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Patients with end stage kidney disease who choose a hemodialysis modality are burdened with the reality that their life is now tied to a dialysis machine 3 to 6 days weekly. The impact on their medical, social and psychological well-being is dramatic. One of the biggest fears patients have expressed to us (nurses) 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 per week or 312 times per year, barring any “missed sticks” or infiltrations. The home hemodialysis patient increases that number to about 10 times per week, or over 500 times annually. 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”¹, it seems only fitting that we seek out options that would reduce this burden.

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 touted to decrease pain, increase the ease of cannulation, be a viable solution to the dilemma of limited cannulation sites, decrease the formation of hematomas, and prolong AVF patency^{2,3}.

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 infection⁴.

In 2007, our in-center hemodialysis units warmly embraced the buttonhole cannulation method, and educated all of the dialysis cannulators on this technique. Shortly after initiating this procedure, we noticed an increased frequency of redness at the buttonhole 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-center⁵. When a patient did present with an access related infection, we would re-educate the patient and/or care partner about the correct procedure and monitor their progress.

Mott and Moore 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 manufacturer⁶. 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, we developed our current needle site preparation procedure (**Table 1**), and have experienced positive outcomes.

Since instituting this process, we have experienced access-related infections rarely (2 infections in 4 years across 40 patients). Investigation of each infection occurrence revealed an obvious deviation from recommended 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. The other patient admitted to “just pushing the scab down into the track”. To date, we have had over 930 buttonhole cannulation days without a single access related infection⁷.

Process

All of the patients in our home hemodialysis program who have an AVF are educated on the buttonhole cannulation 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 guide the patient/cannulator through the steps of successful cannulation. If there are any cannulation issues after the patient goes home, the CCHT will usually make a home visit to evaluate and re-educate, as needed. If it is felt that new buttonholes are required, the patient returns to the clinic for their treatments, and we will work with them to initiate the new buttonhole sites.

Conclusion

The buttonhole technique may not be a viable option for in-center hemodialysis patients, unless the patients cannulate themselves, due to multiple cannulators, schedule time constraints, and the high probability of missed steps or shortcuts³. For home dialysis patients, who are the recipients of over 500 needle sticks per year, the buttonhole cannulation option is a less painful procedure, and may be a safe alternative. Strict adherence to the steps outlined in our procedure has proven to be effective in preventing the occurrence of access related infections in our program.

In summary, with the proper procedure in place, and a strong patient education program, the buttonhole technique may be both a viable option and a welcome alternative for home hemodialysis patients.

Table 1: Modified protocol for preparation of the buttonhole cannulation site

1. Wash access site with anti-bacterial pump soap (no bar soap) and dry with a clean paper towel
2. Moisten a sterile 2x2 inch gauze with sterile saline and a good drop of antibacterial soap or EMLA cream (we suggest 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 antiseptics (Betadine or Chloraprep) for cannulation

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

References

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