

Buttonhole Cannulation of Arteriovenous Fistulas: a Dialysis Nurse's Perspective

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Abstract

End stage renal disease patients who choose a hemodialysis modality are burdened with the reality that their life is now tied to a dialysis machine between 3- 6 days/week. The impact on their medical, social and psychological well-being is dramatic. One of the biggest fears patients have expressed to us regarding hemodialysis is having to be “stuck with big needles” at each treatment.

The average in-center hemodialysis patient is “stuck with large bore needles” 6 times/week or ~288 times/year barring any “missed sticks” or infiltrations. The home hemodialysis patient increases that number to ~10 x’s/week or ~500 times/yr. Understanding that the average person recoils from the thought of needles, and that ~25% of adults present with a real clinical diagnosis of trypanophobia or “needle phobia” [5], it seems only fitting that we seek out options that would reduce this burden.

Key words: arteriovenous fistulas; trypanophobia; cognitive behavioral therapy

History

Buttonhole cannulation, a technique that entails same site (constant) cannulation of the arteriovenous fistula(AVF) with a blunt needle, offers the patient an alternative to the dreaded “sharp needle stick”. The buttonhole procedure has also been shown to, decrease pain [1], increase the ease of cannulation, be a viable solution to the dilemma of limited cannulation sites, decrease the formation of hematomas [2], and prolong AVF patency [1].

Unfortunately, this technique is also associated with negative outcomes. Same site cannulation leaves a scabbed- over area at the site. Prior to cannulation of this “buttonhole site”, the scab must be completely removed. Incomplete removal of the scab means that the cannulator would be pushing debris containing bacteria into the needle track, causing site infection, and/or into the bloodstream, causing a bloodstream infection (BSI) [5].

In 2007, our in-center hemodialysis units warmly embraced the buttonhole method, and educated all of the dialysis cannulators on this technique. Shortly after initiating this procedure, we noticed an increase

in redness at the sites and an increase in BSI’s. At the direction of our medical director, the practice of buttonhole cannulation was discontinued at our in-center facilities.

The home program however, continued the use of this technique with the home hemodialysis patients who had AVFs with resultant few infections. The difference in infection rates was attributed to home patient self-cannulation (or consistent care-partner cannulator) vs. in-center multi-cannulators, and decreased time constraint pressure at home vs. pressure to turn-over patient stations in-center [3]. When a patient did present with an access related infection, we would re-educate the patient and/or care partner to the correct procedure and monitor their progress.

The article “Kinder, Gentler Methods for Scab Removal” “[7] suggested soaking the scabs off rather than the accepted procedure of picking off the scab with tweezers or “pickers” attached to the blunt needles from the manufacturer. We conducted our own “test of change” with a few patients and felt this was indeed, a more acceptable method of site care. Taking this process a step further, developing our current needle site preparation procedure (table 1), we can boast of our positive outcomes.

Table 1

1. Wash access site with anti-bacterial pump soap (no bar soap) and dry with a clean paper towel
2. Moisten a sterile 2x2 with sterile saline and a good drop of antibacterial soap or Emla cream (we instruct the cannulator to use a separate 2x2 for each buttonhole site)
3. Gently rub the sterile 2x2 over the buttonhole site to aid penetration of soap and then leave in place for a minimum of 15 minutes (time varies by patient need to soften up the scab for removal)
4. Remove the 2x2's and rinse site with tap water
5. New sterile 2x2's are used to rub off the scab (this is usually very soft and comes off easily) ***.

The scab is NEVER scraped or "picked off"

***Sites are then prepared with the procedural skin antisepsis (Betadine or ChloroPrep) for cannulation

Absolute compliance with skin prep and cannulation are emphasized during the training period

Since instituting this process, we have had a rare AVF access-related infection (2 infections in 4 years). Investigating each occurrence, revealed an obvious deviation from practice by the patient. In one case the patient washed his arm with the bar soap that was sitting in the sink in his barn, while another patient admitted to "just pushing the scab down into the track". At the time of update of this article, we have had over 1500 days without an AVF access related infection [4].

Process

All of the patients in our home program who have AVFs are educated on the buttonhole technique. Our Certified Clinical Hemodialysis Technician (CCHT) works one-on-one with each patient/cannulator, usually over a two-week period, to develop the fistula tunnel and guides the patient/cannulator through the steps of successful cannulation. If there are any cannulation issues after the patient goes home, the CCHT will make a home visit to evaluate and re-educate as needed. If it is felt that new buttonholes are required, the patient comes into the clinic for their treatments and we will work with them to initiate the new sites.

Conclusion

The buttonhole technique may not be a viable option for in-center hemodialysis patients, unless they cannulate themselves, due to multiple cannulators, schedule time constraints, and the high probability of missed steps or shortcuts [2]. For home dialysis patients, who are the recipients of ~500 needle sticks per year buttonhole option is a less painful procedure and may be a safe alternative. Strict adherence to the steps outlined in our procedure have proven to be effective in preventing the occurrence of access related infections.

With the proper procedure in place, and a strong patient education program [3], the buttonhole technique is both a viable option and welcome alternative for home hemodialysis patients [4].

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