• Some techniques presented utilize medical devices or products off-label.

• The views presented reflect those of the author/presenter and do not necessarily reflect those of ASDIN nor serve as an endorsement of safety, efficacy or applicability of said procedure.

Disclosures

• Bard- consultant
• Cryo-Life – consultant
• Teleflex- consultant
**Buttonhole Technique Definition**

Is the “repeated cannulation into the exact same puncture site, and a scar tissue tunnel tract develops. The scar tissue tunnel tract allows the needle to pass through to the vessel of the fistula following the same path each time.”

Patt Petersen, NNJ, 4/2001

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**Buttonhole Technique History**

Reported first in U.S. by Twardowski in 1977


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**Buttonhole Advantages**

- Cannulation less painful
- Allows cannulation success where standard technique fails
- Cannulation is quicker and easier especially deep and small fistulae
- Less needle trauma: infiltrations, bleeding and aneurysm formation

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*Buttonhole needling of haemodialysis arteriovenous fistulae results in less complications and interventions compared to the rope-ladder technique*

Magda M. van Loon, Tony Goovaerts, Alfons G. H. Kessels, Frank M. van der Sande and Jan H. M. Tordoir

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**Disadvantage- Infection**

Infectious Complications Following Conversion to Buttonhole Cannulation of Native Arteriovenous Fistulas: A Quality Improvement Report

Laura Habr-Gama, MD,1 Ralph Cott, MD, PhD,2 Christine DeSmet, RN,1 Genevieve Andre, RN,1 and Michel Jardim, MD1

Patient Selection

AVF only
Home HD pts
In-center HD pts with:
- limited cannulation zone
- "deep" fistula
- "small" fistula
- inexperienced staff

Buttonhole Skin Preparation

- Have patient tape an alcohol swab over buttonhole prior to coming to dialysis
- Always wash arm on entry to dialysis unit
- Clean the buttonhole area after stretching the skin away from the buttonhole and soaking with a bactericidal solution to loosen the scab.

Buttonhole Skin Preparation

- The scab over the entry site is removed with a sterile piece of gauze or a sterile instrument – never the tip of the cannulating needle and never allow the patient to pick it off with fingernails
- Clean the sites again (gloves are changed prior to the second skin cleaning)

Cannulation Needles

- Limit use of sharp needles to buttonhole site creation only
- Transition as soon as possible to the dull needles to prevent damage to the vessel flap or to prevent creating of multiple vessel flaps and potential aneurysm formation

Do’s and Don’ts of Scab Removal

- Do not flip the scab off with the needle you will use for cannulation – this contaminates the needle.
- Do not use a sterile needle – you could cut the patient’s skin.
- Do not let patients pick off their scabs.
- Do not stick through scabs.

Cannulation – Site Preparation

<table>
<thead>
<tr>
<th>Cleansing Agent</th>
<th>Contact Time</th>
<th>Cannulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betadine®</td>
<td>3-5 minutes</td>
<td>When dry</td>
</tr>
<tr>
<td>ExSept®</td>
<td>2 minutes</td>
<td>When dry</td>
</tr>
<tr>
<td>Chloraprep®</td>
<td>30 seconds</td>
<td>When dry</td>
</tr>
<tr>
<td>Alcohol</td>
<td>60 seconds/each site</td>
<td>Immediately after applying</td>
</tr>
</tbody>
</table>

Needles – sharp and blunt

Skin/tissue tunnel track + vessel flap = Buttonhole Site

Skin/tissue tunnel track + vessel flap = Buttonhole Site

Buttonhole Wrong Angle
- Needle inserted into the buttonhole tunnel track but the angle is not in alignment with the vessel flap
- The needle can bounce on the vein and not displace the vessel flap

Buttonhole Wrong Angle
- Adjust angle to find the flap
- Lift up or down on the needle to readjust the angle (10° until the needle drops into the vessel flap
- Causes: moving needle from angle used to enter the skin, arm positioning not in routine place, fluid status change with edema or patient body weight gain or loss

Damaged Buttonhole
- Buttonhole sites where sharp needles were used
- Ultrasound shows thrombus and stenosis at site.
Summary

• The angle of the skin tunnel track and vessel flap must be aligned for the dull needle to displace the vessel flap
• Re-adjust the needle angle to find the vessel flap—don’t just remove the needle and re-cannulate with a sharp needle
• Patients are the ideal people to create and use buttonhole sites, since they are less likely to change the needle insertion angle
• If the vessel flap is not aligned with the skin tunnel track, evaluate the arm position, edema status or body weight changes to find a solution

Strategies to Establish Buttonholes

• Patient self cannulates with sharp needles
• Level 4 cannulator cannulates with sharp needles for 6-10 times
• Vital Access Guide
• Biohole
• Supercath AZ clampcath dialysis needle/catheter

Vital Access Venous Window Guide for Salvage of AV Fistulae

SAVE trial

Design Features
• Provides palpable target on deep fistulas
• Utilizes buttonhole cannulation technique
• Guides standard fistula needle to single cannulation site
• Creates secure attachment to the outside of the target vessel

http://clinicaltrials.gov/ct2/show/NCT01471041
http://www.vital-access.com/vwng/product_information
Marticorena et al. “A simple method to create buttonhole cannulation tracks in a busy hemodialysis unit” Hemodialysis International June 2009

12 patients
Buttonholes established after 10 days using the Clampcath needles
Followed for 6-18 mo. (no sepsis or tunnel track infx)

Variation in technique of establishing Buttonholes using 5F sheaths

First, discuss with the patient:
- risks and benefits
- hygiene
- patient responsibilities

Second, review Policy and Procedure of buttonhole cannulations at your dialysis units

Variation in technique of establishing Buttonholes using 5F sheaths

Place 2 5F sheaths for 7-14 days
May use the sheath for HD access if pt on Home HD
Otherwise pt must have alternative access (standard needle cannulation or TDC)
After 7-14 days: Remove sheath over a wire and cannulate over the wire with a 15 ga dialysis needle, document angle of needle insertion, determine if 1 inch or 1 1/4 inch needle required

Where is the fistula?

5 French sheaths placed
Sheaths sutured securely

10 days later, sheath removal

Sheath removed over a wire

First needle cannulation over the wire

Grasp tubing, not the needle wings
**Best Demonstrated Practice**

**Touch Cannulation Technique**

- Allows the needle to direct the needle down the buttonhole, and not the cannulator
- Hold the tubing with thumb and forefinger just behind the wings

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**Taut (tight) Skin Anchors the Vein and Decreases Pain**

- Rope Ladder (site rotation)
- Buttonhole (constant site)
- Two-point technique

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**Determine and measure needle cannulation angle**

**Confirm excellent blood return**

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**Hemostasis is very quick**

- Venous buttonhole
- Arterial buttonhole

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**Raleigh Access Center data**

- 1498 HD pts
- 823 AV fistulas (55%)
- 141 Buttonholes (17% of fistulas)
RAC alternative technique data

- 29 patients (51 buttonholes) established with this alternative technique
- 3 Home HD / 26 in-center (only 2 did self cannulations)
- Reasons: limited cannulation zone (9), deep or difficult cannulations (20)

Raleigh Access Center data follow up

24 months:
- 2 - exit site dermatitis - resolved with local care
- 2 - bacteremia – resolved with iv atbx
- 1 - buttonholes tracks difficult to cannulate
- 1 - lost to thrombosis
- 1 - death

Why continue?

Patient satisfaction

A Novel Approach for Creating Buttonholes in Native Arterio-venous Fistulas

Yang et al. Univ of Miami, Miller School of Medicine. Abstract at VASA 2012.

6F sheaths placed by US guidance and sutured
Left for 10-14 days and then buttonhole needles placed
At time of removal.

32 buttonholes in 17 pts. (20 BB, 4 BC, 6 RC, 2 femoral)
31/32 successful cannulations

END

Questions