Retrospective Study of the Management of *Staphylococcus aureus* bacteremia

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Abstract #
IRB Approved

Disclosure

- Lauren Lees
- Potential conflicts of interest: none
- Sponsorship: none
- Proprietary information or results of ongoing research may be subject to different interpretations
- Speaker's presentation is educational in nature and indicates agreement to abide by the non-commercialism guidelines provided

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Learning Objectives

- List the components of a *Staphylococcus aureus (S. aureus)* bacteremia care bundle
- Recall the duration of therapy for complicated and uncomplicated *S. aureus* bacteremia

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Oklahoma State University Medical Center (OSUMC)

- Located in Tulsa, OK
- Academic institution affiliated with Oklahoma State University Health Sciences Center
- Demographics:
  - 195 bed facility

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Introduction

- *S. aureus* is a virulent gram-positive pathogen and is a leading cause of bacteremia
- *S. aureus* bacteremia is associated with a 20-30% increased rate in morbidity, health care costs, and mortality
- The management of *S. aureus* bacteremia is greatly improved with adherence to performance measures and implementation of care bundles

Reig S. Journal of Infection. 2009;59(4):232-39.
Wylit DH. BMJ. 2006;333:281.

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Introduction

- IDSA Clinical Practice Guidelines for MRSA bacteremia
  - Minimum treatment duration of 2 weeks for uncomplicated bacteremia
  - Treatment duration of 4-6 weeks for complicated bacteremia
  - Identification and elimination of source of infection
  - Repeat blood cultures 2-4 days after initial positive cultures until documented clearance
  - Echocardiography recommended in all patients with bacteremia
  - Vancomycin or daptomycin for MRSA bacteremia, beta-lactam antibiotics for MSSA

Liu C. CID 2011;52(3):285-92.

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Antimicrobial Stewardship and Adherence to Care Bundles

- Impact of implementation of a *S. aureus* bacteremia care bundle managed by an antibiotic stewardship team:
  - Complete bundle adherence to performance measures improved from 56.1% to 84.1%
  - Readmission within 30 days decreased from 11% to 1.1%

Nguyen CT. *J Antimicrob Chemother* 2015;70:3390-96.

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Antimicrobial Stewardship and Adherence to Care Bundles

- Mandatory infectious disease consult in all patients with *S. aureus* bacteremia
- Evaluated improved adherence to bundle measures, with improvement in individual measures:
  - Transesophageal echocardiography
  - Follow-up blood cultures
  - Appropriate antibiotic therapy selection
- Decreased in-hospital mortality from 43.59% to 10%

Borde JP. *Infection* 2014;42:713-19.

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Objectives

- Primary objective:
  - Evaluate adherence to various performance measures/care bundle for the management of *S. aureus* bacteremia at our institution
- Secondary objective:
  - Identify impact on adherence to performance measures/care bundle in patients with infectious disease (ID) consultation

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Methods

- Retrospective chart review
- Inclusion criteria:
  - Admitted between August 2016 and July 2017
  - Eighteen years of age or older
  - One positive blood culture with *S. aureus*
  - Received antimicrobial therapy
- Exclusion criteria:
  - Discharged against medical advice
  - Transferred from outlying facility after receiving treatment for *S. aureus* bacteremia
  - Transferred to outlying facility for elevated level of care
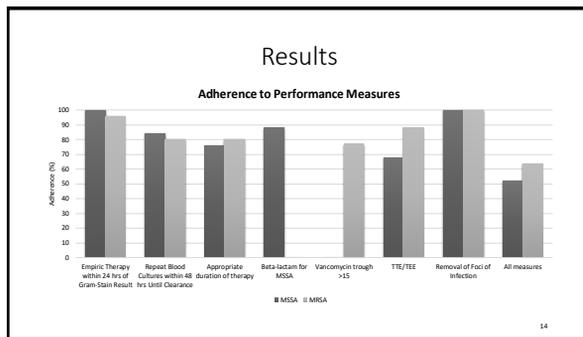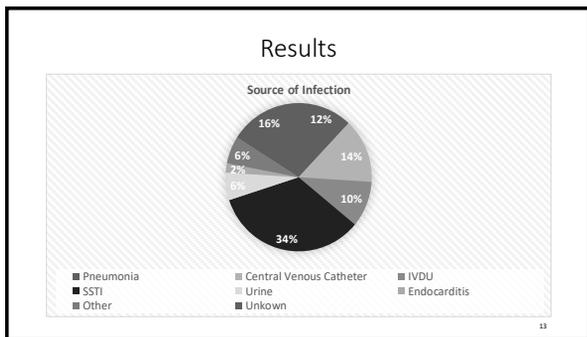
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Performance Measures

- Initiation of appropriate empiric antibiotics within 24 hours of gram stain results
- Beta-lactam therapy for MSSA bacteremia
- Blood cultures repeated every 48 hours until documented clearance
- Echocardiography (TTE or TEE) obtained
- Removal/debridement of foci when possible
- Appropriate duration of therapy
- Therapeutic vancomycin trough obtained when applicable
- Overall adherence to care bundle

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Baseline Characteristics

		MSSA N = 25 (%)	MRSA N = 25 (%)
Age (years)	18-30	5 (20)	1 (4)
	31-50	5 (20)	9 (36)
	51-70	12 (48)	12 (48)
	≥ 71	3 (12)	3 (12)
History of IV Drug Use		7 (28)	8 (32)

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Results

Source of Infection

- ■ Pneumonia
- ■ SSTI
- ■ Other
- ■ Central Venous Catheter
- ■ Urine
- ■ Unkown
- ■ IVDU
- ■ Endocarditis

Values shown on pie chart: 12%, 14%, 10%, 34%, 6%, 2%, 6%, 16%

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Results

Adherence to Performance Measures

Categories: Empiric Therapy within 24 hrs of Gram-Stain Result; Repeat Blood Cultures within 48 hrs Until Clearance; Appropriate duration of therapy; Beta-lactam for MSSA; Vancomycin trough >15; TTE/TEE; Removal of Foci of Infection; All measures

■ MSSA ■ MRSA

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Clinical Outcomes

	MSSA N=25	MRSA N=25
Median Length of Stay (days, range)	13 (5-27)	15 (2-51)
30 day Readmission (with recurrent bacteremia)	-	1
30 Day All Cause Mortality (%)	1 (4)	4 (16)

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Results

- A total of 25 patients had an ID consultation
  - 15 MSSA, 10 MRSA
- Sixteen patients met 100% adherence to all performance measures
  - 9 MSSA, 7 MRSA
- 64% of patients with ID consultation met all performance measures compared to 59% without consultation

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Conclusions

- Results demonstrate that we do not consistently adhere to evidence-based performance measures for the treatment of *S. aureus* bacteremia
- ID consultation had limited impact on adherence compared to those without ID consultation
- Implementation of a *S. aureus* bacteremia care bundle at our institution could improve adherence and patient outcomes

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Self-Assessment Questions

- What is the duration of antibiotic therapy for uncomplicated *S. aureus* bacteremia?
  - a. 1 week total
  - b. 2 weeks from negative culture
  - c. 4 weeks total
  - d. Until cultures are negative

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Self-Assessment Questions

• What imaging is recommended in a patient with bacteremia?
 a. Chest X-ray
 b. Transthoracic echocardiography (TTE)
 c. Transesophageal echocardiography (TEE)
 d. B and C

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