to 15). For these pts, the 2-year PFS rate per investigator was 69% (95% CI 54–79) versus 82% (95% CI 71–89) for pts on the BV arm who completed 16 treatment cycles.

Conclusions: Consolidation treatment with BV in HL pts at high risk of relapse after ASCT showed an improvement in PFS versus PBO, approximately 3 years since the last patient was randomized. Kaplan-Meier analysis of PFS per investigator assessment showed a continued benefit of BV consolidation. No additional secondary malignancies have been observed and most pts experienced resolution of peripheral neuropathy symptoms. We will present clinical responses to BV treatment after disease progression.

PFS per Investigator



10. CARDIOVASCULAR (CV)-RELATED HOSPITALIZATION IN PATIENTS WITH CHRONIC-PHASE CHRONIC MYELOID LEUKEMIA (CP-CML) IN SIMPLICITY, A PROSPECTIVE OBSERVATIONAL STUDY

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Background: SIMPLICITY is an ongoing observational study of CP-CML patients designed to understand the use of first-line (1L) imatinib (IM), dasatinib (DAS) or nilotinib (NIL) in the United States (US) and Europe (Eu) outside clinical trials (NCT01244750). Previous SIMPLICITY data showed ≥1 baseline comorbidity reported in >75% of patients, with >3 comorbidities in majority of patients (52.2%). 40.6% had cardiovascular (CV) comorbidities at start of 1L TKI. Baseline comorbidity did not affect initial TKI selection, although cautions regarding risks for specific adverse events (e.g. cardiac and pulmonary) have been described for individual TKIs in patients with pre-existing conditions. This analysis focuses on the frequency of CV-related hospitalizations in SIMPLICITY patients and describes these events by 1L TKI and TKI received at time of hospitalization. Demographics and clinical characteristics of hospitalized patients are compared with the total SIMPLICITY population.

Methods: SIMPLICITY includes three prospective patient cohorts treated with IM, DAS or NIL as 1L therapy since 2010 and a historical cohort treated with IM since 2008. CV-related hospitalizations were identified using preferred MedDRA terms in the CV category. Based on events reported, events were categorized: valvular disease; arrhythmia; cardiac failure; cardiac ischemic disease; and pericardial disorder. TKI exposure was calculated from total duration on specified TKI regardless of initial TKI.

Results: A higher proportion of patients enrolled in SIMPLICITY were male (54.6%), treated in private practices and were from the US (66.7%). A total of 651 hospital admissions were recorded for all SIMPLICITY patients (n=1494). Overall, 368 patients (24.6%) were hospitalized, with 49 patients (3.3%) hospitalized for CV conditions (IM: n=31; DAS: n=7; NIL: n=11). Median age at initiation of 1L TKI was higher in CV hospitalized patients (70.9 years) compared to patients with and without any hospitalization (62.4 years and 54.6 years respectively). 61.2% of patients with CV hospitalization were ≥65 years (compared to 26.2% for patients without and 46.2% for patients with any hospitalization). Most frequent causes of CV hospitalization were cardiac ischemic disease (34.5%), arrhythmia (30.9%) and cardiac failure (29.1%). The rate of CV hospital admissions per 100 patient years exposure was 1.35 for all hospitalized patients and was highest in the NIL-treated cohort (NIL: 2.15 compared with, IM: 1.04 and DAS: 1.13). The median (interquartile range) length of stay in hospital for CV hospitalizations was 3.0 (2.0-7.0) days. All patients with CV hospitalizations had baseline comorbidities, and a higher proportion of hospitalized patients (CV and any cause) (68%) had ≥3 comorbidities compared with patients not hospitalized (46%). The majority of patients with any hospitalization (59%) and CV hospitalization (82%) had baseline CV comorbidities.

Conclusion: In SIMPLICITY, few patients overall were hospitalized for CV-related events. Patients with CV-related hospitalizations were older than the total SIMPLICITY population. The highest rate of CV hospitalizations per 100 patient years was in NIL-treated patients, while the observed rates for DAS and IM patients appeared similar. Pre-existing CV co-morbidities were present in the majority of hospitalized patients (CV and any cause).

11. TYROSINE KINASE INHIBITOR (TKI) SWITCHING: EXPERIENCE FROM SIMPLICITY, A PROSPECTIVE OBSERVATIONAL STUDY OF CHRONIC-PHASE CHRONIC MYELOID LEUKEMIA (CP-CML) PATIENTS IN CLINICAL PRACTICE

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Background: Few data from clinical practice describe treatment switching patterns in patients with CP-CML treated with TKIs. This study aims to investigate patterns of, and reasons for, TKI switching in patients with CP-CML who discontinued first-line treatment.

Methods: SIMPLICITY is an ongoing observational study of CP-CML patients receiving first-line treatment with imatinib (IM), dasatinib (DAS) or nilotinib (NIL) in Europe (Eu) and the United States (US) outside of clinical trials (NCT01244750). The primary objective is to understand TKI management patterns in clinical practice. The study includes three prospective cohorts of patients treated with IM, DAS or NIL as initial therapy since 2010 (the study opened after first-line approval of all three TKIs) and a historical cohort treated with IM since 2008. Data on treatment discontinuation and treatment switching in all patients with ≥12 months of follow-up are presented for prospective cohorts.

Results: 1,083 patients (Eu: 34%, US: 66%) were enrolled through 1 April 2014, initially treated with IM (N=415), DAS (N=343) or NIL (N=325). Median age at initiation of first-line TKI was 55 years and was higher in IM patients compared with DAS and NIL patients. Across all regions, 862 of 1,083 patients were followed for ≥12 months after initiation of first-line TKI (IM: n=400, DAS: n=230 or NIL: n=232). Of these, 30%, 17% and 21% of patients discontinued IM, DAS and NIL, respectively, within a year of initiation. The main reason for TKI discontinuation was physician-reported intolerance (IM: 61%, DAS: 88%, NIL: 81%). Physician-reported primary resistance, leading to discontinuation, was largely observed in IM-treated patients (IM: 13%, DAS: 3%, NIL: 0%). Median time to first discontinuation varied by TKI (IM: 121 days, DAS: 92 days, NIL: 68 days). A proportion of patients who discontinued first-line TKI within 12 months switched to a second-line TKI (IM: 82%, DAS: 58%, NIL: 62%), while no further TKI treatment information was available for the remaining patients at the time of data lock (IM: 18%, DAS: 42%, NIL: 48%). Of patients who switched to a second-line TKI within 12 months, 61% and 39% of IM-treated patients switched to DAS and NIL, respectively; most DAS-treated patients switched to IM (70% vs. 30% to NIL) and 47% and 53% of NIL-treated patients switched to DAS and IM, respectively. Few patients, all in the US, discontinued therapy due to financial reasons (IM: 5%, DAS: 3%, NIL: 8% of all US patients). Median time to first discontinuation was consistently higher in the US, with the largest regional difference observed in the DAS cohort (Eu: 42 days, US: 106 days). Among patients in Eu who received a second-generation TKI as second-line therapy, the proportion receiving NIL and DAS were similar (32% NIL, 29% DAS), whereas, in the US, DAS predominated (38% DAS, 18% NIL).

Conclusion: The proportion of patients discontinuing first-line treatment for CP-CML, and reasons for discontinuation, vary by TKI. While intolerance was the primary reason for treatment discontinuation in all TKI cohorts during the first 12 months, primary resistance was mostly reported in IM-treated patients.

12. A PILOT PROJECT COMPARING THE FEASIBILITY AND EFFICACY OF UPFRONT PLERIXAFOR PLUS G-CSF TO CHEMOTHERAPY PLUS G-CSF FOR THE MOBILIZATION OF PERIPHERAL BLOOD STEM CELLS FOR AUTOLOGOUS TRANSPLANTATION IN PATIENTS WITH LYMPHOMA AND MYELOMA

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Background: Autologous stem cell transplant (ASCT) is standard of care for many patients with multiple myeloma (MM) and relapsed lymphoma. Our centre has seen an increase in the demand for access to ASCT in the last 2 years resulting in scheduling delays for peripheral blood stem cell (PBSC) mobilization.

Plerixafor, a novel CXCR4 antagonist, is an effective and safe upfront mobilizing agent with predictable stem cell mobilization kinetics that yields more CD34+ cells in fewer apheresis sessions than G-CSF+placebo. We hypothesized that an upfront plerixafor+G-CSF (Px-G) strategy would permit mobilization of more patients per week than our current standard of chemotherapy plus G-CSF (chemo-G), and increase access to ASCT.

Objectives: To compare upfront Px-G for the mobilization of PBSC for ASCT in patients with MM and lymphoma to the current standard of chemo-G with or without Px rescue. We hypothesized this approach would i) result in regular scheduling of more PBSC collections per week; ii) reduce the number of apheresis days; iii) yield similar numbers of patients attaining a safe CD 34+ dose; iv) with less regimen-related toxicities than chemo-G.

Methods: We retrospectively compared outcomes of 18 Px-G mobilized patients to a historical cohort of 20 consecutive chemo-G mobilized patients. Px-G patients received G-CSF 10 mcg/kg/day for ≥ 4 days. Plerixafor 0.24 mg/kg was given subcutaneously day 4, 16-19 hours prior to the first PBSC collection. Px and G-CSF were administered daily until target CD34+ dose was attained ($3x10^6$ CD34+/kg and $6x10^6$CD34+/kg for lymphoma and MM patients respectively). Chemo-G mobilized patients received G-CSF 10 mcg/kg/day beginning 24 hours after completing cyclophosphamide (2.5g/m^2) or salvage chemotherapy. PBSC were collected 9-19 days later using standard institutional apheresis procedures when peripheral blood CD34+ counts exceeded 20/uL. Outcomes between regimens were compared descriptively using medians and proportions as appropriate.

Results: 38 patients (18 Px-G, 20 chemo-G) were mobilized between October 1 2014 and December 31 2015. Patient characteristics are presented in Table 1. 16 Px-G and 17 chemo-G patients underwent ASCT, 5 did not.

Px-G upfront allowed us to double our weekly PBSC collections and decreased median apheresis days by 50% (1 day, range 1-3 for Px-G vs 2 days, range 1-3 for chemo-G). There was no difference in the number of patients reaching target CD34+ dose (83% for for Px-G vs 80% for chemo-G) nor in the number achieving the minimum safe CD34+ count (≥ $2x10^6$ CD34+/kg) to proceed to ASCT (94% for Px-G and 95% for chemo-G). Mobilization failed for 1 patient in each group. Neutrophil engraftment was 100% in both groups (median time to engraftment 10.5 days, range 9-12 for Px-G vs 11 days, range 9-19 for chemo-G). There were 5 mobilization-related hospitalizations in the chemo-G group (4 febrile neutropenia, 1 nausea/emesis) and 1 in the Px-G group (symptomatic hypocalcemia).

Conclusions: Px-G upfront is a viable alternative to chemo-G in patients undergoing mobilization for ASCT. It allowed our centre to increase its

number of weekly stem cell collections and decrease apheresis days by 50%.

Table 1

Parameter	Plerixafor-G(n=18) Number(%)	Chemo-G(n=20) Number(%)
Median age (yrs)	66	65
Median follow-up	105days	251days
Female sex	11(61)	7(35)
Multiple myeloma	13(72)	12(60)
Lymphoma	5(28)	8(40)

13. IMPACT OF BUSULFAN SYSTEMIC EXPOSURE PRIOR TO HEMATOPOIETIC STEM CELL TRANSPLANTATION ON PULMONARY FUNCTION TESTS IN CHILDREN

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Background: Busulfan conditioning regimen has been suggested to be associated with pulmonary toxicity after hematopoietic stem cell transplantation (HSCT). This agent has a narrow therapeutic index and therapeutic drug monitoring has been used to control patient exposure to improve efficacy and safety. We recently showed a significant association between first-dose pharmacokinetics of intravenous (IV) busulfan and outcomes in children receiving allo-HSCT. First-dose busulfan steady-state concentration (Css) > 600ng/mL was significantly associated with a higher non-relapse mortality and a lower overall and event-free survival. The aim of the present study was to determine whether there is an association between first-dose IV busulfan Css and changes of pulmonary function tests (PFTs) in children receiving allo-HSCT.

Methods: A retrospective, single-center study of HSCT patients who received IV busulfan as part of their conditioning regimen between May 2000 and August 2010 was performed. Of the 75 eligible patients, 46 had done PFTs before and/or until five years after HSCT and were included in this study. We reported PFTs done before and annually after HSCT until five years post-HSCT. Changes of PFTs over time and association with busulfan systemic exposure through first-dose Css dichotomized in two groups (≤ 600ng/mL versus > 600ng/mL) were evaluated using the linear mixed model. Only patients who performed PFTs before and at least one time after HSCT were included for statistical analysis.

Results: Of the 46 patients included in this study, 29, 27 and 25 patients had respectively baseline spirometry, lung volumes measurement, and diffusion capacity before HSCT. Of all PFTs, only residual volume (RV) was strongly associated with first-dose Css (p=0,0001). Indeed, patients with first-dose Css ≤ 600ng/mL had an improvement of RV post-HSCT. This is compatible with less air trapping in this group over time. Our analyses also showed that PFTs before HSCT were strongly associated with the evolution of PFTs post-HSCT for all PFTs measurements.

Conclusion: First-dose busulfan steady-state concentration (Css) ≤ 600ng/mL was significantly associated with improvement of residual volume (RV) and consequently less air trapping. Relationship between busulfan pharmacokinetics and pulmonary toxicity should be tested in a larger cohort of patients to confirm this preliminary data.

Table 1 Characteristics of the Study Population (n=46)

Characteristic	N (%)
Female gender	28 (60,9)
Age at HSCT, median (range), yr	9,9 (0,4-19,9)
TBI	2 (4,3%)
Graft type - Bone marrow - Peripheral blood - Umbilical cord	 - 21 (45,7) - 1 (2,2) - 24 (52,2)
Donor type - HLA-identical sibling donor - Other donor	 - 18 (39,1) - 28 (60,9%)
Malignant diagnosis	32 (69,6%)
First-dose IV busulfan exposure - Css ≤ 600 ng/mL - Css > 600 ng/mL	 - 27 (58,7) - 19 (41,3)

14. SUCCESSFUL STEM CELL MOBILIZATION USING IFOSFAMIDE, GEMCITABINE AND VINORELBINE (IGEV) SALVAGE CHEMOTHERAPY PRIOR TO AUTOLOGOUS STEM CELL TRANSPLANTATION FOR RELAPSED AND REFRACTORY PEDIATRIC HODGKIN LYMPHOMA

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Rationale: A significant proportion of pediatric patients with relapsed or refractory Hodgkin Lymphoma (HL) who fail first line therapy can achieve a second durable remission with re-induction chemotherapy followed by consolidative autologous stem cell transplant (ASCT). A variety of salvage

chemotherapy regimens are currently in use and the combination of ifosfamide, gemcitabine, and vinorelbine (IGEV) has been used in adults with high rates of successful stem cell mobilization and disease response. Utilization of this regimen in pediatric HL has not been previously reported.

Objective: To report the efficacy of IGEV salvage chemotherapy for stem cell mobilization and subsequent outcomes when followed by ASCT in pediatric patients with refractory or relapsed HL

Method: Eight pediatric patients aged 6 to 16 years with primary refractory (N=4) or first relapse (N=4) HL after failure of initial multi-agent chemotherapy alone (N=7) or in combination with involved-field radiation therapy (IFRT) (N=1) were included. The patients were treated at a single institution with 2-4 cycles of IGEV chemotherapy and filgastrim (G-CSF) support. Peripheral blood stem cells (PBSCs) were collected following the first (N=5) or second (N=3) cycle by apheresis with a target CD34+ stem cell count of $>3x10^6$ cells/kg. All patients received BEAM (carmustine, etoposide, cytarabine and melphalan) conditioning regimen for ASCT. IFRT was delivered following ASCT for those who had not received it during upfront therapy. Disease evaluation by FDG PET/CT, using Deauville response criteria, was completed at relapse/progression prior to IGEV, after IGEV salvage chemotherapy prior to ASCT, and following all therapy.

Results: Peak peripheral CD34+ stem cells were detected at a median of 13 days (range 12-17 days) following initiation of IGEV chemotherapy. A CD34+ cell count greater than target was collected after a single apheresis procedure in 100% of patients. The median CD34+ cell count was $12x10^6$ cells/kg (range $5\text{-}30x10^6$ cells/kg). Patients required a median of 7 days of G-CSF prior to peak CD34+ count. Following BEAM conditioning, engraftment occurred at median of 11 days post-infusion of PBSCs (range 9-13 days). The median length of admission during ASCT was 15 days (range 10-22 days).

The overall rate of disease response to IGEV therapy was 100%: 4 patients obtained complete response (CR), and 4 had partial response (PR). Following ASCT and IFRT, 7 patients achieved CR, and at a median follow up of 74 months, continue to be alive and in second remission. One patient, who had PR following IGEV and progressive disease after ASCT, has died. During IGEV therapy, no grade 4 non-hematologic toxicities or toxicity-related mortalities occurred.

Conclusion: IGEV salvage chemotherapy facilitates successful PBSC collection and induces high rates of sustained remission in pediatric patients with relapsed and refractory HL when followed by consolidative ASCT and IFRT.

15. SUCCESSFUL REDUCED INTENSITY ALLOGENEIC TRANSPLANT WITH FULL DONOR CHIMERISM AND GOOD QUALITY OF LIFE IN ADOLESCENT PATIENT WITH WISKOTT-ALDRICH SYNDROME

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Background: Wiskott-Aldrich syndrome (WAS) is an X-linked disease characterized by congenital microthrombocytopenia, eczema, combined immune deficiency, and autoimmune phenomena. Allogeneic hematopoietic stem cell transplantation (HSCT) is the only curative treatment. Myeloablative conditioning is the most common regimen used for HSCT in WAS patients to avoid risk of mixed donor chimerism and autoimmunity post HSCT. There is limited data on the use of reduced intensity conditioning (RIC) for HSCT in WAS patients. Here, we report a case with severe phenotype of WAS transplanted successfully with RIC.

Case: A 12-year-old boy was diagnosed with WAS based on genetic test confirming a hemizygous mutation in the WAS gene. He had a history of chronic eczema, asthma, frequent ear infections and arthritis. He developed CNS vasculitis, myositis, and nephritic range proteinuria. He had microthrombocytopenia and anemia requiring transfusion.

Patient was treated with high dose steroids and Cyclophosphamide for his arthritis and CNS vasculitis with minimal effect. Subsequently, he was referred for allogeneic HSCT. The conditioning regimen included: using Fludarabine (30 mg/m^2/dose x 5 doses from day -7 to -3), Melphalan (140mg/m^2 x 1 dose on day -2) and Alemtuzumab (0.2 mg/kg/dose x 5 doses from day -8 to -4). The RIC regimen was chosen to decrease transplant related toxicity in this patient with significant comorbidities including reduced lung function.

He received a bone-marrow from a 9/10 HLA matched (A antigen mismatch), ABO mismatched and CMV positive (recipient CMV negative) donor. Cyclosporin A and mycophenolate mofetil were used for graft versus host disease (GVHD) prophylaxis. The number of infused total nucleated cells and CD34-positive cells were $7.3x10^8$/kg and $3.7x10^6$/kg, respectively. The patient achieved neutrophil engraftment on day +15 and platelet engraftment on day +44. His first chimerism was full donor.

Post transplant course was complicated by multiple infections including BK viremia, Clostridium difficile, Varicella zoster virus reactivation, Klebsiella sepsis and mycobacterium kansasii lung infection diagnosed on a bronchoalveolar lavage. His infections responded to specific antimicrobial treatment. For mycobacterium kansasii, he received multidrug treatment for nine months with complete resolution of lung lesions.

He developed upper gut GVHD, treated with oral Budesonide. Systemic immunosuppression was weaned and stopped by five months post HSCT to allow immune recovery due to recurrent infections.

His arthritis resolved and he was able to ambulate without support. Brain MRI eight months post HSCT showed significant improvement of his CNS vasculitis. Lymphocyte immunophenotyping showed normal T and B cells counts at one year post HSCT. His pulmonary function test showed marked improvement and chimerism remained at full donor with no evidence of autoimmune phenomenon two years post HSCT. Patient's quality of life has improved significantly. Mobility prior to HSCT was by wheel chair, while two years after transplant he was able to play soccer.

Conclusion: RIC allogeneic HSCT is an acceptable conditioning regimen in patient with WAS and allows for engraftment and full donor chimerism. It can be considered in WAS patients with significantly impaired organ functions.

16. PRELIMINARY RESULTS OF FDG-PET SCANNING AFTER GDP CHEMOTHERAPY PRIOR TO AUTOLOGOUS STEM CELL TRANSPLANTATION (ASCT) FOR RELAPSED/ REFRACTORY (RR) LYMPHOM

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Objective: To determine the response rate (RR) as assessed by 18-Fluoro-deoxyglucose positron-emission-tomography (FDG-PET) to GDP (gemcitabine, dexamethasone and cisplatin) salvage chemotherapy (SC) prior to ASCT in patients with RR Hodgkin's lymphoma (HL) and aggressive NHL (NHL)

Rationale: GDP salvage chemotherapy has become the standard of care for salvage chemotherapy for RR-lymphoma based on NCIC LY12. The primary endpoint of this trial was RR to SC as assessed by CT imaging using the 1999 Working group Criteria (JCO 1999). The recent Lugano classification (Cheson JCO 2014) has suggested that the new standard of care for imaging in the curative setting is FDG-PET. There are no published data regarding the outcome of GDP assessed by FDG-PET imaging.

Methodology: We performed a retrospective chart review of consecutive patients referred to Princess Margaret between Jan 2014 and Aug 2015 for consideration of SC and ASCT. A prospectively collected transplant database is maintained and additional data were reviewed from electronic charts. FDG PET imaging was increasingly performed in patients as clinicians adopted the Lugano classification. FDG PET scans were reported as positive or negative based on the report in the patient record. Review of scans to report them by the Deauville Classification is ongoing.

Results and Conclusions: 61 patients were identified, 15 with HL and 46 with aggressive NHL. Relevant details are listed in Table 1. Post-GDP, the PET result was negative in 33% (5/15) of patients with HL and 26% (12/46) with aggressive NHL. CT (CR/PR) responses were: HL 74%, NHL 57%. Additional cases, PFS and OS will be reported with additional follow-up.

Table 1 – Patient Characteristics and Results

Characteristic	N (%) HL	DLBCL
Total no. of patients Median age in years (range	15 30 (20-58)	46 52 (24-69)
Gender - Male	11 (73)	30 (65)
Stage at Diagnosis I- II III –IV B symptoms	 6 (40) 9 (60) 10 (67)	 12(26) 34 (74) 16 (35)
Response to initial chemotherapy CR/Cru PR SD PD Unknown	 3 (20) 2(13) 1(7) 8 (53) 1 (7)	 11 (24) 10 (22) 8 (17) 13 (30) 3 (7)
Prior Radiation (Y)	5 (33)	10 (22)
Disease Stage at Recurrence Stage I and II Stage III and IV B symptoms	10 (67) 5 (33) 2 (13)	18 (39) 28 (61) 2 (4)
Duration of response to initial chemotherapy < 3 months 3-12 months > 12 months	7 (47) 5 (33) 3 (20)	20 (44) 13 (28) 13 (28)
Response to SC by CT CR PR SD PD Missing	 1 (6.5) 10 (67) 3 (20) 1 (6.5) 0 (0)	 4 (9) 22 (48) 14 (30) 3 (6.5) 3 (6.5)
ORR to GDP (%) by CT CR + Cru + PR	 **73**	 **57**
Post-GDP PET scan results Positive Negative	 10 (67) 5 (33)	 34 (74) 12 (26)

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17. IN ELDERLY PATIENTS WITH LYMPHOMA, CHEMOSENSITIVE DISEASE RATHER THAN AGE OR COMORBIDITY INDEX PREDICTS OUTCOME FOLLOWING AUTOLOGOUS HEMATOPOIETIC STEM CELL TRANSPLANTATION

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High-dose chemotherapy (HDT) and autologous hematopoietic cell transplantation (AHCT) is considered standard of care as first-line therapy for mantle cell lymphoma[1,2] and in chemosensitive primary refractory or relapse Non-Hodgkin Lymphoma (NHL)[3]. The implementation of hematopoietic cell transplant comorbidity index score (HCT-CI)[4] for transplant risk evaluation have impacted on patient selection. Over the last decade, most transplant programs have seen an increase in the median age of AHCT recipients[5]. The goal of this study was to identify factors impacting the safety and efficacy of AHCT in the elderly NHL population in order to better select those who will benefit from this intervention.

This single-centre, ethic research committee approved, retrospective study examined outcomes of AHCT in elderly patients (≥60 years old) with NHL. Between January 1st, 2008, and January 1st, 2015, 90 patients met the inclusion criteria and were included in the study. Patients signed an informed consent. Progression-free-survival (PFS) and overall survival (OS) were analyzed according to age at the time of transplantation, HCT-CI, NHL histology and disease status at the time of the transplant. Toxicities were analyzed according to age and HCT-CI.

Median age at time of NHL diagnostic was 60 years (range 42 to 68) and 63 years at time of transplant (range 60 to 69). One-third of our cohort was ≥65 years old. Histology subtype was mainly composed of follicular (36%), mantle cell (20%) and large B-cell lymphoma (38%). HCT-CI risk score was low in 34%, intermediate in 40% and high in 26%. The incidence of febrile neutropenia was 92% with 2% admission to the intensive care unit (ICU). Age ≥65 years was not associated with an increased transplant-related mortality (TRM). The median follow-up was 27 months (range, 1 to 87), median PFS was 46 months (CI 95% 24,4-67,6) and OS is still not reached (graph 1). The estimated 5 years OS is 62% and PFS is 40%. TRM was only 1% at 100 days and 2% at 1 year after the transplant. The 1-year progression rate was 30% and mortality rate only 12%. Progressive disease status following first-line therapy was associated with a worse PFS compared to the achievement of a partial or complete remission (HR 2,77; CI 95%, 1,18; 6,49). Progressive disease status at time of transplant was also associated with a lower PFS (HR 9,30: CI 95% 2,55 to 33,92) and OS (HR 13,44: CI 95% 2,68 to 67,48). International Prognostic Index, age and treatment type did not influence PFS or OS. Surprisingly, HCT-CI score did not correlate with toxicities, morbidity or mortality.

AHCT is safe and effective in selected elderly NHL patients. Progressive disease at the time of transplant was associated with worse PFS and OS. HCT-CI did not allow to predict outcome. Our data suggest that age alone should not exclude patients from transplantation. This approach should be strictly reserved to patients with chemosensitive disease.

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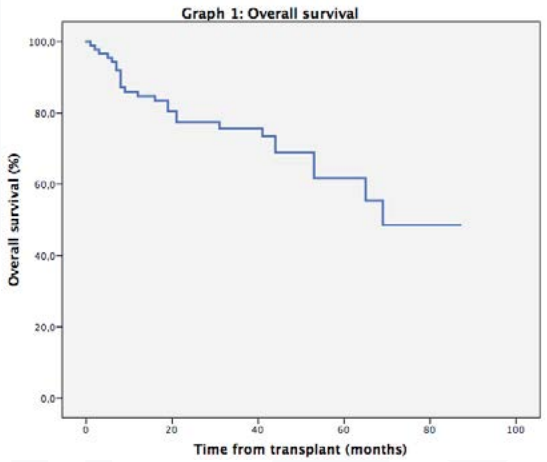

18. AN EVALUATION OF INTRAVENOUS IMMUNOGLOBULIN (IVIG) UTILIZATION AMONG HEMATOPOIETIC STEM CELL TRANSPLANT RECIPIENTS IN VANCOUVER, BC

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Rationale & Objective: Infectious complications account for the overwhelming majority of non-relapse mortality in hematopoietic stem cell transplantation (HSCT). The role of intravenous immunoglobulin (IVIg) therapy post-allogeneic transplant remains controversial but continues to be widely used. Patients with low IgG levels with either recurrent infectious complications or chronic graft vs. host disease (GVHD) are thought to benefit from monthly IVIg in the year following HSCT. Certain categories of transplant patients have significantly delayed immune reconstitution, such as those who receive T-cell depletion, cord stem cell transplants and haploidentical transplants. These patients are more likely to suffer fatal infection related to their immunocompromised state and are also targeted more specifically for prophylaxis.

IVIg use in British Columbia (BC) is increasing and use in secondary immunodeficiency, which includes HSCT, has made up the majority of this increase. As a result, provincial initiatives have formed to carefully evaluate IVIg use. The purpose of this project is to audit IVIg the use among HSCT recipients in BC as a first step in the development of provincial IVIg guidelines.

Methods: We reviewed IVIg utilization data among patients who had undergone allogeneic stem cell transplant at any time – at 4 Vancouver hospitals -over a 100 day period in Fall 2015 to provide a "snapshot" of utilization. The following variables were collected from hospital and clinic charts: indication for initiation, improvement of IgG levels and appropriate timing of IgG troughs, reduced infections, and documentation of reasons for continuation of IVIg use at 1 year.

Results: Eighty-five patients (28 sib-matched, 50 unrelated donor, 1 haplotype, 6 cord blood) underwent HSCT in 2015 and 26 (31%) received IVIg in the post-transplant period.

Twenty-five patients received IVIg at one of the 4 above hospitals over the 100 day audit period. The mean duration on IVIg therapy was 1.37 years and mean amount of IVIG received of 435 grams. Four patients were on IVIg for over 4 years. All applicable patients had an IgG level less that the lab lower normal limit (6.5 g/L) prior to initiation of therapy and 15/25 patients had an IgG level of $\leq$ 4.0 g/L . The indications for initiation of IVIg were as follows recurrent infections (3 patients), severe GVHD (10 patients) recurrent infections and GVHD (7 patients), CMV reactivation (2 patients), cord blood transplant protocol (1 patient), following CAR-T cell therapy and GVHD-related neuropathy (1 patient). Documentation of perceived clinical benefit (eg reduced infections) was rare; of the 9 patients on IVIg replacement therapy over 1 year there was no documentation of rationale for continuation of IVIg past the 1 year mark.

Conclusions: IVIg use is coming under greater scrutiny in BC. This audit of IVIg use in HSCT recipients demonstrated that the indications for commencement of IVIg in the majority of cases were appropriate. However, the rationale for continuation of IVIg therapy past the 1 year mark was seldom documented. The development of provincial IVIg guidelines will include formal mechanisms for the re-evaluation of ongoing IVIG therapy at 1 year post HSCT.

19. OUTCOMES OF PEDIATRIC HSCT PATIENTS WITH MYELOID MALIGNANCIES TREATED WITH BUSULFAN-FLUDARABINE BASED CONDITIONING REGIMEN

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Introduction: IV busulfan and fludarabine (Bu/Flu) conditioning is associated with decreased treatment-related mortality (TRM) and adequate anti-leukemic activity in adults with AML/MDS. Its efficacy in children is not well substantiated. We report the outcome of pediatric patients with myeloid malignancies conditioned with a myeloablative Bu/Flu regimen.

Methods: A retrospective chart review of all children with AML/MDS or CML who underwent HSCT at SickKids, Toronto or at Saint Justine, Montreal using Bu/Flu conditioning between 2011 and 2015 was conducted. Busulfan was given once daily for 4 days at a dose targeting an area-under-the-curve of 3600-6000 µM·min/day (SickKids) or a total of 18,800 µM·min/4 days (SJ). The cumulative fludarabine dose was 160 mg/m2. The patients were evaluated for overall survival (OS), event free survival (EFS: including relapse, graft failure, death), TRM, engraftment, GVHD and other complications.

Results: Twenty-six children (n=15 females; mean age: 8.4 years, range: 3-17.2y) underwent HSCT for AML (n=20), MDS (n=5) or CML (n=1). Thirteen AML patients were in CR1, 3 in CR2, 3 in CR3 and 1 was not in remission at time of HSCT. Eight patients received bone marrow (BM) from unrelated donors (6 10/10 HLA matched, 2 9/10 HLA mismatched); 10 received cord blood unrelated stem cells (UCBT) (9 single and 1 double cord units) and

8 received related donors stem cells (6 matched, 1 9/10 HLA matched and 1 haplo-identical donor). Sixteen patients (62%) received anti-thymocyte globulin and 3 (12%) received 400cGy total-body irradiation. Twenty-three patients (88%) had neutrophil engraftment (mean: 21 days; range: 13-55 days). Eighteen patients suffered from at least one episode of infection (12 viral, 4 fungal, 8 bacterial). Mucositis was the most common adverse effect (20/26) followed by hemorrhagic cystitis (n=3), cardiac dysfunction (n=2), respiratory failure/ ADRS (n=2) and hepatic veno-occlusive disease (n=1). Five patients developed acute GVHD (grade I-II); no grade III-IV acute GVHD was observed.

Three patients died prior to day 100 (2 from relapse and 1 from TRM). Three patients had primary graft failure and received a second UCBT (n=2) or a second UCBT followed by a third un-related HSCT (due to non-engraftment of the second UCBT).

Thirteen of the surviving 20 children who achieved initial engraftment had evidence of mixed donor chimerism and were treated with withdrawal of immunosuppression (n=12), donor lymphocyte infusion (n=4) or no intervention (n=1). Of these, 3 developed secondary graft-failure (cord n=2, BM n=1) which was treated with second HSCT (n=2) or stem cell boost (n=1). A total of 8 patients relapsed post-transplant (4 patients died after a second HSCT and 4 underwent salvage therapy, second HSCT and are in remission). At a median follow-up of 1121 days (range: 63-1618 days) the EFS was 39.8±12.2%, TRM 4.3±4.3% and OS was 79.1±8.4%

Conclusion: Myeloablative conditioning with Bu/Flu was well-tolerated with low TRM (1/26). However, we observed a high rate of mixed donor chimerism (13/26) and a high rate of primary (3/26) or secondary (3/26) graft failure. We found low EFS in pediatric patients with myeloid malignancies and long-term outcome should be followed.

20. TREATMENT MODALITY BASED ON MRD ASSESSMENT FOR A HIGH-RISK PEDIATRIC ACUTE MEGAKARYOBLASTIC LEUKEMIA CASE

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Non-Down syndrome acute megakaryoblastic leukemia (AMKL) is a high-risk (HR) AML in children with a poor survival rate. Recently, inv(16)(p13.3q24.3) with CBFA2T3-GLIS2 fusion transcript has been identified as a particularly dismal prognosis AMKL subgroup.

For a few years now, in our pediatric oncologic unit, we have stored RNA samples of every newly diagnosed AML to perform transcriptome analysis on leukemic cells. Minimal residual disease (MRD) is monitored during treatment by flow cytometry and, if a fusion transcript is identified, by nested RT-PCR. Furthermore, we now opt to intensify AMKL with hematopoietic stem cell transplant (HSCT) in first remission.

This case highlighted how this practice can lead to a more personalized treatment.

A two and a half year old boy was diagnosed with a CNS-1, non-hyperleucocytic AMKL. Cytogenetic analysis revealed a 46XY caryotype and t(1;16)(q21;p11.2) with no other abnormality. Usual AML cytogenetic anomalies were negative by FISH analysis. Flow cytometry unraveled CD33, CD34, CD41, CD61 and CD117 positivity. Transcriptome analysis identified a specific CBFA2T3-GLIS2 fusion transcript which allowed us to develop specific primers for Nested RT-PCR to assess molecular MRD with a high sensitivity (10^{-4}).

Treatment was initiated with Hydroxyurea for 5 days awaiting health care insurance eligibility, and then according to COG AAML0531 arm A, that included cytarabine (with both standard and high dose [HD]), Daunorubicin, Etoposide and Mitoxantrone. After induction, complete cytological remission (CR) was reached. MRD in flow cytometry revealed 1.6% of AMKL cells. Evaluation after first and second intensification showed a continuous CR, but persistant 1% and 0.02% (respectively) residual disease. Thus, we decided to intensify by a second line therapy including 5-Azacitidine, Fludarabine, and HD cytarabine, leading to a negative MRD in both flow cytometry and nested RT-PCR before HSCT.

A sibling HLA-identical cord blood transplant with intra-bone infusion has been performed, conditioned with Busulfan and Cyclophosphamide. Immunosupressive therapy included MMF and CSA has been weaned early after graft (day 30 for MMF and day 83 for CSA) according to our local procedure, without GVHD. No major side effect and good immune reconstitution were observed.

Bone marrow aspirate performed at day 31, 45, 76 and 136 post transplant showed persistent negative MRD (flow cytometry / molecular). After 6 months post-transplant there was no sign of relapse.

AMKL is a HR-AML with high rate of relapse and poor survival, especially in the subgroup of inv16 with CBFA2T3-GLIS2 fusion transcript. Proceeding to systematic transcriptome for newly diagnosed AML allowed us to identify and follow this HR-AMKL with Nested RT-PCR and then made us intensify the treatment before HSCT.

This case showed that targeting a negative residual disease with minimal tumor load before transplant could lead to sustained complete response after transplant, for a short-term follow-up of 6 months. This observation raises the important question of molecular remission assessment prior to HSCT in pediatric HR-AML patients, which needs to be addressed in future prospective studies.

21. SUCCESSFUL MYELOABLATIVE MATCHED UNRELATED DONOR HEMATOPOIETIC STEM CELL TRANSPLANT IN A YOUNG GIRL WITH GATA2 MUTATION AND EMBERGER SYNDROME.

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Background: GATA2 deficiency results in a spectrum of clinical symptoms known as Emberger syndrome with lymphedema and monosomy 7; MonoMAC syndrome for the lack of monocytes and non-tubercular mycobacterial infections (MAC); DCML, dendritic cell, monocyte and lymphoid cell deficiency; and familial myelodysplastic syndrome (MDS)/ acute myelogenous leukemia (AML). Reconstitution of the deficient cell compartments by allogeneic hematopoietic stem cell transplant (HSCT) is the only curative treatment. Use of non-myeloablative conditioning regimens have been reported with more rejection and higher relapse rates after HSCT. Umbilical cord blood transplant has been reported to be suboptimal in this population.

Case: A 4 year old girl with a history of bilateral congenital sensorineural deafness found at birth. At 12 weeks of age, she developed lymphedema of both legs which progressed to involve her upper limbs and face by the age of 6 months. She underwent bilateral cochlear implantation at 14 months of age. She developed intermittent facial acneiform lesions at 28 months of age. Her endocrine evaluation was normal. During the first year of life she had 3 episodes of recurrent lower respiratory tract infection requiring hospitalization. At 3.5 years of age she developed a plantar wart treated with laser therapy with partial response. At the age of 4 years she had febrile neutropenia resulted in further investigations including bone marrow (BM) examination which showed GATA 2 mutation with monosomy 7 without dysplasia. Lymphocyte immunophenotyping revealed mildly decreased B cells with normal NK and T cells. Repeat BM examination 3 months later showed MDS with refractory cytopenia.

She underwent 10/10 matched living unrelated donor (LURD) HSCT at 4.5 years of age using a myeloablative conditioning regimen. The conditioning regimen included once daily IV busulfan for 4 days (targeting an area-under-the-curve of 3600-6000 μM·L.min) and 4 days of fludarabine for a total dose of 160mg/m^2. Cyclosporine and methotrexate (10 mg/m^2 on days+1, +3, +6, and +11) were used as graft versus host (GVHD) prophylaxis. A fresh BM with nucleated cell dose of 5 x10^8 /kg and CD34 cell dose of 7.83 x 10^6/kg was infused on day 0.

Results: She tolerated conditioning regimen and bone marrow infusions well. On day+12 she developed croup with severe oral mucositis (grade 4) which required 48 hours of intensive care unit admission without invasive ventilation. She achieved neutrophil engraftment on day +24. Initial chimerism was mixed (90% donor). Cyclosporine was gradually weaned and discontinued at day + 85. This resulted in conversion to full donor chimerism. BM assessment 3 months post HSCT revealed normal hematopoiesis and absence of monosomy 7. Three months after HSCT, the patient developed grade 1 acute skin GVHD which responded to topical steroid and topical tacrolimus. Seven months post HSCT she developed limited chronic GVDH of oral mucosa which improved with dexamethasone mouthwashes. She had complete resolution of her acne and plantar warts. At 18 months of follow up she had full donor chimerism with complete reconstitution of the monocyte, NK cell, and B-lymphocyte populations.

Conclusions: Myeloablative LURD HSCT represents an effective viable option for cure in patients with GATA2 deficiency and Emberger syndrome.

22. DOSE EXTENDED TOTAL BODY IRRADIATION FOLLOWED BY ALLOGENEIC CELL TRANSPLANTATION FOR THE TREATMENT OF REFRACTORY ACUTE LEUKEMIA

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Introduction: Refractory acute myeloid leukemia (rAML) is unlikely to be cured with a conventional allogeneic cell transplantation (alloHCT). We designed a novel transplant conditioning regimen to try to overcome disease resistance.

Methods: Between January 2012 and September 2015, 14 patients, with either primary refractory or refractory at relapse, were prospectively enrolled in, an ethics approved, phase I/II study using dose-escalated total body irradiation (DETBI) as the sole conditioning agent pre-alloHCT. 18Gy TBI was delivered by a linear accelerator, fractionated twice/day over 4 days. Unselected HLA-matched grafts were infused on day 0. Graft versus host disease (GVHD) prophylaxis included tacrolimus and mycophenolate mofetil (MMF).

Results: Patients' median age was 39 (24 - 60) years. Median Karnofsky score was 80 (50-90). Median blast percentage, in the marrow, prior to alloHCT was 80 (0 – 100). All but 1 patient had circulating blasts at the time of enrollment; 9 had relapsed disease. For patients with relapsed AML, the median duration of remission was 4 (2-21) months. Seven patients received a graft from a related donor.

Ten patients required narcotics for mucositis for a median of 9 (5-33) days. Seven patients required total parenteral nutrition for a median of 16 (6-43) days. All patients had diarrhea for a median of 9.5 (4-23) days. Two patients

developed sinusoidal obstructive syndrome which resolved with conservative management. Five patients spent a median of 3.5 (1-18) days in the intensive care unit (ICU). Among the 5 transferred to the ICU: one patient was in ICU, for one day, for the infusion of an ABO incompatible stem cell product on day 0; three were transferred to the ICU for complications, potentially, from the transplant (day 27-39); and 1 was a late fulminant relapse at day 394.

Neutrophil engraftment occurred at a median of 15 (11-25) days. 11/14 were discharged from hospital in a median of 26 (19-82) days post alloHCT. 8 patients spent part of their admission [median 6 (5-19) days] in our outpatient bed. 9 patients reached a normal CBC (neutrophil>1x109/L and platelets >100 x109/L) at a median of 20 (15-45) days post-alloHCT. Three patients only achieved a CRp after alloHCT. 7/12 patients had no blasts in a post alloHCT bone marrow, at a median of 56 (21 – 114) days post alloHCT.

Acute GVHD, grade II-IV, was noted in 3 patients involving the liver and the gastrointestinal tract. Chronic GVHD was noted in 4.

One patient is a long-term survivor 1143 days post alloHCT. 9/10 patients who have relapsed died at a median of 122 (34 – 396) days post alloHCT. 3 patients died of treatment related toxicity (TRM) between 43 and 116 days, 2 of whom were in remission. Deaths were due to sepsis, macrophage activating syndrome and colitis secondary to graft vs. host disease +/- CMV.

Conclusion: DETBI, 18Gy, is tolerable, facilitates engraftment and demonstrates some initial disease control. Remissions, however were not sustained preventing the assessment of long-term engraftment. Future studies, examining the effect on toxicity and maintenance of remission, of adjuvant therapies on this platform are being planned.

23. POST-TRANSPLANT ADMINISTRATION OF DONOR LYMPHOCYTES DEPLETED OF ALLOREACTIVE T-CELLS (ATIR101) IMPROVES OVERALL SURVIVAL AND REDUCES TRANSPLANT RELATED MORTALITY FOLLOWING T-CELL DEPLETED HAPLOIDENTICAL HSCT: RESULTS FROM A PHASE 2 TRIAL IN PATIENTS WITH AML AND ALL

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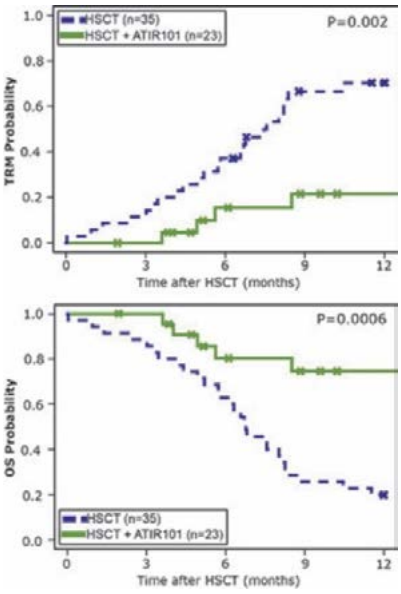
Background: Haploidentical donor grafts may resolve the shortage of available HLA-matched donors for hematopoietic stem cell transplantation (HSCT). However, to prevent graft-versus-host disease (GVHD), haploidentical HSCT requires alloreactive T-cell depletion. We have developed a strategy that allows additional donor lymphocytes to be infused post-HSCT without the risk of inducing severe GVHD and maintaining the ability to react against infections and leukemic cells.

Methods: In this open-label, multicenter phase 2 study (CR-AIR-007; NCT01794299), 23 patients with a median age of 41 years (range 21 - 64) were treated with ATIR101. Seventeen patients had AML (74%), 12 in CR1 and 5 in CR2, and 6 patients had ALL (26%), 4 in CR1 and 2 in CR2 at the time of HSCT. Patients underwent myeloablative conditioning, consisting of a] TBI (1200 cGy; n=11) or b] melphalan (120 mg/m2; n=12), along with thiotepa (10 mg/kg), fludarabine (30 mg/m^2 x 5d) and rabbit ATG (2.5mg/kg x 4d). A CD34+ selected stem cell graft from a haploidentical donor was given, containing 10.9x10^6 CD34+ cells/kg (range;3.2 – 24.4). Donor lymphocytes were processed using a selective photodepletion technology, creating a donor lymphocyte infusion depleted of alloreactive T-cells (ATIR101). ATIR101 was infused at a median of 28 days post-HSCT (range; 28-73 days) at a fixed dose of 2x10^6 CD3+ cells/kg. No post-transplant GVHD prophylaxis was administered.

Results: All patients engrafted rapidly after transplantation, with neutrophil and platelet engraftment achieved at a median of 12 days (range 8-34, range 9-35 respectively). Mean follow-up, as of November 23rd, 2015 was 292 days post-HSCT. A total of 19 patients were beyond 6 months post-HSCT, of which 15 were alive. Among the 15 patients who were beyond 12 months post-HSCT, 10 were alive. None of the patients developed grade III/IV acute GvHD after infusion of ATIR101. Two cases of grade II acute GVHD were reported thus far with a delayed onset, starting at day 173 and day 247 post-HSCT. When compared to a matched historic control group (N=35), TRM was significantly lower in patients given ATIR101 after a T-cell depleted haplo-transplant : 6-month TRM for HSCT + ATIR101 was 15% versus 37% for HSCT alone (Figure 1). Two patients experienced a relapse within the first year, occurring at 61 and 90 days post-HSCT. One patient died as a result of the disease relapse. The overall survival of patients given ATIR101 was also significantly improved compared to the historic control group, with a 1-year survival of 75% in the HSCT+ATIR101 group and 20% in the control group (Figure 2).

Conclusion: Administration of a high dose ATIR101 treated donor lymphocytes from a haploidentical donor does not cause severe GVHD despite the absence of prophylactic immune suppression. Addition of ATIR101 to a T-cell depleted HSCT protocol significantly improves transplantation outcome, with reduced TRM and improved OS. Moreover, the low number of relapses observed thus far is most encouraging and supports the hypothesis of preserved T-cells in ATIR101 that are able to recognize leukemic antigens.



24. INFECTION-RELATED COMPLICATIONS AFTER ALLOGENEIC HEMATOPOIETIC CELL TRANSPLANTS IN CHRONIC LYMPHOCYTIC LEUKEMIA IN COMPARISON WITH FOLLICULAR LYMPHOMA

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Introduction: Patients undergoing allogeneic Hematopoietic Cell Transplants (HCT) are prone to infections after HCT. Previous studies have shown that patients with Chronic Lymphocytic Leukemia (CLL) have increased risk of secondary cancers compared to Follicular Lymphoma (FL), possibly due to greater immune suppression in CLL. There is limited literature focusing on post-HCT infections in CLL. We hypothesized that due to a higher degree of pre-HCT immune suppression in CLL patients, they have a higher burden of infections post-allogeneic HCT, at least until full immunological recovery. FL was chosen as a comparator to CLL, as it is also an indolent lymphoid malignancy.

Objective: To study the frequency and types of infections seen after HCT in CLL and FL patients.

Methods: The medical records of all allogeneic HCTs for CLL and FL performed by the Manitoba Blood and Marrow Transplant Program (MBMT) from 1990 to 2014 were analyzed retrospectively. New infections were included from the time of HCT admission until death, relapse, or last follow-up. Each infective episode was assessed for (a) time since transplant, (b) severity of infection based on NCI CTCAE, (c) site of infection, and (d) Microorganism type. Cumulative infection incidence was calculated, accounting for competing risk of death.

Results: A total of 32 CLL and 28 FL patients received an allogeneic HCT. There was a male predominance (CLL: 71.9%, FL: 67.9%). CLL patients tended to have lower rates of infection, but higher rates of competing risk (death without infection).

Results of Grade 2+ infections:

	CLL		FL		
Year	Infection (%)	Death (%)	Infection (%)	Death (%)	P-value Infection: 0.1490 Death: 0.1911
1	59.4	6.3	60.7	0	
2	65.6	9.4	79.9	0	
3	71.9	12.5	83.9	0	
4	71.9	12.5	87.9	0	
5	81.3	15.6	96.0	0	

Patients with CLL had a higher number of infections associated with death, CLL: 19%, FL: 3.6%.

Conclusion: Overall survival of FL patients is substantially higher than in CLL patients. While the total number of infections were higher in FL, fatal infections were more common in CLL. Sample size and the retrospective nature of the study are limitations of this analysis.

25. CYTOMEGALOVIRUS REACTIVATION DOES NOT REDUCE THE RISK OF DISEASE RELAPSE AFTER ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION

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Background: A protective effect against hematological disease relapse mediated by Cytomegalovirus reactivation (CMV-rt) and NK cell proliferation induced by this viremia has been proposed. We analyzed the possible link between CMV-rt and malignant disease relapse after hematopoietic stem cell transplantation (HSCT) in a large single institution cohort.

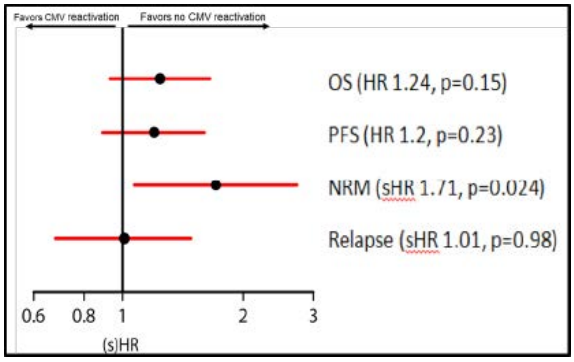
Methods: We identified 1384 patients who underwent first allogeneic HSCT between 1/1/2006 and 8/31/2012 at the Dana Farber Cancer Institute. Data were extracted from the HSCT data repository and confirmed by medical chart review. All patients underwent weekly CMV surveillance in the first 100 days after HSCT, and as clinically indicated beyond day +100. CMV-rt was defined as detection of more than 500 copies/mL of CMV DNA by quantitative real-time PCR. The median follow-up time among survivors was 48 months (range 11.5-103.2).

Results: Among HSCT recipients, 746 (53.9%) were CMV seropositive prior to HSCT. 301 patients had CMV-rt after allogeneic HSCT (21.7%). Of these 301 patients, the median age was 53 (range 19-73), 52.2% were male, 39.2% had AML, and 12.6% received an umbilical cord blood HSCT. The median time to CMV-rt was 58 days (range 3-1512). The majority of CMV-rt occurred within the first 100 days after HSCT (68.4%). The cumulative incidence of CMV-rt was 21.4% (95% CI 19-24) by 2 years after HSCT, with no difference by disease category (p=0.69). 29 patients went on to develop invasive CMV disease, with colitis (14) and pneumonitis (10) being the main sites of involvement.

There was no difference in age, diagnosis, conditioning intensity, or disease risk index between patients with and without CMV-rt in univariable analysis. CMV-rt was associated with donor type, with mismatched unrelated donors having the highest risk (32.8%, p=0.0005) and stem cell source, with cord blood recipients having the highest risk (37.3%, p=0.0002). In multivariable Cox models stratified by conditioning intensity and treating CMV-rt as a time-dependent variable, CMV-rt was associated with worse overall and progression free survival (HR=1.37, 95% CI 1.14-1.64 and HR=1.3, 95% CI 1.08-1.57 respectively) and higher non-relapse mortality (NRM HR=1.69, 95% CI 1.28-2.23). There was no effect of CMV-rt on the cumulative incidence of relapse (HR=1.08, 95% CI 0.84-1.39), even when restricted to AML patients only (Figure 1). In a day 100 landmark analysis excluding death or relapse within 100 days, the 2-year cumulative incidence of NRM was higher in patients with CMV-rt by day 100 compared to those without CMV-rt (19.3% vs. 11.5%, p=0.01), but there was no difference in relapse (p=0.45).

Conclusion: In this large cohort of patients undergoing allogeneic HSCT for hematologic malignancy, NRM was significantly associated with CMV-rt, but not relapse. Strategies to prevent and pre-emptively treat CMV therefore remain pertinent in patients undergoing allogeneic HSCT.

Figure 1: HSCT outcomes for AML patients only (N=530)



OS=overall survival, PFS=progression-free survival, NRM=non-relapse mortality, sHR=subdistribution HR since NRM and relapse computed in the competing risks framework

26. VENOUS THROMBOEMBOLISM IS ASSOCIATED WITH GRAFT-VERSUS-HOST DISEASE AFTER ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION

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Background: Although venous thromboembolism (VTE) after allogeneic hematopoietic stem cell transplantation (HSCT) is known to occur, there are currently limited data on its incidence, risk factors and outcomes. Studies that have examined VTE after HSCT have been small and not adequately able to address clinical risk factors including graft-versus-host disease (GVHD). We describe VTE incidence, characteristics, risk factors and outcomes in a large cohort of patients undergoing allogeneic HSCT in a single institution with extended follow-up.

Methods: We identified all patients who underwent allogeneic HSCT between 01/01/2002 and 12/31/2013 at Dana Farber Cancer Institute/Brigham and Women's Hospital (DFCI/BWH). Using pharmacy records and subsequent medical chart review, patients who received systemic anticoagulation for VTE were identified. All VTE events were confirmed by radiologic imaging. VTE was defined as catheter-associated, pulmonary embolism (PE), lower extremity deep vein thrombosis (DVT), upper extremity DVT, superior vena cava (SVC) thrombosis or other (which included pelvic, abdominal, or ventricular thrombosis). Patient, disease and transplant related factors were extracted from the transplantation database at DFCI.

Results: 2276 patients who underwent initial allogeneic HSCT at DFCI/BWH were identified, with a median follow-up time of 50 months (range 4-146) among survivors. 190 patients (8.3%) developed VTE requiring systemic anticoagulation. The 1 and 2-year cumulative incidence of all VTE were 5.5% (95% CI 4.6-6.5%) and 7.1% (95% CI 6.1-8.2%) respectively. There was no difference in age, gender, body mass index, diagnosis, disease status at time of HSCT, conditioning regimen intensity, donor type (HLA matched or mismatched, related or unrelated, or cord blood), or graft source (bone marrow or peripheral blood) between HSCT recipients with and without VTE.

Amongst the 190 patients who developed VTE, 65 (34.2%) were lower extremity DVT, 48 (25.3%) were catheter-associated, 45 (23.7%) were PE, 10 (5.3%) were PE and DVT, 9 (4.7%) were upper extremity DVT, 9 (4.7%) were other DVT, and 4 (2.1%) were SVC thrombosis. Catheter-associated DVT occurred at a median of 1.1 months (range 0.1-41.1) after HSCT, which was significantly shorter than other types of VTE (p<0.0001). 98 patients (51.6%) had active GVHD at time of VTE, while 28 (14.7%) had a history of GVHD, still on immune suppression at time of VTE.

In a multivariable Cox model treating VTE and GVHD as time-dependent variables, VTE was associated with increased non-relapse mortality (HR=1.47; 95% CI 1.07-1.98), but not relapse (HR=0.98, 95% CI 0.69-1.34), progression-free survival (HR=1.21, 95% CI 0.94-1.57) or overall survival (HR=1.07, 95% CI 0.86-1.34). Non-relapse mortality was also significantly associated with VTE when catheter-associated VTE were excluded (HR=1.67; 95% CI 1.14-2.37). In multivariable model identifying potential risk factors for VTE, acute and chronic GVHD were independently associated with developing VTE (HR=2.02, 95% CI 1.47-2.77 and HR=2.30, 95% CI 1.52-3.48, respectively).

Conclusion: Venous thromboembolism is a prevalent complication of allogeneic HSCT that increases non-relapse mortality risk. Both acute and chronic GVHD are associated with an increased risk of developing VTE. Further analysis is needed to identify HSCT patients with the highest risk for VTE who might benefit from VTE prophylaxis.

27. VALIDATION METHOD FOR RBC DEPLETION OF MARROW USING THE COBE 2991

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Background: Major ABO incompatibility occurs when patients have antibodies directed against donor red blood cell (RBC) antigens thus requiring RBC depletion. Minor incompatibility occurs when donor plasma contains antibodies directed against patient RBC, thus plasma depletion is required. In some cases both exist and product needs to be Plasma and RBC reduced.

The RBC depletion for marrow was being done in the apheresis unit. The procedure is a rare occurrence and concern regarding staff competency was an issue.

The laboratory staff of the Clinical Cell Therapy Laboratory (CCT) is responsible for processing marrow for plasma depletion and cryopreservation on the COBE 2991. The proposed method for RBC depletion of marrows using the COBE 2991 would allow the process to become the responsibility of the CCT laboratory. This would be dependant upon RBC volumes being low enough and maintaining acceptable TNC recoveries.

Method: A modified version of the protocol using the COBE 2991 was adapted. The following changes were introduced:

- The target volume to collect was ~100 to 180mls, TNC recoveries >70% and RBC volume <30mls.
- The buffy coat will not be diverted from the donut until all marrow has been processed.
- Plasma from the discard bag will be used to do the final push of buffy coat once the end of the buffy coat has reached the T junction.
- The cells are spun for 8 minutes @ 3000rpm on manual mode.
- The valve to the harvest marrow was released temporarily to allow product in the tubing to run into the harvest bag at the 4 minute mark.
- Superout rate of 100 instead of 250 will be used at final buffy coat collection.

Results: Initial workup using pigs blood yielded poor TNC recoveries (64.9% and 62.2%) although RBC depletion volume was acceptable (16.0 and 16.9mls). The buffy coat layer was hard to see and it seemed that the superout rate of 100 mls/minute was too slow. We then investigated using PV blood which was spiked with thawed HPC,A products that were to be discarded. The HCT was adjusted to mimic a bone marrow. The same product was processed using 250 vs175 superout rates with RBC volume of 24.4 and 10.6mls respectively. The TNC recovery for both was ~82%. Subsequent superout rate of 175 was used.

The initial two autologous marrows processed using this method had a low TNC/kg, so it was decided to err on the high side of the RBC volume to ensure a high TNC recovery.

The next 7 marrows processed using the new protocol yielded TNC recoveries ranging from 79-98% with a mean of 87% and RBC volumes of 8 to 29.5mls with a mean of 19mls. All well within our acceptable limits.

Conclusions: The COBE 2991 can be used to process marrow for RBC depletion with some key adjustments of the superout rate and using the plasma to push the buffy coat into the buffy coat bag. These changes yield TNC recoveries > 70% and the 30 ml RBC cutoff allows for increased TNC recoveries.

28. OVEREXPRESSION OF C-MYC ENHANCES THE GROWTH OF PRIMITIVE HUMAN HEMATOPOIETIC CELLS AND INDUCES A HUMAN LEUKEMIA DE NOVO IN TRANSPLANTED MICE

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Background: MYC is a well-studied transcription factor implicated in regulating many normal cell functions and widely in tumorigenesis when overexpressed. Increased expression of MYC has been reported in the leukemic cells of patients with chronic and acute myeloid leukemia (CML and AML). However, the functional role of MYC in primitive normal human hematopoietic cells and in the pathogenesis of human leukemia has not been investigated. The present study was designed to address these questions.

Methods and Results: We first examined the effects of lentivirally-mediated overexpression of MYC on the extent and duration of cell production from normal CD34+ cord blood (CB) cells and CD34+ cells isolated from

a chronic phase CML patient sample in which all CD34+ cells had been previously found to be BCR-ABL1-positive. When the cells were co-cultured for 16 weeks on mouse stromal feeders engineered to express FLT3-ligand, Steel/Stem Cell Factor, IL-3 and G-CSF, we found the number of mature (nonadherent) cells present in the cultures of MYC-transduced cells to be markedly increased relative to the cultures initiated with control-transduced cells. An immediate enhancing (7-fold) effect of MYC overexpression on cell production was also observed in single-cell 12-day cultures initiated with normal CD34+ CB cells. When MYC-transduced CD34+38- CB cells were transplanted into sublethally irradiated immunodeficient NRG-3GS mice immediately post-transduction, a fatal CD33+CD123+CD14-CD15- human leukemia was rapidly (within 5 weeks) and consistently (8/8 engrafted mice, 2 experiments) produced from the MYC-transduced cells.

The mice showed occasional blasts in the blood, suppression of host blood cell production and of blood cell production from the non-transduced human cells, and splenomegaly caused by the presence of the leukemic cells.

Conclusions: Overall, our results suggest that supra-normal levels of MYC in human chronic phase CML and normal CB CD34+ cells activate pathways that significantly, rapidly and sustainably increase cell outputs from both these sources in vitro and are sufficient to induce an AML-like disease in mice transplanted with manipulated CB cells. Future experiments will seek to further characterize the abnormal cells produced, the range of susceptible target cells, and the pathway alterations that cause the hyper-proliferative state generated, with the goal of achieving an improved understanding of the early events and pathways involved in human MYC-driven leukemogenesis.

29. VALIDATION AND IMPLEMENTATION OF THE CREDO CUBE™ CONTAINER AT THE OTTAWA HOSPITAL FOR TRANSPORT OF ALLOGENEIC CELLULAR THERAPY PRODUCTS

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Background: To ensure transport of HPC, Marrow and HPC, Apheresis at consistent desired temperatures in accordance with FACT standards, a qualified packing configuration for therapeutic cell transport was needed to ensure an adequate survival time for courier-based transport of cells from national and international stem cell collection sites to the Ottawa Hospital BMT Program (transplant centre).

Methods: The ability of the Credo Cube™ container (Series 4-496; Minnesota Thermal Science) to maintain a payload temperature of 1-10°C was tested using saline bags mimicking cell therapy products with standard minimum and maximum volumes. The container was qualified for HPC, Apheresis by conditioning thermal insulation chamber (TIC) plates as per manufacturer instructions followed by incubation of the packed container in ambient temperature (22+/-2°C) for 72h, or the maximum time to infusion post-collection for HPC, Apheresis. This was repeated for HPC, Marrow transport qualification at 15-25°C, but without the use of TIC plates. Though most product transit time is spent in a thermally-controlled environment (cab, airport, airplane cabin, collection centre), performance of the containers exposed to ambient temperatures of -20°C and +37°C for up to 1 hour was also tested in-house using a validated freezer and incubator respectively to parallel the range of extreme temperature exposures possible during transport. All tests were performed three times in duplicate with two containers, with continuous temperature monitoring using Libero Ti1 temperature data loggers (Elpro). Once qualifications were complete, process validation was performed using updated program standard operating procedures and courier transport records for both continental and intercontinental courier missions with continuous temperature monitoring. Upon satisfactory performance, a training video and detailed checklist for container assembly and use were developed and an inaugural cooler training session was conducted for all prospective couriers. Courier feedback was requested and collected for these and all subsequent product pick-up missions as part of the Ottawa Hospital and Bruce Denniston Bone Marrow Society volunteer courier collaborative agreement.

Results: Temperatures were maintained within the above specified acceptable ranges beyond endpoints for all trials with TIC plates (HPC, Apheresis) and without (HPC, Marrow). The containers also maintained stable desired temperatures during the process validation courier missions. The courier satisfaction reported with training material quality and use of the Credo Cube™ was unanimous.

Conclusion: The Credo Cube™ containers performed as expected, maintaining the desired temperature ranges for transport of product at refrigeration and room temperatures for HPC, Apheresis and HPC, Marrow respectively. These containers have been implemented at our transplant centre since January 2014 without incident or deviation from expected performance standard, with positive feedback from the couriers.

30. A CLINICALLY DERIVED ALGORITHM TO ESTIMATE THE PROPORTION OF ACUTE MYELOID LEUKEMIA PATIENTS THAT PROCEED TO TRANSPLANT

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Background: Since 2010, Cancer Care Ontario (CCO) has been responsible for the planning of hematopoietic cell transplantation (HCT) services in Ontario. To effectively plan HCT services, CCO needs to understand

how many patients should be eligible and potentially benefit from this treatment. The largest volume driver of allogeneic (allo) HCT in Ontario is acute myeloid leukemia (AML) patients, accounting for approximately 40% of all allo HCTs performed in Ontario.

Methods: The AML incident population was stratified into 3 age groups: 18-60, 61-70 and 71-75. A consensus building process was used to estimate the proportion of incident AML patients that should be eligible for transplant for each age group. Clinicians from three allo HCT centres in Ontario were engaged to account for variation in practice across the province. A calculator tool was developed in Excel to enable clinicians to adjust the assumptions at different steps of the algorithm and quickly recalculate the overall proportion.

Results: Based on consensus estimates for the 18-60 cohort, 100% of patients presenting with AML are referred and receive treatment. Of this 100%, 80% will achieve a complete remission (CR). Of this 80%, 75% (60% of the total) will achieve CR with 1 induction while 25% (20% of the total) will require 2 inductions. Of the former 60%, 60% will have appropriate cytogenetic risk for transplant (36% of total). Of the latter 20%, 100% will have appropriate cytogenetic risk for transplant. Overall, 36%+20% = 56% of the initial cohort are risk appropriate and require a transplant. Of this 56%, 65% (36.4% of total) will currently find a sibling donor or matched unrelated donor, assuming 9/10 match is sufficient. With alternative donor sources (cords and haplos) as well as improved HLA typing processes (as we note in other countries like Germany), this number should be close to 100%. Therefore, between 36.4%-56% of the initial cohort will find a donor. Of this 36.4%-56%, 90% should proceed to transplant. Of the 10% that don't make it to timely transplant, 95% don't go for medical reasons/patient refusal and 5% don't go due to relapse on the waiting list. If waitlist reasons are excluded, an additional 0.2%-0.3% patients would proceed to transplant. For patients in CR1, 33.0%-50.7% would proceed to transplant. We assume that 15% of all transplants are done for patients in CR2+. Therefore, 38.8%-59.6% of the initial AML 18-60 cohort should be eligible for transplant. A similar process was taken for the other age cohorts with the transplant proportions being between 18.4%-41.0% and 11.8%-26.2% for the 61-70 and 71-75 age groups, respectively.

Conclusion: These transplant proportions estimate the proportion of patients who would be eligible for HCT using current standard approaches to treatment. They can be used in conjunction with incidence estimates to calculate the provincial demand for HCT as contributed by AML. As management of AML changes, the model can be updated to revise estimates for resource planning. In general, this approach can be taken with all relevant indications for HCT to estimate the total demand for HCT by jurisdiction.

31. IMPROVED COLLECTION EFFICIENCY OF PERIPHERAL BLOOD STEM CELL COLLECTIONS IN PEDIATRIC ONCOLOGY PATIENTS UNDERGOING AUTOLOGOUS STEM CELL TRANSPLANTATION UTILIZING THE NEW SPECTRA OPTIA APHERESIS DEVICE

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Background: In order to utilize autologous stem cell transplantation for the treatment of various cancers, stem cells need to be collected beforehand and can be challenging in the pediatric population. Since February 2015 our institution has utilized the new Spectra Optia (Optia) collection device which has eventually replaced the former COBE Spectra (COBE) device (both from TerumoBCT, Lakewood, CO) for collecting mobilized peripheral stem cells. The new Optia device uses centrifugation for blood separation and a unique optical detection technology for automated interface management as opposed to the manual interface management of the COBE system. In this study we compare the two apheresis devices in pediatric patients in regards to collection efficiency, side effects and other relevant collection variables.

Methods: As a quality initiative we retrospectively collected clinical, laboratory and technical collection data from stem cell collection procedures done with the Optia device and compared them to a similar historical group of consecutive collections done with the COBE device. The collected data included patient demographic data, laboratory results such as pre collection peripheral CD34 cell counts and total CD34 cells collected, CBC and electrolytes pre and post collection, side effects attributed to the collection, total blood volumes processed, collection times for each procedure, and calculated collection efficiencies and collection ratios for both machines.

Results: During the period between February 2015 and January 2016 a total of 40 stem cell collection procedures were done on 28 pediatric patients with the new Optia device in our center. We have compared them with an historical group of 42 subsequent collections done on 28 patients with the COBE device, between January 2013 and January 2015. There was no significant difference between the COBE and Optia groups with regards to mean patient ages (5.6±0.78 years vs 5.1±0.74 years, respectively, p=0.66) and weights (24.4±3.5 kg vs 22.2±3.6 kg, respectively, p=0.67). The mean total blood volumes processed through the Optia device were significantly smaller than the COBE (3.91±0.13 x TBV vs 5.96±0.11 x TBV, respectively, p<0.001), providing similar amounts of stem cells, with a significantly higher calculated collection efficiency

(mean, 67%±5.14% vs 53%±4.17%, respectively, p=0.0356). The mean cell viability post processing was similar in both groups (99.3%±0.07% vs 99.2%±0.06%, p=0.24). No significant differences were noted with regards to platelet depletions post collection, but decreases in plasma Mg and Ca concentrations post collection were significantly reduced with the new Optia device. No significant side effects attributed to the procedure were noted.

Conclusion: In our experience with the new Optia device for PBSC collections in pediatric patients, we have found the device as safe as and significantly more efficient than the former COBE device. More conclusions may be drawn in the future as more experience with the new device will be gained.

32. CANADIAN BLOOD SERVICES' CORD BLOOD BANK: STEM CELL NATIONAL SYSTEM SOLUTION (SCNSS)

Elmoazzen H, Halpenny M, Parks J, Garcia Y

Canadian Blood Services, Ottawa, Ontario

Background: In March 2011, the Ministers of Health approved funding for a national, public Cord Blood Bank (CBB). The provincial and territorial governments recognized the CBB as an important health need to be led by Canadian Blood Services (CBS). An identified critical aspect for operating the CBB was the implementation of a national IT system to support all the operational activities of the bank. CBS operates the Stem Cells National Systems Solution (SCNSS), an IT business application that supports the OneMatch Stem Cell and Marrow Network which includes both the OneMatch Donor Registry and the CBB. SCNSS provides an all-inclusive operational IT system for the CBB providing an "end to end" solution from collection to distribution of cord blood units designed and developed in-house with SAP expertise/dedicated resources for support, upgrades, customization, and enhancements. The system is supported by CBS' high availability fail-over/back-up, is self-reliant for disaster recovery and is integrated with other business areas within the organization. SCNSS has the capability to be fully electronic records compliant; SAP solutions are compliant to the major standards found globally such as GMP, ISO, Six Sigma, FDA Title 21 CFR Part 11 Regulation.

System Design / Development: SCNSS development, validation and implementation followed the existing CBS Information Technology: System Life Cycle Methodology. SCNSS is built on an SAP platform consisting of Customer Relationship Management (CRM) and Enterprise Resource Planning Central Component (ECC). User Requirement Specifications (URS) were initiated, followed by overall system design architecture and development of specific functional system requirements.

The validation process consisted of both IT integration testing and user acceptance testing for all aspects of the developed system with final approval by quality assurance staff.

Quality management:

- System maintains audit log of user and system actions
- Double entry and/or 2nd person data verification required for critical fields
- Automated calculations
- Integrated tolerances that prompt to review data outside acceptable criteria
- Supplies and equipment are captured for traceability
- ISBT128 aligned system-generated labels
- Role-based authorizations restrict ability for users to only perform designated activities
- Electronic release performed by CBB Director automatically lists qualified CBUs as searchable for Canadian and International patients via OneMatch

Organizational Integration:

- SCNSS provides the organization with a "360" donor view enhancing customer service and records management. An individual can be a CBS Donor, OneMatch Registrant and/or CBU Mother.
- Integration with OneMatch eliminates the need for entry/upload of CBU information to the OneMatch database
- Interfaced with HLA laboratory system (HistoTrac), eliminates the requirement for manual data entry of HLA results
- Integration with Finance enables automated invoicing and financial postings
- Integration with Documentum (CBS' approved electronic records document repository) allows for all paper-based documents to be linked/accessible directly in SCNSS
- Integration with Data Warehouse framework allows for extensive data analysis
- Integration with CBS' IT support system for management of operational problem resolution

Summary: SCNSS has provided the end to end IT system for the CBB; including tracking and data capture for collection, receiving, accession, production, storage, inventory management, and distribution.

33. GLOBAL TRANSCRIPTOME ANALYSIS OF CD34+ CHRONIC-PHASE CML CELLS

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Background: Chronic myeloid leukemia (CML) is a clonal multi-lineage leukemia in which all cells express a BCR-ABL1 fusion oncogene. The effects of this constitutively activated tyrosine kinase on gene expression are believed to contribute to the malignant phenotype and competitive advantage of CML cells over the co-existing normal hematopoietic cells. Previous comparative investigations of CML-associated changes in gene expression have mainly relied on microarrays that capture a subset of mRNAs. Here we present the results of global gene expression profiling (>19,000 genes) of primary samples of leukemic and normal CD34+ hematopoietic cells isolated from chronic phase CML patients and normal individuals, respectively.

Methods: Strand-specific RNA-seq Illumina® libraries were created from highly purified (>90%) $CD34^+$ cells isolated from a single adult patient (with chronic phase CML) or a large pool of normal neonates (cord blood samples). Paired-end sequencing reads were aligned to a transcriptome reference consisting of a genomic sequence (GRCh37-lite July 2010) supplemented by read-length-specific exon–exon junction sequences. Comparisons between the two samples to identify differentially expressed genes were performed using the DESeq tool and custom R scripts (FDR≤0.05).

Results: We found more than 200 genes to be significantly differentially expressed between the $CD34^+$ cells isolated from normal cord blood and CML cells. Of these, only 79 genes were more highly expressed in the $CD34^+$ CML cells. These included numerous genes involved in the regulation of apoptosis. Conversely, the genes found to be more highly expressed in the cord blood $CD34^+$ cells were involved in IGF-1 signaling, self-renewal control, and immune responses. Interestingly, a number of the differentially expressed genes were consistent with the age difference in the two sources of cells analyzed, echoing transcriptome differences previously observed between primitive hematopoietic cells in fetal and adult mice.

Conclusion: These results set the stage for deeper analyses of the intrinsic mechanisms underpinning CML-associated changes in $CD34^+$ stem and progenitor cells and a distinction between those associated with age versus leukemia.

34. CANADIAN BLOOD SERVICES' CORD BLOOD BANK: BUILDING AN ETHNICALLY DIVERSE CORD BLOOD BANK

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Canadian Blood Services, Ottawa, Ontario

Background: In 2011 the provincial and territorial governments approved funding for a national public cord blood bank (CBB) which was subsequently established by Canadian Blood Services. The mandate from government is that the CBB adequately represent the unique ethnic diversity of the Canadian population in order to increase transplant opportunities for Canadian patients who are unable to find a stem cell match.

The selection of the collection sites in four Canadian cities was achieved through the CBS Request for Proposal (RFP) process with a number of critical factors including a minimum of 20% ethnic diversity of mother/infants delivering at the hospitals. In addition, to promote an ethnically diverse inventory, acceptance criteria for qualifying cord blood units (CBU) was implemented; pre-production Total Nucleated Cell (TNC) of $1.5X10^9$ for Caucasian CBU and $1.3X10^9$ for non-Caucasian CBU. The slightly lower threshold was established to allow for larger numbers of CBUs while maintaining quality standards for donors with unique HLA types and to ensure larger TNC CBUs were collected for common or duplicate Caucasian HLA types.

Study design and methods: This study analyzed the ethnic breakdown of all CBUs currently in inventory at the CBS' CBB. Quality control characterization including collection volume, TNC, CD34, viability and CFU content for each CBU was reviewed within the different ethnic groups.

Results: Between Sept 30, 2013 and Jan 19, 2016 the CBS' CBB collected a total of 7,812 CBUs. 1,361 CBUs have qualified for banking with 813 of the qualifying units currently released / available for transplant. Ethnic breakdown of CBB inventory, as well as quality characterization is identified below.

CBS' Cord Blood Bank Inventory Analysis

(Sept 30, 2013 – Jan 19, 2016)

Ethnicity Group	CBU Inventory	% of Total Inventory	Collection Volume (mL)	TNC (x107)	Total CD34+ (x106)	Viability (%)	Total CFU-GM (x105)
Caucasian	398	49.0%	118.07	144.85	6.26	96.74	23.35
Non-Caucasian	415	51.0%	114.91	136.34	5.70	96.51	21.81
Non-Caucasian Breakdown							
Multiple Ethnicity	196	24.1%	112.55	130.89	5.35	96.52	20.84
Asian	122	15.0%	108.93	125.0	4.79	95.77	18.5
Black	47	5.8%	113.56	124.19	4.74	96.07	19.47
Arab	34	4.2%	112.26	121.71	5.3	97.16	18

Hispanic	10	1.2%	117.51	144.2	6.05	96.4	22.4
Aboriginal	3	0.4%	130.63	135.96	9.91	95.07	16.67
Other	3	0.4%	122.44	156.55	4.45	95.95	18
Total Inventory:	813	100.0%					
		Mean:	116.99	135.42	5.86	96.21	19.65
		Median:	115.54	133.43	5.33	96.24	18.99
		Max:	130.63	156.55	9.91	97.16	23.35
		Min:	108.93	121.71	4.45	95.07	16.67
		SD:	6.93	12.28	1.75	0.64	2.34

Summary: Cord blood inventory should not only be ethnically diverse but must be at a certain "quality" for selection at transplant sites. Canadian Blood Services' Cord Blood Bank, an AABB accredited bank, is fulfilling its mandate to provide ethnically diverse, HLA-diverse, quality cord blood units to patients that reflect Canada's ethnic diversity, increasing the ability to find units for hard-to-match patients. A lower TNC has allowed for inclusion of more non-Caucasian donors without compromising quality. To further improve ethnic diversity, the CBB is currently working on a translation and interpretation process to assist non English speaking extended families with general awareness of the cord blood program and consent processes.

35. ANALYSIS OF HUMAN HEMATOPOIETIC CELLS GENERATED FROM HUMAN INDUCED PLURIPOTENT STEM CELLS DIFFERENTIATING IN TERATOMAS

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Objective: To optimize a protocol for generating hematopoietic cells from induced pluripotent stem cells (iPSCs) differentiating in teratomas produced in vivo and characterize their properties.

Rationale: Much progress has been made in characterizing human hematopoietic cells that can sustain the long-term output of mature blood cells in vivo. However, methods for deriving these cells from developmentally earlier precursors, or for manipulating them genetically and expanding them ex vivo remain elusive. One approach to support this transition is to produce them in vitro from iPSCs, although a suitable and reproducible in vitro protocol for this has also not yet been achieved. Recently, however, some success has been reported in teratomas produced from iPS cells transplanted into immunodeficient mice. We are now exploring the possibility that this latter approach may be improved using a new immunodeficient mouse strain with a c-kit deficiency (W41/W41 genotype) in addition to being genetically engineered to constitutively express several human growth factors (human IL3, GM-CSF and SCF).

Methodology: NOD-Rag1-null- IL2Rgc-null W41/W41 producing human IL3, GM-CSF and SCF (NRG-W41±3GS) mice were injected with human iPSCs (103-106 cells/injection) ± fibroblasts producing human FLT3-L, SCF, IL3 and IL6. The teratomas obtained a few weeks later were dissociated into single cell suspensions that were then analyzed for the presence of human CD34+and/or CD45+ cells. In vitro assays for various progenitor cell types were also performed.

Results and Conclusions: Teratomas containing human CD45+ cells were generated in every experiment and in highest yields (up to 7x106 CD45+ from a teratoma containing 4x108 cells) in mice containing a source of human 3,G,S. CD34+ cells were detected in all teratomas with >0.4% CD45+ human cells. Colonies of myeloid, erythroid and mixtures of these formed in standard growth factor-supplemented methylcellulose cultures, and GM-CFC were detected in a 6-week LTC-IC assay. These experiments lay the foundation for future studies of the in vivo activities of the human hematopoietic cells produced in this system.

36. PRESENCE OF IMMATURE GRANULOCYTES IN MONONUCLEAR CELL PRODUCTS COMPROMISES CELL FUNCTION

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Background: Recently it has been shown that density gradient centrifugation (DGC) does not fully deplete neutrophils in bone marrow (BM) compromising recovery yields however the underlying cause and its impact on cell function have not been studied. Here, we further investigated the efficiency of DGC as well as a commercially available granulocyte depletion kit (Stem Cell Technologies, Vancouver, BC, Canada) in neutrophil depletion on bone marrow as well as other blood products including cord blood (CB), peripheral blood (PB) and G-CSF mobilized PB samples. The sub-populations of neutrophils before and after DGC were studied using CD16 and CD62L markers. The impact of neutrophil contamination on function of peripheral blood mononuclear cells (PBMCs) was also evaluated by measuring cytokine production in response to different stimuli.

Methods: Fresh BM (n=15) were provided by BCCH biobank, fresh cord bloods (n=20) were provided by BCWH. Contamination of neutrophils was determined by flow cytometry (CD45+CD66b+). Differential expression of CD16 and CD62L were utilized to determine percentage of immature neutrophils prior and after DGC/granulocyte depletion. PBMCs recovered after DGC processing and/or granulocyte depletion were cultured in presence or absence of CpG or PHA and IL-6 and CXCL-9 levels were measured using ELISA.

Results: Mean % of neutrophils in pre-processed, DGC and granulocytes

depletion in BM samples was 53.1+/-18, 32.41+/- 22.44 and 0.65+/-0/44 respectively (p<0.001).

Neutrophil contamination in frozen PBMCs isolated from HSCT cases by DGC was 25.86% +/- 20.31. Neutrophil contamination in fresh cord blood was 8.2% +/-5.1 using DGC and 0.6% +/- 0.3 using granulocyte depletion kit. Flow cytometry using CD16 and CD62L markers on BM samples showed that DGC depletes mature neutrophils ($CD16^{hi}CD62L^{hi}$) however fails to deplete immature neutrophils ($CD16^{lo}CD62L^{lo}$). In contrast, granulocyte depletion kit was able to deplete both mature and immature myeloid populations. Furthermore, cytokine production in response to CpG, an inflammatory stimulus and to pan T-cell stimulus PHA was compared in paired PBMCs samples processed by DGC and/or granulocytes depletion. Results showed significant higher unspecific release of IL-6 and decreased CXCL-9 production in response to PHA in samples with higher neutrophil contamination (DGC processed).

Conclusion: DCG does not remove the majority of immature neutrophils (CD16loCD62Llo) in contrast to the granulocyte depletion kit. Presence of immature neutrophils interferes with functional assays of mononuclear cells.

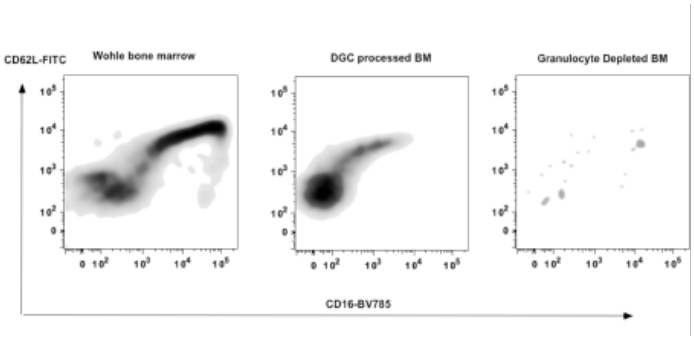

Figure1: Representative dot-plot of neutrophils (CD45+CD66b+) expressing CD16 and CD62L. Far left dot-plot shows mature $CD16^{hi}CD62L^{hi}$ and immature $CD16^{lo}CD62L^{lo}$ sub-populations of neutrophils present in bone marrow prior to processing. The middle dot-plot shows remaining of immature neutrophils after density gradient centrifugation. Far right dot-plot shows complete depletion of total neutrophils after immune-depletion.

37. QUALITY INDICATORS FOR CELL THERAPY PRODUCTS CRYOPRESERVED BY "DUMP" FREEZING

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Introduction: The controlled rate freezing (1°C/min) has been the standard method for cryopreservation of Cellular Therapy Products (CTP). An effective and inexpensive alternative method has been developed by "dump" freezing into -86°C mechanical freezers followed by transfer to the vapor phase of liquid nitrogen (VPN2). The Cell Processing Laboratory at Princess Margaret Cancer Centre has used this method exclusively.

Rationale and study objective: Fifteen different CTP samples were included into a pilot study to evaluate three different parameters of the "dump" freezing procedure: 1: freezing rate temperature, 2: cell viability, and 3: engraftment data. Twelve CTP samples from autologous patients and three from allogenic patients were included.

Methodology: The CTPs were aliquoted into cryostores (Origen Biomedical Company) and cooled down using a platform of ice packs wrapped in sterile drape towels. 10% of DMSO (vol/vol) was added to the each CTP aliquot at approx. rate of 1ml/sec. The cryostores containing the CTP were placed into a metallic cassette and transferred under cooling conditions into the -86 °C mechanical freezer and subsequently to the VPN2.

Tube samples of 1 ml were taken at two different points. A fresh sample was taken after collection and kept at 4 °C and three samples were taken after addition of DMSO and kept frozen along with the CTPs. Samples drawn after addition of DMSO were tested for cell viability by trypan blue at different intervals: 18 hours post starting the "dump" freezing into a -86 °C mechanical freezer; 72 hours after storage in VPN2; and prior to infusion time.

Temperature probes (HH506RA Multilogger OMEGA Thermometer) were placed onto the cryostores containing CTP to record the freezing rate temperature and the time elapsed for the CTP to reach the acceptable plateau range of -79 to -84 °C, from the starting temperature of approx. 20°C. The time (days) for neutrophil (>500) and platelet (>20000) engraftment were analyzed.

Results: The average time for CTPs included in this pilot study to reach the acceptable plateau temperature range is comparable with the controlled rate freezing curve at approx.1.12 °C/min. The average of the cell viability from fresh samples was 99.7 % and the average viability from the frozen aliquots were: 80 % at 18 hours post starting the "dump" freezing into a -86 °C mechanical freezer; 77 % at 72 hours after storage in VPN2; and 75 % prior to infusion time. The average of days to reach engraftment is: 11 days for neutrophil (>500) and 10 days for platelet (>20000).

The "dump" freezing method sustained acceptable viability and capacity for timely engraftment. The results indicate that this method is consistent and reproducible.

The method was validated for 50 additional products. The results will be presented in the poster.

38. ENUMERATING VIABLE CD34+CELLS IN THE AUTO- AND ALLO-TRANSPLANT SETTINGS WITH ISHAGE TECHNOLOGY: UPDATES FOR NAVIOS AND CANTO CYTOMETERS

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Enumerating CD34+ cells provides critical information to the bone marrow transplant physician. The number of viable CD34+ cells present in the peripheral blood after mobilization with cytokines and/or chemotherapy predicts the 'yield' of CD34+ cells in the apheresis product. Additionally, the number of CD34+ cells collected predicts time to engraftment after autologous or allogeneic HSC transplantation. The infusion of a minimum of 2-2.5 x 106 viable CD34+ cells per kilogram patient weight will generally ensure rapid (10-12 days for neutrophils to 500/uL) and sustained engraftment in the auto setting. The ISHAGE Guidelines for CD34+ cell enumeration is the most widely used method for the enumeration of viable CD34+ cells in clinical laboratories and several commercial 'kits' are available based upon these Guidelines (for auto transplants). These 'single platform' assays utilyse CD45FITC, CD34PE, 7-AAD (a viability dye) and fluorescent counting beads to determine the absolute viable CD34+ cell content using only a flow cytometer. Manual data acquisition and analysis templates/ protocols were developed for a variety of older cytometers equipped with 4 (Calibur, BD Biosciences) or 5 (FC500, Beckman Coulter) fluorescence defectors (PMTs). More recently, the widespread deployment in clinical labs of newer instruments with 6 or 8 PMTs (BD Biosciences Canto) and 8 or 10 PMTs (Beckman Coulter Navios/Gallios), required us to develop equivalent assays that could run on newer computer systems running more modern operating systems/flow cytometry software. Here, we have validated the single platform ISHAGE protocols across instruments with 4 PMTs (Calibur), 5 PMTs (FC500), 8 PMTs (Canto II), and 10 PMTs (Navios) and show that equivalent data is generated regardless of instrument platform/software combination used (T-Test showed no significant difference). For example, analysis of 20 fresh mobilized PB/apheresis samples across FC500 and Navios instruments using Stem-KitTM yielded virtually identical results with a high correlation coefficient of 0.9995. Manual analysis of the another batch of samples stained with the SCE-KitTM on both Calibur and Canto II cytometers also generated very similar results with correlation coefficient in excess of 0.99.

While addition of a CD3PC5 conjugate in place of 7-AAD allowed the simultaneous enumeration of CD3+ cells in fresh donor samples used in the allo-transplant setting, the increasing use of matched unrelated donor transplants in which samples are often shipped internationally required the incorporation of both 7-AAD and CD3. Thus we have developed 4-color variants of the single platform ISHAGE methodology that can simultaneously measure not just absolute viable CD34+ and CD45+ cell content but also the absolute viable CD3+ cell content. In this study, we have also validated this 'allo' variant of the single platform ISHAGE protocol across multiple platforms. It is not uncommon for allo-transplant recipients to require donor lymphocyte infusions (DLI) and the allo ISHAGE variant provides a rapid and validated means to accurately determine the number of viable CD3+ cells to be infused in this context. The assay can also be used to measure the CD34+ cell purity and residual contaminating viable CD3+ cells in CD34+ cell selected samples.

39. FEASIBILITY AND ACCEPTABILITY OF INTEGRATED CARDIAC REHABILITATION IN LYMPHOMA PATIENTS REFERRED FOR AUTOLOGOUS BONE MARROW TRANSPLANTATION

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Background: High-Dose Chemotherapy (HDCT) and bone marrow/ hematopoietic cell transplantation (BMT) is established therapy for many malignancies. While advances in transplant practice have led to improved cancer-specific outcomes, HDCT negatively impacts healthy organ function via direct effects (i.e., high-dose cytotoxic injury to organ systems) and indirect effects (i.e., functional disability).

The resulting cardio-metabolic sequelae such as dyslipidemia, hypertension, diabetes, and weight gain (with lean body mass loss) contribute to the significantly increased rates of cardiovascular (CV) mortality and heart failure (HF) observed in HDCT survivors.

Cardiac rehabilitation/secondary prevention (CR/SP) programs are a level one recommendation in multiple CV diseases, significantly reducing secondary CV risk and events. Currently the feasibility of integrating standard multidisciplinary CR/SP programs in outpatients (PTS) referred to HDCT is unknown.

Aim: To prospectively evaluate feasibility and acceptability of routing referral to a multidisciplinary CR/SP program in unselected lymphoma PTS referred for autologous HDCT/BMT.

Methods: Lymphoma PTS referred for HDCT/BMT were serially screened and referred to the Northern Alberta Cardiac Rehabilitation Program (NACRP) at the Jim Pattison Centre for Heart Health in Edmonton, AB. The NACRP includes the expertise of a interdisciplinary team including cardiology, exercise physiology, nursing, occupational therapy, physiotherapy, social work, dietary, and psychosocial services. Baseline exercise testing was performed prior to HDCT/BMT. Upon recovery (6 weeks post BMT) testing

was repeated, and PTS were invited to participate in the 8-week NACRP for guided exercise rehabilitation and CV risk reduction education.

Results: 23 PTS were referred for HDCT/BMT from January 1, 2015 to August 2015. All were referred to the CR/SP program. A total of 15 patients completed the NACRP post transplant. Functional testing demonstrated an increase in patient function indicators and high levels of satisfaction of CR/SP program components were reported.

Conclusion: Seamless integration of CR/SP within standard HDCT/BMT care is feasible and acceptable. We expect short term measurable impacts including reduced symptom burden and improved quality of life. Longer term impacts will evaluate CV morbidity and mortality. This work will inform patient-centered care and improve survivorship care across the cancer continuum.

40. IMPROVING CENTRAL AND PERIPHERAL VASCULAR ACCESS CARE IN A HEMATOLOGY/HSCT UNIT

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Background: Ward C4 (a 39-bed inpatient unit) at the Juravinski Hospital and Cancer Centre serves patients with hematologic malignancies and patients undergoing hematopoietic stem cell transplantation (HSCT). These patients have an increased risk of infection and thrombosis as a direct result of their disease or as a side effect of their treatments. Complications from a central vascular access device (CVAD) lead to delays in treatments, increased patient stress and dissatisfaction, increased length of stay, increased health care costs and increased risk of morbidity and mortality (Green, E., Macartney, G., Zwaal, P., Kutzscher, L.et al, 2008).

The hospital has a program in place to enhance central line care and maintenance skills for new staff. However, many competent and expert nurses within the hematology/HSCT unit have not had recent training. In addition, there had been a growth in the use of Alteplase over the past 3 years, which suggests an increase in central line catheter occlusions. An assessment identified the need for education related to CVAD management to bring staff into alignment with current best practice standards in CVAD care. This included the use of Alteplase to dissolve central line occlusions caused by blood.

Research on nurse empowerment tells us that a nurse's ability to effectively perform the job is directly linked to access to training, support, time and resources (Laschinger, Finegan, Shamian, & Wilk, 2004; Laschinger & Haven, 1997; McDermott & Laschinger, 1996; Laschinger & Wong, 1999). An Education grant from the JCC Foundation was secured and a partnership with BD Signature Solutions® was established to develop, implement and evaluate a CVAD training program specifically tailored to the needs of the hematology/HSCT patient population.

Method: A project team developed a practice audit checklist. In partnership with BD Signature Solutions® program we followed the seek, solve and sustain model in conjunction with HHS policies and procedures to identify expected practices. The pre-intervention audit was completed in July 2014.

The key findings were reviewed and prioritized to select improvements that would give the greatest return on training investment.

A 2-day training session for staff super-trainers was developed following BD's Preanalytical Best Practice in Blood Collection, HHS policies, and the audit results. The super-trainers provided hands-on training to 83% staff in February and March 2015.

A post-intervention audit was repeated in September 2015.

Results:

Audit Results

Risk Factor	Practice	Pre	Post
Patient Safety	Pt. ID Bracelet checked prior to collecti	50%	03%
	Correct order of Draw	89%	95%
	Tubes Underfilled	34%	14%
	Tubes Undermixed	74%	18%
	No Mixing	2%	0%
Infection prevention	**From Vascular access device**		
	Quick Swipe only	34%	0%
	Scrub time 15 sec or >	66%	97%
	Air Dried	15%	42%
Post flush technique	Pre: 38% 10 ml only; mix of smooth and turbulent flush; not all lumens Post: 100% 20 ml turbulent flush every lumen		

Alteplase (Cathflo™) usage decreased by 30% post education per Pharmacy

Conclusions: This quality improvement initiative empowered nurses to improve best practice in CVAD care and blood sampling methods. The education surrounding turbulent flush technique and increase to 20 ml post blood collection resulted in a decrease in occlusions post blood collection and a 30% decrease in Cathflo usage ($2000 savings). A next step will be to focus on developing a process for monitoring central line infection rates.

41. OPEN COMMUNICATION WITH TRANSPLANT TEAMS DURING THE SEARCH PROCESS – CLOSING THE GAPS

Susie Joron, BSc, Marie-Claire Cheurier, MSc, Lucie Richard, PhD

Héma-Québec Donor Registry & Cord Blood Bank

Introduction: Open and continuous communication with transplant centers is of critical importance. Communication can be affected relative to the registry/TC relationship and structure. The Héma-Québec registry, as the central donor search hub in the province of Quebec, has no contact with referral teams and little contact with the transplant center team during the

search process. Therefore, efforts to improve our liaison with the transplant coordinators were necessary.

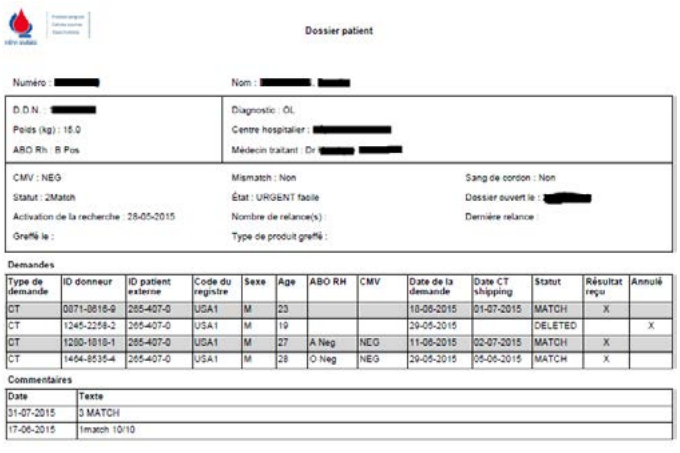
A timely search request that includes specific search criteria, as well as regular feedback on the search progress is required to help facilitate transplant coordination. Review of the process revealed gaps showing inefficient information sharing at different levels of the search process. Some causes contributing to these gaps are: physical distance, little contact with transplant center teams and later awareness of new referrals.

Aim: The project was initiated in an effort to eliminate waste (using the LEAN methodology) throughout the search process. The goals included creating methods to facilitate clinical decision making, and to improve both the quality and frequency of information shared with TCs. To that effect, a reliable validated electronic system that would allow secure data entry needed to be developed.

Method: It was recognized that the odds of finding a donor according to TC search criteria are necessary communication elements; this allows for a clear direction regarding possibilities for patients. This is achieved via an initial communication at the very start of the search process. The transplant team may or may not change their search criteria based on that information provided very early in the process. The search team at Héma-Québec is then able to better orient the search and save valuable time.

Another solution included giving an overall perspective of the search process on a continuing basis. Therefore, a weekly report was developed and is automatically generated from the Héma-Québec computer database in order to keep all transplant centers well informed of the search progress for each of their patients.

Summary:



Dossier patient

Numéro : [redacted] Nom : [redacted]

D.D.N. : [redacted]	Diagnostic : OL
Poids (kg) : 15.0	Centre hospitalier : [redacted]
ABO Rh : B Pos	Médecin traitant : Dr [redacted]

CMV : NEG	Mismatch : Non	Sang de cordon : Non
Statut : 2Match	État : URGENT facile	Dossier ouvert le : [redacted]
Activation de la recherche : 28-05-2015	Nombre de relance(s) :	Dernière relance :
Greffé le :	Type de produit greffé :	

Demandes

Type de demande	ID donneur	ID patient externe	Code du registre	Sexe	Age	ABO RH	CMV	Date de la demande	Date CT shipping	Statut	Résultat reçu	Annulé
CT	0871-8618-9	265-407-0	USA1	M	23			18-06-2015	01-07-2015	MATCH	X	
CT	1245-2258-2	265-407-0	USA1	M	19			29-05-2015		DELETED		X
CT	1260-1818-1	265-407-0	USA1	M	27	A Neg	NEG	11-06-2015	02-07-2015	MATCH	X	
CT	1464-8535-4	265-407-0	USA1	M	28	O Neg	NEG	29-05-2015	05-06-2015	MATCH	X	

Commentaires

Date	Texte
31-07-2015	3 MATCH
17-06-2015	1match 10/10

Figure 1: Search report example

The report (see figure 1) includes all extended typing and verification typing requests, when results should be expected, and the final compatibility results. This allows Héma-Québec partners to view the comments made by the search team throughout the process and use this tool in their weekly patient rounds.

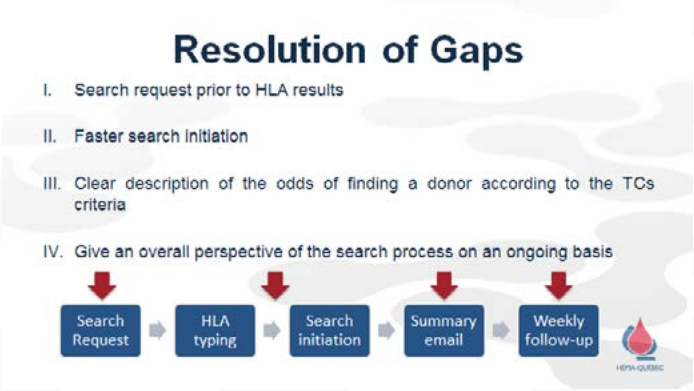


Figure 2: Resolution of Gaps

Figure 2 represents the unique solutions that were put in place at different steps of the process.

Conclusion: Four professionals were involved in the process review and in the development of an electronic system. Thus, a minimal amount of resources made a significant impact.

Positive feedback was received from our partners following this change, and timelines to transmit critical information were improved. This further improved customer satisfaction. Transplant teams are now able to provide a timely treatment plan due to this new process.

42. EVALUATING PRESCRIBING PRACTICE OF PNEUMOCYSTIS JIROVECII PNEUMONIA PROPHYLAXIS IN ALLOGENEIC BONE MARROW TRANSPLANT RECIPIENTS

Ian Pang, MSc, BScPhm[1,4], Lina Ho, BScPhm, ACPR[1], Shahid Husain, MD, MS[1,2], Jeff Lipton, PhD, MD[1,2], Hans Messner, MD[1,2], Chaim Bell, MD, PhD[2,3], Andrew Morris, MD, MS[1,2,3], Miranda So, BScPhm, PharmD[1,4]

[1]University Health Network, Toronto, ON, [2]Department of Medicine, University of Toronto, ON, [3]Mount Sinai Hospital, Toronto, ON, [4]Leslie Dan Faculty of Pharmacy, University of Toronto, ON

Background: Pneumocystis jirovecii pneumonia (PJP) is a life threatening opportunistic infection that can affect immunosuppressed allogeneic bone marrow transplant (alloBMT) patients. While PJP prophylaxis with trimethoprim-sulfamethoxazole (TMP-SMX) is considered first line, patients are often prescribed aerosolized pentamidine (AP) as a second line alternative. This study aims to describe the prescribing practice of PJP

prophylaxis in alloBMT recipients to aid development of a clinical decision tool.

Methods: A single-centre, retrospective cohort study was performed for inpatients who received an alloBMT in 2012. For each initiation and adjustment of PJP prophylaxis until the end of 2014, the date, medication, rationale, platelet (PLT) count, and absolute neutrophil (ANC) count were recorded. For patients started on TMP-SMX and switched to AP, the duration until switch and percentage decrease in PLT were calculated. Pentamidine adherence was analyzed.

Results: Sixty-four percent, 34%, and 2% of patients were initiated on TMP-SMX, AP, or no therapy respectively (N=99). Of those initiated on TMP-SMX, 63% were later switched to AP, and 75% of all patients received at least one dose of AP. The most common documented rationales for prescribing AP were 'decreased counts' (41%) and 'thrombocytopenia' (34%). The median PLT count and ANC count of patients when they were prescribed TMP-SMX vs. AP was 171.0 (IQR 124.0-218.0) vs. 83.5 (IQR 49.8-108.5) $x10^9$/L ($p < 0.001$), and 3.10 (IQR 2.08-5.08) vs. 2.54 (IQR 1.34-4.93) $x10^9$/L ($p = 0.13$), respectively. Patients who required more than one prophylaxis regimen were on TMP-SMX for a median duration of 43 days (IQR 17 – 78) vs. 349 days (IQR 170 – 589) on AP ($p < 0.001$). The median AP adherence rate (n = 39) was 87.5% (IQR 70.2 – 100).

Conclusion: For PJP prophylaxis, most patients were initially prescribed TMP-SMX; however, many eventually switched to AP due to myelosuppression. Most patients were adherent to AP. Future works include investigating the effects of concomitant myelosuppressive medications and transplant-related complications on clinical decision making.

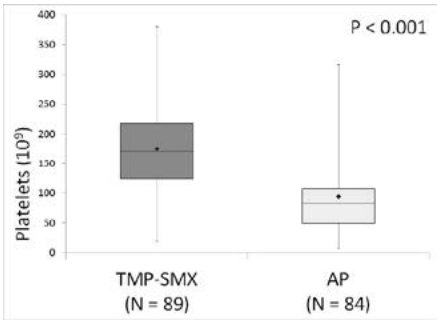


Figure 1. Median PLT count for patients on TMP-SMX vs. AP.

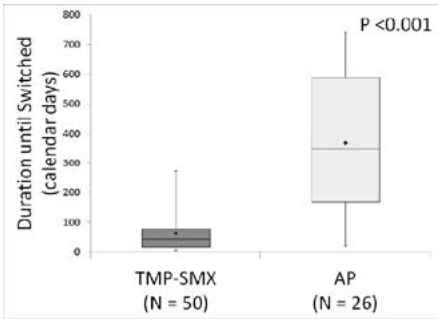


Figure 2. Median ANC count for patients on TMP-SMX vs. AP.

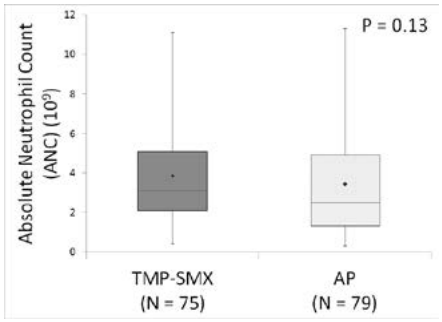


Figure 3. Median duration of therapy until a change occurred for patients on TMP-SMX vs. AP.

43. DONOR ADVOCACY IN THE SETTING OF PEDIATRIC STEM CELL TRANSPLANTATION

Christine Armstrong MScN, RN(EC), Sarah Courtney, MN, RN(EC), Jane Lowry, RN, Joerg Krueger, MD, Muhammad Ali, MD, Tal Schechter, MD

Division of Haematology/Oncology/Blood and Marrow Transplantation, The Hospital for Sick Children, Toronto, Ontario, Canada.

Standards for the care of family donors for the purpose of stem cell transplantation at both national (Health Canada) and international (Foundation for the Accreditation of Cellular Therapy: FACT) levels have led to a refinement of process at The Hospital for Sick Children. Beginning with Human Leukocyte Antigen (HLA) Typing this process continues throughout the evaluation and care of potential donors. As a pediatric institution potential donors are often young individuals providing unique issues for obtaining informed consent and disclosure of personal health information. The need for a specialized process is supported by a current position statement of the American Academy of Pediatrics which states that minors can ethically serve as stem cell donors only with adherence to specific criteria.

An initial HLA consult is arranged to discuss the implications of being identified as a stem cell donor. To provide support, individuals of 11

years and older are referred to the Adolescent Medicine service prior to completion of HLA testing. This provides opportunity for assessment by an individual separate from the treatment team of the recipient to ensure non interdependent care of the potential donor and recipient. During this meeting the Donor Health Assessment Form is reviewed in addition to the individual's current health status as a beginning step in the assessment of whether donor suitability requirements would be met. If issues are identified which would require disclosure to the recipient and/or the parents as substitute decision makers of the recipient it is established if the potential donor would be willing to proceed with this disclosure. Additional support to make this disclosure is offered and available. Assessment of donor competency to provide consent is also confirmed at this time. If deemed competent, results of HLA testing are given directly to the potential donor and only with their permission is this information disclosed to the recipient, their family and the recipient's health care team.

If continuing to proceed towards stem cell transplantation a consultation for evaluation of suitability to donate is then arranged with a donor advocate. In our hospital this role is filled by a licensed Pediatrician in the department of General Pediatrics. In certain instances additional advocacy may be provided by Adolescent Medicine (as involved in the HLA consult), Social Work, Child Life and Bioethics. Once suitability is assessed and with the consent of the potential donor the donor advocate releases the assessment to the recipient's treatment team. The potential donor then attends a consultation with a Physician from the Blood and Marrow Transplant Program to discuss the associated risks of stem cell collection together with their willingness to donate. A final declaration of donor suitability is determined by the BMT physician. At all points in the process the potential donor is given the opportunity to ask for clarification and support. Our current process has been established in an attempt to protect the rights and safety of both stem cell donors and recipients. Evaluation of this process is planned.

44. INTRAVENOUS LINE OCCLUSIONS AS AN INFUSION-RELATED COMPLICATION IN PATIENTS UNDERGOING ALLOGENEIC STEM CELL TRANSPLANTATION RECEIVING BONE MARROW AS A DONOR SOURCE

Sarah Courtney RN(EC)[1], Christine Armstrong RN(EC) [1], Elizabeth McDougall, BSc[2], Tal Schechter, MD[1], Muhammad Ali, MD[1], Joerg Krueger, MD[1]

[1]Division of Haematology/Oncology/BMT, The Hospital for Sick Children, Toronto, ON, [2]Department of Pediatric Laboratory Medicine, The Hospital for Sick Children, Toronto, ON.

Background: A critical component of successful haematopoietic stem cell transplantation (HSCT) is the safe and timely infusion of the donor cellular therapy product. Bone marrow is the preferred donor cell source for most patients undergoing HSCT at the Hospital for Sick Children. However, utilizing BM as a donor source can be associated with complications such as IV line occlusions. These occlusions can lead to significant delays of the transplant in addition to loss of valuable donor product. Further, IV line occlusions can cause significant anxiety among health care providers, patients and parents. The literature does not provide significant guidance in regards to the etiology and management of IV line occlusions during marrow infusions.

Methods: As a quality improvement initiative we retrospectively reviewed the infusion records and associated health care records of 43 consecutive patients who received a hematopoietic stem cell product from BM source at the Hospital for Sick Children from January 2014 to December 2015.

Results: 12 out of 43 patients (28%) who received a hematopoietic stem cell product from BM source experienced at least one IV line occlusion during the infusion. No filtering devices were applied. The majority (11/12) were unrelated donors, 9/12 were male donors and the average donor weight was 76.2kg (range 50-104.5kg). In 3/12 products visible fatty deposits were observed prior to infusion. All but one product required laboratory processing prior to infusion due to ABO incompatibility or the need for volume reduction. The average hematocrit of RBC depleted products (n=8) was 0.079 (range 0.026-0.27), the average infusion volume was 18.5ml/kg recipient weight (range 6.4-46.3ml/kg). In four cases bone marrow product was discarded as a result of the IV line occlusion (range 10-60ml). All patients achieved neutrophil engraftment at an average of 20 days (range 12-29 days).

Conclusion: IV line occlusions at our centre occurred in 28% of BM infusions. Further studies are needed to determine the etiology and to this end our centre is currently comparing the presented data with data from infusion records of patients who received BM without complications. Furthermore, clear guidelines for healthcare providers are needed to ensure that IV line occlusions are addressed safely, efficiently and do not lead to significant loss of donor product. Routine use of blood component filters may be a potential solution to reduce the incidence of IV line occlusions.

45. GENITO-PELVIC HEALTH AFTER HEMATOPOIETIC CELL TRANSPLANTATION: REVIEW OF THE LITERATURE AND RECOMMENDATIONS FOR BEST PRACTICE.

Reanne Booker, MN NP[1], Michael Krychman, MD[2]

[1]Alberta Health Services, Calgary, Alberta, [2]Southern California Center for Sexual Health and Survivorship Medicine, Newport Beach, California

Background: While it remains an area that garners little attention in terms of research and education, several studies have revealed an array of transplant-related toxicities and complications that may affect genito-pelvic health after hematopoietic cell transplantation (HCT). In particular, female genital graft-versus-host disease (GVHD) and hypoestrogenism secondary to premature ovarian failure (POF) may occur after HCT and have a significant negative impact on sexual function, sexual satisfaction, pelvic

floor health and overall quality of life.

Female genital GVHD was first reported by Corson et al. in 1982 after 5 women were treated for hematocolpos caused by vaginal synechiae. Since then, several case reports and small series have appeared in the literature. The incidence of female genital cGVHD varies with rates reported in the literature between 2-52%. The true prevalence of female genital cGVHD is largely unknown since the condition is underreported and under-diagnosed. Patients are apprehensive to discuss genito-pelvic symptoms and HCP are remiss by rarely broaching the topic

Potentially confounding the diagnosis of genital GVHD is the fact that more than 90% of women who undergo allogeneic HCT will develop premature ovarian failure. The signs and symptoms associated with hypoestrogenism may overlap with or mimic those of female genital GVHD. In particular, such constellation of symptoms as vaginal/vulvar and clitoral dryness, itching, irritation, dyspareunia, changes in vulvar architecture, fissures, ulcerations and foreshortening and/or narrowing of the vagina all may occur as a direct result of estrogen deprivation

Objectives: This presentation will provide a review of the literature on genito-pelvic health after HCT, highlighting clinical pearls pertaining to the assessment, diagnosis and management of female genital GVHD and hypoestrogenism after HCT. Included in the discussion on management will be an overview of a comprehensive treatment paradigm that illustrates current evidence-based recommendations on when to consider appropriate use of: dilators with or without physical genital therapy, topical immunosuppressive therapy, intravaginal medications (such as minimally absorbed local hormonal therapy, or compounded muscle relaxants), orgasmic enhancers, lubricants, moisturizers and vulvar washes.

Conclusion: Altered genito-pelvic health after HCT, as a consequence of hypoestrogenism/POF and/or female genital cGVHD may adversely impact sexual function, quality of life and female pelvic health. Early recognition, prompt treatment and patient education and support are necessary in order to prevent progression of symptoms. Patients should be educated on signs and symptoms of female genital cGVHD and should be screened regularly by health care providers for the emergence of cGVHD. The comprehensive management of altered genito-pelvic health after HCT requires an integrated multidisciplinary team with care and attention to the physiologic and psychological changes that may arise post-HCT.

46. WHEN 'GOALS OF CARE' COLLIDE WITH 'GOALS OF CURE': CHALLENGES OF ACP IN HEMATOLOGY AND HEMATOPOIETIC CELL TRANSPLANTATION

Reanne Booker, MN NP[1], Jessica Simon, MBChB, FRCPC[2], Shelley Raffin Bouchal, PhD RN[3] on behalf of ACP CRIO Program

[1]Palliative and End of Life Care services, Alberta Health Services, Calgary, AB, [2]Department of Oncology, University of Calgary, Calgary, AB, [3]Faculty of Nursing, University of Calgary, Calgary, AB

Objectives: To examine patient, family member, and clinician perspectives on advance care planning (ACP) in hematology and hematopoietic cell transplantation (HCT).

Rationale: Studies have found that ACP engagement and completion of advance directives (ADs) remain low in patients undergoing HCT in spite of the high risks of treatment-related mortality and potential for intensive care unit (ICU) admission and/or life-sustaining measures in the peri or post-HCT period. This study, as part of a larger program of research on ACP policy implementation, sought to understand readiness, barriers and facilitators to ACP in the setting of hematology and hematopoietic cell transplantation.

Methodology: This qualitative study used Thorne's Interpretative Description methodology. We accrued patients, family members and clinicians from hematological malignancy outpatient clinics at a tertiary oncology centre. Participants underwent audio-recorded semi-structured interviews. Interviews were transcribed verbatim. Analysis involved meticulous review of transcripts; the constant comparative method was utilized and data collection occurred concurrently with analysis until saturation of themes was achieved.

Results: The study involved 6 patients, 5 family members, and 8 clinicians (physicians, nurses, social worker). Participants in this study indicated that they thought ACP was both acceptable and important yet many had not engaged in ACP and few had completed any formal documentation around ACP. Perceived barriers reported by participants included: systems barriers such as lack of process for ACP, lack of time and/or resources; patient-related factors such as lack of understanding of disease, prognosis and/or expectations of HCT, lack of patient/family understanding of ACP, patients' desire to 'focus on positives'; and disease/treatment-related factors such as uncertainty and unpredictability of the disease and treatment trajectories in hematology and HCT. Potential facilitators identified by participants included: normalizing and integrating ACP as part of routine HCT care, maintaining a positive focus even when treatment goals change from curative intent to comfort, involving the multidisciplinary team in ACP, and introducing ACP early and revisiting frequently.

Conclusions: We found significant barriers to participation in ACP from clinicians and patients alike and are using the results of this study to inform and tailor interventions on ACP in hematology/HCT at our centre. Introducing ACP as part of standard care in HCT and providing ongoing

facilitation of ACP, including disease and treatment expectations at the outset, and when complications arise, may assist patients and families in recognizing how ACP fits into their care. The challenges of unpredictability and uncertainty in hematology/HCT may be mitigated in the future as prognostic models emerge that will assist in being able to anticipate which patients are at risk for certain complications such as graft-versus-host disease, infectious complications and disease relapse. In the interim, unpredictability may best be met by revisiting goals of care discussions frequently and ensuring patients and families are aware of other treatment options, such as supportive and palliative care.

47. ADMINISTRATION OF GRANULOCYTE-COLONY STIMULATING FACTOR FOLLOWING OUTPATIENT AUTOLOGOUS STEM CELL TRANSPLANTATION: EFFECTS ON HOSPITALIZATION, BACTEREMIA, AND MORTALITY

Julian Lee BSc(Pharm)[1], Katie Lacaria BSc(Pharm.), ACPR[2], Dawn Warkentin PharmD[2], Raewyn Broady MBChB[3]

[1]Pharmacy Resident, Lower Mainland Pharmacy Services, Fraser Health, BC, [2] Faculty of Pharmaceutical Sciences, University of British Columbia; Vancouver General Hospital, Vancouver, BC [3]Faculty of Medicine, University of British Columbia; Leukemia/BMT Program of BC, Vancouver, BC

Background: Following autologous stem cell transplant (ASCT) in the inpatient setting, the administration of granulocyte-colony stimulating factor (G-CSF) has been associated with acceleration of neutrophil engraftment by 1-2 days and reduction in infections, but no effect on mortality. Information on the association of G-CSF administration following outpatient ASCT and rate of hospitalization is limited.

Objectives: To determine if administration of G-CSF following outpatient ASCT results in a difference in hospitalization, engraftment kinetics, bacteremia, and mortality.

Methods: A retrospective, single centre, observational cohort study over a 2 year period comparing 91 patients who did not receive G-CSF as outpatients (No G-CSF group) following ASCT for multiple myeloma to 80 patients who did (G-CSF group).

Results: No statistically significant difference was observed in rate of hospitalization within 30 days of ASCT between patients in the No G-CSF group compared to the G-CSF group (31.9% vs 25%, P=0.32). The No G-CSF group had a significantly longer median time to neutrophil engraftment (15 vs 13 days, P<0.001) and duration of neutropenia (8 vs 6.5 days, P<0.001). The No G-CSF group also had a fewer median number of outpatient clinic visits (13 vs 14 visits, P=0.009). No difference in days of severe neutropenia, platelet recovery, febrile neutropenia, duration of IV antibiotic use, bacteremias or mortality were observed between the two groups.

Conclusion: No differences were observed in hospitalization rate, bacteremias or mortality in patients who received or did not receive G-CSF following outpatient ASCT, suggesting limited clinical benefit in this setting. Further prospective studies are needed to confirm effects of G-CSF on hospitalization.

48. EXAMINING NOVEL APPROACHES TO REDUCE THE NEGATIVE IMPACT CHEMOTHERAPY DRUG SHORTAGES HAVE IN ADULT BLOOD AND MARROW TRANSPLANT PROGRAMS.

Cherie C. Severson RN, MN CON(C), BMTCN.

Calgary, Alberta

Introduction: Oncology drug shortages pose a significant threat to the delivery of high quality care in Canadian blood and marrow transplant programs. Drug shortages not only put Canadian transplant patients at risk for delaying or possibly being denied treatment, they also cause disruptions and alter outcomes in research and clinical trials.

Statement of the Main Thesis: In response to oncology drug shortages, novel approaches are needed in Canadian blood and marrow transplant programs to ensure patients receive the most appropriate treatment options for their cancer to provide them with the best possible outcomes.

Summary: A 2013 Canadian survey reveals physicians and pharmacists believe approximately 20% of cancer patients are impacted by cancer drug shortages resulting in compromised care. The short supply of cancer pharmaceuticals appears to be increasing. According to the FDA's drug shortage list, at least 22 of these drugs are cancer drugs. Of the 400 NCI funded trials, half of them contain one of these cancer drugs on the list. Many of these drugs are commonly used in combination chemotherapy regimens for hematology and blood and marrow transplant patients including: vincristine, methotrexate, leucovorin, cytarabine, cyclophosphamide, doxorubicin, and melphalan. 64% of physicians admitted that patients suffer significant consequences related to drug shortages including delay or stoppage of treatment/clinical trial, use of less effective medication, changes in the outcome of treatment, increased symptoms and an increase in hospital admissions. Early notification of drug shortages to practitioners is imperative to the delivery of high quality cancer care. In a 2011 publication, physicians report getting as little as 3 days' notice that a cancer pharmaceutical would no longer be available leaving them scrambling to find other alternatives to treat their patients' cancer. Much of the suspected causes for these drug shortages include: supply issues (raw materials), manufacturing issues, contracting issues and economic decisions. Current strategies in the US and European cancer care delivery systems to combat drug shortages include: early notification to the FDA of a drug shortage, legislation ensuring manufacturers give 3-6 months notice to the FDA if they decide to stop production of a drug, earlier application for FDA approval and licensing of generic drugs, expedited updating of government websites outlining drug shortages, smart phone apps allowing immediate

access to drug shortage information and reduction of chemotherapy doses with the addition of colony stimulating factors. Other ideas may include a centralized Canadian or provincial registry to stratify patients by risk score and curative intent and allocate cancer drugs in short supply to the highest risk patients with best chance of cure first.

Conclusion: There are a number of strategies used in other countries that can assist Canadian transplant programs and practitioners with oncology drug shortages. It is essential for Canadian transplant programs to explore these options in order for cancer patients to achieve optimal care and outcomes.

49. LAUNCH OF STEM CELL CLUBS AT FOUR MEDICAL SCHOOLS IN ONTARIO

Warren Fingrut, MD[1,2],Ari Cuperfain, MSc[1,2], Alexander Tigert, BSc[1,2], Kathryn Cogger, PhD[1,3], Yongjun (George) Wang, B Pharm[1,4], Thomas Henderson, BSc[1,4], Sara Calvert[1,5], Christopher Welsh, BSc[1,6], Navot Kantor, BSc Kin[1,6], Joseph Aziz, BSc[1,6], Menachem Benzaquen, BSc[1,6], Neha Arora, BSc[1,7], Amanda Yaworski, BSc[1,7], Jessica Shanahan, BSc[1,7], Saravannan Shaan[1,7], Janice Yu, BMSc[1,7], David Allan, MD, FRCPC[6,8,9,10], Hans Messner, MD, PhD, FRCPC[2,11]

[1]Stem Cell Club, ON, [2]Faculty of Medicine, University of Toronto, Toronto ON, [3]McEwen Centre for Regenerative Medicine, University Health Network, Toronto ON, [4]Faculty of Medicine, Western University, London ON, [5]Faculty of Nursing, Western University, London ON, [6]Faculty of Medicine, University of Ottawa, Ottawa ON, [7]Faculty of Medicine, McMaster University, Hamilton ON, [8]OneMatch Stem Cell & Marrow Network, Canadian Blood Services, Ottawa ON, [9]Ottawa Hospital Research Institute, Ottawa ON, [10]Department of Medicine, The Ottawa Hospital, Ottawa ON, [11]Department of Medicine, Princess Margaret Cancer Centre, University Health Network, Toronto ON

Introduction: The Stem Cell Club is a student-run non-profit organization that works to recruit Canadians as unrelated stem cell donors. We are a community partner of Canadian Blood Services, and we are accredited through them to run our own stem cell drives. At these drives, we guide registrants to provide informed consent and a tissue sample (buccal swab) for HLA typing. Through targeted recruitment of the most needed donors (ethnically-diverse males), we aim to improve the quality of membership on Canada's donor database and improve the chances that patients in need of an unrelated donor will find the match they need for transplant.

Previously, we outlined our initiative's successful launch at University of British Columbia's medical school in 2011 (Fingrut, CBMTG 2014). Here, we report the expansion of Stem Cell Club to include chapters at four medical schools in Ontario.

Methods: Teams of medical, nursing, graduate, and undergraduate students were recruited to launch stem cell clubs at each medical school and associated campuses at University of Toronto, University of Ottawa, McMaster University, and Western. All club leaders underwent Stem Cell Club's online training program, which covers how to volunteer at, lead, and organize a stem cell drive. Online training was followed up with in-person training workshops. Each team was connected with a Canadian Blood Services Territory Manager, and equipped with all needed supplies to run drives. Teams registered their chapter as a medical school and/or university campus club and applied for renewable clubs funding. Drive outcomes were obtained from post-event reports, which log number of registrants recruited as well as their sex and self-reported ethnicity.

Results: To date, 68 Ontario Stem Cell Club leaders have completed Stem Cell Club's training program. $4,750 has been secured from university club funding ($4000 at UOttawa, $500 at McMaster, and $250 at Western). From 01/10/2015-31/12/2015, Stem Cell Club chapters at UofT, UOttawa, and McMaster ran five stem cell drives, recruiting a total of 439 donors. Of 319 donors recruited at drives for which outcomes are available at time of publication, 60.0% were male and 53.3% were non-Caucasian males. Stem cell drive planning is ongoing at all chapters, with 8 scheduled upcoming drives in Ontario.

Conclusions: In summary, we have demonstrated the successful launch of Stem Cell Clubs at four medical schools in Ontario. Based on our preliminary results, we estimate that we have established a capacity to sustainably recruit over 1000 stem cell donors per year in Ontario, of which the majority are ethnically-diverse males. Further, we show that our initiative is financially sustainable, as demonstrated in success in securing funding from renewable sources external to Canadian Blood Services (university clubs funding). Our results support Stem Cell Club as a model for stem cell donor recruitment that can be applied to campuses across Canada.

50. DEVELOPMENT OF AN ONLINE TRAINING PROGRAM FOR STEM CELL DRIVE RECRUITERS

Warren Fingrut, MD[1,2]

[1]Stem Cell Club, Toronto ON, [2]Faculty of Medicine, University of Toronto, Toronto ON

Introduction: Unrelated stem cell donors are recruited at stem cell drives, at which recruiters guide registrants to provide informed consent and a tissue sample (buccal-swab) for typing. Studies have shown that registrant experience, including impression of how knowledgeable recruiters are, impacts donor attrition rates. These studies highlight the need for well-trained, competent recruiters. A recent World Marrow Donor Association guideline recommends topics to be included in a training program delivered to volunteers, staff recruiters, and drive supervisors (Schmidt 2013). However, to date, no recruiter training programs have been described in the literature. The Stem Cell Club is a federal non-profit in Canada that works to strengthen Canada's donor-database. This presentation outlines Stem Cell Club's online training program for recruiters.

Methods: A three-module self-directed online training program was constructed: 1) volunteering at, 2) leading, and 3) organizing a stem cell drive. These modules feature spiral curricula in: stem cell donation science, strategies for donor recruitment, informed consent, quality control, good

documentation practices, confidentiality and privacy, recruitment of the most-needed donors, redirecting non-optimal donors to help in other ways, and drive supplies and setup. All WMDA recommended training topics for recruiters are included (Schmidt 2013). The modules are published online at www.stemcellclub.ca/training. Each module ends with a link to a post-module quiz to assess successful knowledge transfer.

Results: Since the modules' publication in 09/2015, 96, 60, and 24 recruiters have completed the first, second, and third modules and post-module quizzes. Quiz scores are over 90% for each recruiter and module. Participants unanimously found these modules to improve their confidence with the material and to prepare them for their first shifts volunteering at, leading, or organizing a stem cell drive.

Conclusions: This presentation showcases a novel strategy to deliver training to stem cell donor recruiters. It is relevant to any registry looking to build or upgrade their recruiter training program, and to any groups or individuals who organize stem cell drives.

51. DEVELOPMENT OF STEM CELL DONATION PROCEDURE DIAGRAMS TO FACILITATE INFORMED CONSENT

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Introduction: Securing informed consent for unrelated hematopoietic stem cell donors is an important moral, ethical, and legal obligation. Moreover, two studies by Switzer et al. (2003, 2004) found that donors who felt less informed at various points in the donor recruitment, evaluation, and workup process were more ambivalent about donation and more likely to withdraw if asked. In 2003, the World Marrow Donor Association (WMDA) published a set of suggested procedures for securing informed consent of potential stem cell donors. These procedures include providing the general public as well as volunteer donors at time of recruitment with information on the haematopoietic stem cell collection process. The WMDA suggested procedures further stipulate that, prior to stem cell collection, the volunteer donor should attend a consultation session where a physician provides a comprehensive overview of both collection procedures (marrow and peripheral blood stem cell collection) which can be readily understood by a lay person.

Here, we describe the development of stem cell donation procedure diagrams for use at all stages of donor recruitment and consultation prior to donation.

Methods: Diagrams were illustrated graphically and explained with accompanying text understandable to the lay-person. Donors featured are ethnically diverse young-adult males, as these are the most-needed donor groups. Ethnicity specific diagrams were approved by community representatives from the respective ethnic groups. Procedure diagrams were reviewed by two actively practicing transplant hematologists to ensure accuracy. The diagrams have been published online at www.stemcellclub.ca, and are available for the transplantation community to use.

Results: Bone marrow and peripheral blood stem cell donation procedure diagrams were constructed, with versions featuring each of Aboriginal, Black, Chinese, and Indian young-adult male donors. The peripheral blood stem cell collection procedure diagrams highlight pre-procedure GCSF administration and day-of-donation apheresis. The bone marrow donation procedure diagrams illustrate marrow being harvested from the posterior superior iliac spine via a Jamshidi needle. A zoom-in of the needle inside the marrow is shown.

Conclusion: In summary, we describe the development of bone marrow and peripheral blood stem cell collection procedure diagrams for use at time of stem cell donor recruitment and consultation of donors prior to transplant. These diagrams facilitate securing informed consent and their use may therefore reduce donor ambivalence and attrition. They are relevant to any group who raises public awareness about stem cell donation, recruits stem cell donors, or counsels donors prior to transplant.

52. HEMATOPOIETIC STEM/PROGENITOR CELL TRANSPLANTATION FOR SEVERE HEREDITARY SPHEROCYTOSIS DUE TO ALPHA SPECTRIN DEFICIENCY.

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Background: Hematopoietic stem/progenitor cell transplant (HSCT) is an accepted and recommended therapy for children/young adults with red cell disorders including hemoglobinopathies (thalassemia, sickle cell anemia) and Diamond-Blackfan anemia. There is a subset of red cell membrane disorders marked by high rates of red cell turnover and life-long transfusion dependence with associated iron overload that require additional therapeutic options such as HSCT.

Two female patients (ages 5 and 11 years) were diagnosed in utero with hydrops fetalis– requiring intrauterine transfusions. Molecular analysis identified severe alpha-spectrin deficiency in both patients. One had a paternal family history of hereditary spherocytosis, the other did not. Both girls have had splenectomies, but even scheduled transfusion did not adequately suppress hematopoiesis. After extensive discussion with the families it was elected to move to allogeneic transplant with curative intent.

Methods: Patient 1 had an HLA-matched sibling and underwent myeloablative reduced toxicity transplant after 6 weeks of hydroxyurea and hypertransfusion. After early alemtuzumab, fludarabine and melphalan, an unmanipulated marrow was infused. GVHD prophylaxis was tacrolimus and short course methotrexate. The post-transplant course was marked by C. difficile infection and reactivation of CMV. She is now 6 months post-transplant, transfusion independent (Hbg 135 g/L), mixed chimeric with her donor, and off immunosuppression.

Patient 2 had a matched unrelated donor and underwent a similar transplant strategy with the addition of Thiotepa to the preparative regimen. The post-transplant course was unremarkable. She is now 5 months post-transplant, transfusion independent (Hbg 120 g/L), fully donor chimeric, and off immunosuppression.

Results/Conclusion: Both patients are still in the early post-transplant period, but demonstrate the feasibility of allogeneic transplant as therapy for an expanded cohort of patients with severe red cell abnormalities. Review of literature and transplant registries failed to identify previously reported transplants for this and like disorders. We suggest that patients with defined red cell disorders requiring chronic transfusion regimens should be candidates for allogeneic transplant.

53. PROLONGED THERAPY WITH LOW DOSE INTERLEUKIN-2 IS ASSOCIATED WITH IMPROVEMENT IN ESTABLISHED EXTENSIVE SCLEROTIC CHRONIC GVHD

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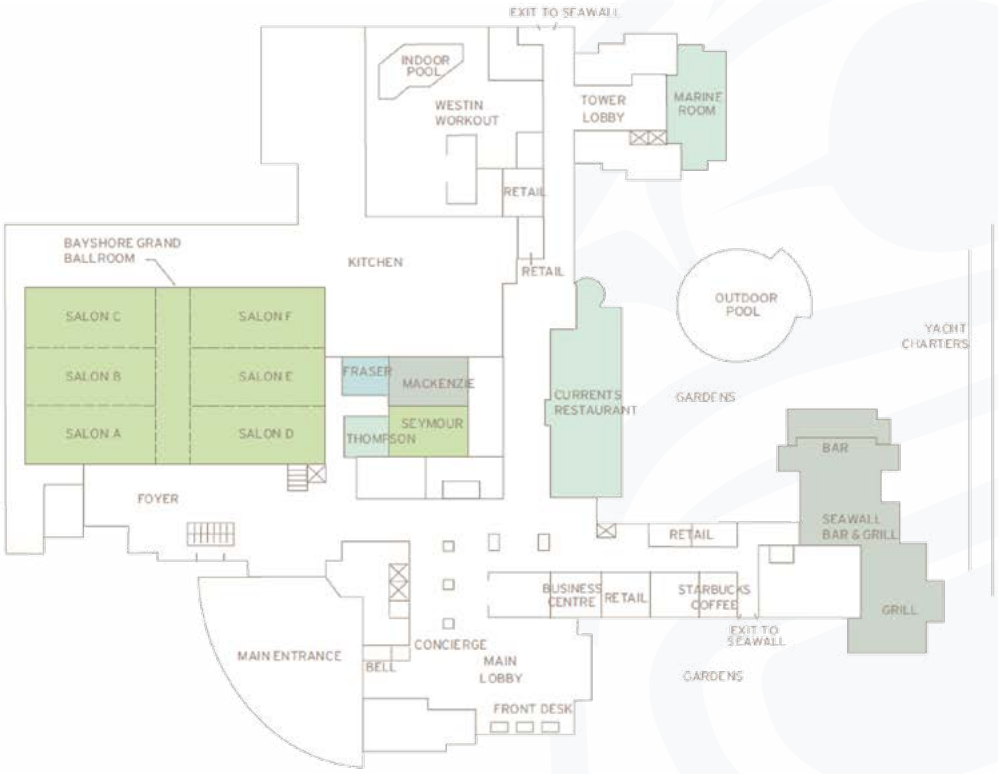
Background: Sclerosis predominant chronic GVHD (cGVHD) is a particularly devastating manifestation of GVHD that frequently leaves patients with prolonged disability. It is often challenging to discern whether the fibrosing process is still active and treatment outcomes continue to be disappointing.

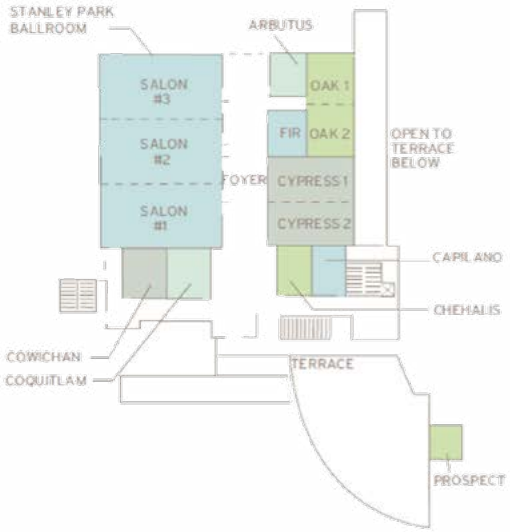
Methods: Here we present a series of patients with steroid refractory, multi-agent-resistant sclerosing cGVHD who were treated with daily subcutaneous low dose interleukin-2 (IL-2) for an initial 3-month course, with continuation of therapy if response was seen. The 8 patients (age 18-62 y; 2F:6M) all had established extensive sclerotic cGVHD (6 months to 8 years) that progressed despite multiple lines of therapy. Following the published phase II experience of Koreth and colleagues (NEJM 2012) we started rHIL-2 as additive therapy to existing immunosuppression. With stabilization or improvement, other immunosuppression was tapered with a priority given to weaning steroids. Based on stability data from the Boston group we were able to prepare 8-10 doses of IL-2 from a single vial and supply patients with ready to self-administer syringes. The care is routinely coordinated by community pharmacies affiliated with CancerCare Manitoba.

Results: Local reactions were common at the injection site and often alleviated with the use of topical evening primrose oil. Otherwise the treatment was well tolerated. One patient died of sepsis shortly after starting thought not to be attributable to the IL-2. One patient stopped therapy at 7 months with GVHD stabilization and a significant steroid wean. The others all are continuing on IL-2 at a median of 6 months (range 3 – 12 months). All are showing continued improvement with increasing mobility, softening of fibrotic areas, and healing of refractory wounds. In 7 out of 7 patients (excluding deceased patient) we were able to significantly reduce concurrent immunosuppression post addition of IL-2. One patient with a concomitant myeloid sarcoma has experienced regression of her tumor while on IL2 therapy. In addition to the early infectious death there was one patient with a serious blood stream infection and septic arthritis attributed to an infected port. There were no opportunistic fungal or viral infections seen.

Conclusion: We have been impressed with the responses seen in patients with longstanding refractory sclerotic GVHD. Feasibility of treatment is improved with the ability to dose multiple days from a single vial. This modality deserves further exploration – perhaps in combination with other modalities that increase Treg function such as ECP.

The Westin Bayshore Hotel Floor Plans





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Notes

About CBMTG

The Canadian Blood and Marrow Transplant Group (CBMTG) is a member-led, national, multidisciplinary organization providing leadership and promoting excellence in patient care, research and education in the field of blood and marrow transplant.

OUR MISSION

The Canadian Blood and Marrow Transplant Group is the voice of experts working in the field of blood and marrow transplant.

OUR VISION

Canada will be the best place in the world to have a blood and marrow transplant.

OUR STRATEGIC PRIORITIES

Education	Providing high quality educational programs that advance the practice of blood and marrow transplantation in Canada.
Research	Establish and organize an effective and sustainable research infrastructure for translational and clinical research.
Outreach	Increase the visibility and influence of CBMTG among members and the public.
Financial Capacity	To support education, research and outreach initiatives through fundraising, partnerships and the establishment of a charitable organization.

Become a member

of the Canadian Blood and Marrow Transplant Group!

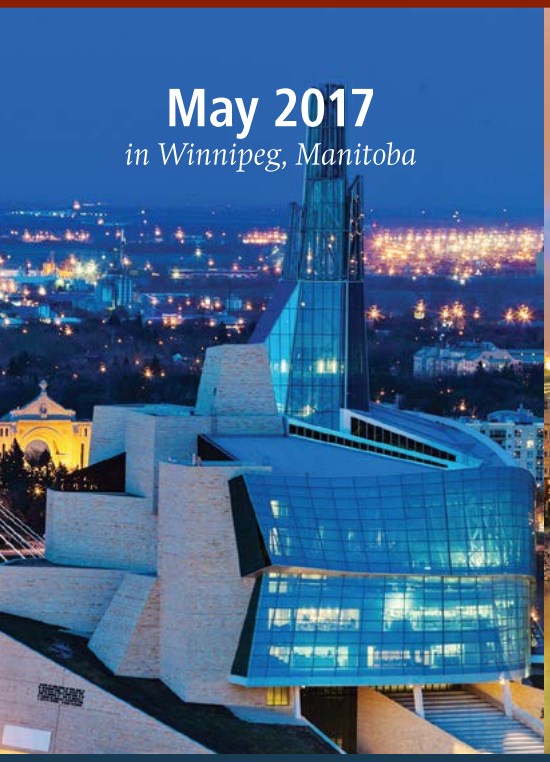
Are you a Physician, Researcher, Nurse, Pharmacist, Laboratory Technician, or Program Coordinator working in blood and marrow transplant? Join CBMTG and take advantage of the exciting benefits that membership has to offer!

BENEFITS:

- Discounted rate for CBMTG annual conferences
- **FREE** access to association educational webinars
- Get involved with **CBMTG committees and working groups**
- Opportunity to apply for **CBMTG small budget research grants**
- Network with your colleagues in BMT
- Help **advance the BMT profession** across Canada!

THE CANADIAN BLOOD AND MARROW TRANSPLANT GROUP IS PLEASED TO ANNOUNCE A SERIES OF THREE MEETINGS IN 2017!

Based on the successful model of the Annual CBMTG GVHD Symposium in Montreal, these meetings will address key issues facing the Canadian BMT field.



May 2017
in Winnipeg, Manitoba

Led by **Dr. David Szwajcer and Tracy Robinson,** this meeting will include sessions focused on regulatory issues, supportive care and care delivery and lab focused sessions.

June 2017
in Calgary, Alberta

Led by **Dr. Michelle Geddes,** this meeting will focus on Innovation within the BMT field.

September 2017
in St. John's, Newfoundland

Led by **Dr. David Jones,** this meeting will address mobilization considerations, both allo and auto, and long term follow up, complications and relapse.

These 1.5 day long meetings will include scientific sessions, keynote presentations, multidisciplinary and discipline specific session and corporate satellite symposia.

We invite all BMT healthcare professionals to attend our meetings in 2017!

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT:
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