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NEPHROLOGY PROGRAM
DEPARTMENT POLICIES AND PROCEDURES

Home Dialysis - Section 05 - Vascular Access - HDU 5-01
Buttonhole (constant-site) Cannulation for AV Fistulas
No.: 01459 (TOH Standardized Policy Number)

ISSUED BY: Home Dialysis Unit Clinical Practice Committee	**DATE OF APPROVAL:** 2011/07
APPROVED BY: Program Clinical Director & Division Head	**LAST REVIEW/REVISION DATE:** 2017/04
CATEGORY: Vascular Access	**IMPLEMENTATION DATE:** 2011/07

POLICY STATEMENT:

- To guide the effective use of buttonhole (Constant-site) cannulation technique for AV fistulas

ALERTS:

- Initiation of buttonhole technique requires consultation with the Nephrology Access APN/Coordinator and HDU Physician
- Buttonhole technique is not to be used on AV grafts
- Buttonholes must be created in the centre of the vessel, not on the sides
- To ensure the same angle and depth is used for each cannulation the **same person** must needle the fistula until the track is developed; minimum 8-10 consecutive cannulations (may require 12-18 cannulations for upper arm fistulas or for patients with a history of poor wound healing: e.g. diabetic patients)
  - A photo of the initial cannulation or a small template with the original angle of cannulation may help in maintaining the same angle for subsequent cannulations
  - Once the track has been established other staff may cannulate the buttonholes; attention to angle of the track should always be made
- To maintain the identical angle and depth the patient's arm must be the same position for cannulation until the track is developed
  - Attention should be given to height of table, rotation of arm etc. ensure that the position is comfortable and easy for the patient to replicate

Indications for use of buttonhole cannulation technique include:

- Limited cannulation sites due to tortuous vein, depth of vein, short length of fistula, or presence of aneurysms limiting potential cannulation sites
- Difficulty in self cannulation resulting in multiple cannulations, hematomas or patient frustration or discomfort
- Significant patient fear of needles or cannulation that impacts patient's ability to perform home therapy

Relative contraindications for buttonhole cannulation include:

- Thin subcutaneous tissue
- Signs of active infection, hematoma, swelling, skin breakdown
- Immature of poorly functioning fistula
- Significant central vein stenosis resulting in bleeding from sites of cannulation or around needles during hemodialysis
- History of previous infection at a buttonhole site

When creating a buttonhole consider the following:

- Availability of sites which are relatively easy for patient to access
- Availability of straight segments of vein
- Availability of a minimum of 2 inches between buttonholes
- Creating arterial buttonhole 1 inch above the arterial anastomosis and selecting a site for the venous buttonhole 2 inches or more above the arterial buttonhole
- Do not use aneurysmal areas or areas with thin subcutaneous tissue (white shiny skin over the vein)
- Button hole site should be evaluated regularly when created on an new AVF
- NOTE: new AVF should have 2weeks of stepladder cannulation to allow maturation prior to initiation of buttonholes

SUPPLIES:

Amount	Item
1	Hand sanitizer
2	Fistula needles (sharp needles for the first cannulations, then blunt)
4	Alcohol swabs
4	Chlorhexidine swabs
1	Paper tape
2	Transparent dressings (IV 3000 small)
1-2	Mask and protective eyewear if helper cannulating
2	Pairs of non-sterile gloves if a helper is cannulating
1	Mupirocin 2% cream
8	2x2 gauzes
8	4x4 gauzes
2	Blue clamps
2	Drapes
1	Towel
1	Burn net #5 for wrist band
2	Angio needles
1	IV extension set if required
2	20 ml syringe
2	18 gauge needles (red blunt)
1	Tourniquet

PROCEDURE:

1. Assess fistula for the presence of an audible bruit and a palpable thrill, any redness, swelling or pain on palpation or at rest
2. Wash hands and then needle sites with antimicrobial soap and water using friction for 15 seconds
3. Cleanse each of the sites with a swab starting from the cannulation site outwards in a circular motion using a fresh swab for each site. Ideal cleansing solution is Chlorhexidine (if sensitive to Chlorhexidine, use Betadine alcohol swab)
4. Apply an alcohol swab over each site for 10 minutes to soften the scab
5. If the scab becomes mushy, decrease the soak time
6. If alcohol soak insufficient to loosen scab apply a sterile saline soaked gauze for 10 minutes
7. When ready to cannulate, place a clean towel to create a working space; add supplies
8. Remove the scab with the alcohol swab
9. Every effort should be made to completely remove the scab to ensure that no scab is pushed into the buttonhole track
10. Cleanse hands with hand sanitizer
11. Re-cleanse each site as in step 3
12. Apply tourniquet if required
13. Insert needles as per section A or B taking care not to re-palpate the cleansed area

Section A: Creating Buttonhole Site

1. Position patient arm so that the access is accessible, firmly supported and allows placement of the clean towel. Put tourniquet on arm (if used)
2. Administer local anesthetic as per physician order if required. EMLA cream is the recommended agent
3. Once the buttonhole is created, there should be no need for anesthetic
4. Insert the arterial needle at an angle that fits with the depth of the vessel. Note and document the angle to allow repeat cannulation at the same angle for subsequent treatments. A blood flashback in the needle will indicate that the needle is in the vein. Lower the angle of insertion and advance the needle to its entire length. If needle was flushed, pinch tubing to check for flashback
5. Prop needle as needed and apply paper tape or transparent dressing over needle site
6. Release the tourniquet (if used)
7. Unclamp the fistula needle and aspirate blood into syringe testing for adequate blood supply. Flush blood / NaCl into vein assessing for swelling, resistance or pain
8. Clamp the needle and leave syringe attached
9. Repeat step # 1-8 for insertion of the venous needle. Note that the venous needle is always inserted in the direction of the blood flow
10. Proceed with dialysis

<u>Transition to blunt needles</u>

Timely transition to blunt needles can help preserve the integrity of the buttonhole site and help prevent complications.

- use of sharp needles beyond the time needed to create the buttonhole track may cut the tunnel track creating an ideal medium for bacterial growth.
- a sharp needle can also puncture the vessel or cause an infiltration.

Indications that the buttonhole is mature include:

- Site looks well healed;
- Buttonhole site has a round hole (progresses from a V cut to a U cut to a O);

Change to blunt buttonhole needles when the buttonhole is created.

- attempt blunt needles on treatment #9; treatment # 13 for diabetic patients Resistance in the track decreases with each cannulation

Section B: Maintaining a Buttonhole using the Blunt Needle

Cannulation

1. The angle of entry remains the same as in creating the buttonhole
2. Once the needle is inserted, release grip on wings of needle, hold the tubing and gently advance the needle. If some resistance is felt, slightly lift or lower the needle to find the track and gently rotate the needle as you advance it
3. If unable to cannulate the buttonhole:
    a. Re-cleanse the site and try again with a new sterile blunt needle.
    b. If unable to thread the second blunt needle, re-cleanse the site and try again with a new conventional sharp blunt.
    c. If you are unable to insert the needle in the buttonhole track and need to cannulate elsewhere using a conventional sharp needle, the needle should be placed a minimum of 1 inch from the buttonhole and in the same direction as the buttonhole track.
4. If there are signs of infection at the buttonhole site:

    a. Abscess at buttonhole site and or systemic symptoms such as fever, chills or rigors- patient should be instructed to contact the HDU. Cultures of exit site, blood cultures x 2 and IV antibiotics will be ordered by the physician as indicated.
    b. Patient may require assessment by Vascular Surgery depending on the extent of the infection.
    c. Do not access the buttonhole until antibiotic treatment is complete and infection resolved.
    d. Transition to step ladder cannulation.
    e. Patient should be reassessed by the HDU nurse/Nephrologist/Nephrology Access APN/Coordinator prior to re-cannulating this site

Section C: Removing the needle with a buttonhole

1. Post dialysis, following needle removal and needle sites hold time, apply mupirocin cream to the pad of each bandaid or 2x2 gauze and apply to needle sites. The bandaids or gauze should be removed within 24 hours.

RELATED POLICIES / LEGISLATION:

1. Nephrology Policies and Procedures - Hemodialysis - Section 02 - Medical Directives - Neph 2-10 Administration of Local Anesthetics
2. Nephrology Policies and Procedures - Hemodialysis - Section 05 - AV Fistula Graft - Neph 5-07 Patient Self-Cannulation of an Arterio-Venous Fistula

DOCUMENTATION:

1. Consultation with the Nephrology Access APN/Coordinator and HDU Physicia regarding initiation of buttonhole access is documented in the Nephro/Care progress notes
2. Documentation of buttonhole development/ maintenance and any issues is described in the Nephro/Care progress notes

REFERENCES:

1. Clinical Practice Guidelines for Vascular Access, American Journal of Kidney Disease, Vol 48, Suppl (July), 2006: pS177
2. Ball, L.K., Treat, L., Riffle, V., Scherting, D., and Swift, L. (2007). A multi-center perspective of the buttonhole technique in the pacific northwest. Nephrology Nursing Journal, 34(2):234-241
3. Ball, L.K. (2006). The buttonhole technique for arteriovenous fistula cannulation. Nephrology Nursing Journal, 33(3):299-305
4. Staphylococcus aureus Bacteremia and Buttonhole Cannulation: Long-Term Safety and Efficacy of Mupirocin Prophylaxis CJASN June 2010 5): (6) 1047-1053

COMMENTS / SIGNIFICANT REVISIONS: N/A