

Getting going with button holing.

Milburn JA, Annand J[†], Ross J[†], Humphrey A[†], Fluck N[†], MacAulay E
Dept of Vascular Surgery & Dept of Renal Medicine[†] Aberdeen Royal Infirmary, Aberdeen,
Scotland

Introduction

The constant site method of arteriovenous fistula cannulation was first described in the world literature in 1977¹ and was subsequently termed the *button-hole* technique.² Many patients and healthcare staff are increasingly aware of the potential benefits of this technique with many modifications also described.^{3,4} Some myths have arisen around the technique including that it is only suitable for fistulas with limited usable space or old fistulas which may have limited its introduction to some centres.⁵ However, models have shown the button-hole method reduces aneurysm formation compared to the area puncture technique.² It is suitable for new or converted fistulae and studies have suggested a reduction in patient discomfort and a low complication rate.⁶ Our main dialysis unit began using the button-hole technique for accessing fistulas in April 2006, the technique has subsequently spread to many of our “satellite” dialysis units. We have now audited our experience from the first year.

Methods

A prospective database has been kept of all patients commenced on button-hole in our main dialysis unit. Each individual patient has a button-hole cannulation log which is completed at each dialysis session detailing the cannulation method and needle type. Complications are recorded at each session and these data are maintained centrally by a nurse specialist.

Questionnaires were devised to ascertain patient and nursing staff attitudes and experience to the introduction of the technique. All patients and nurses who had been exposed to the technique over the previous 12 months were identified by the central register and invited to complete the anonymous questionnaire. Patients were excluded if they had less than five cannulations into their button-hole site.

Results

To date we have tried to establish 42 patients, 36 converting and 6 as a new technique. 29 patients dialyse in the main teaching hospital with 13 in satellite units and this represents almost a quarter of our native fistula patients. Initial reasons for choosing to convert patients with existing fistulae to the technique included large aneurysms (13), a short segment of usable fistula (9) and prolonged haemostasis (4). 2 patients have asked for conversion for cosmetic reasons. Currently eight tracks, 4 new fistulae and 4 conversions for aneurysms and scarring, are still being established. Each

patient has had a maximum of three nurses as a “track-forming” team who have attempted to be on shift at each session. Two button holes sites for each patient were initially chosen.

The median number of cannulations to initial blunt cannulation was 10 for arterial (range 0-33) and 9 for venous sites (range 0-44). The quickest time to full blunt cannulation was 7 cannulations and this was observed with a single cannulator under supervision in a satellite unit. Our complications include 2 significant haematomas following cannulation at the venous site in different patients which represented 0.2% of all cannulations during the study. Seven site changes were required from 84 original sites (8.3%) In 6 cases this was due to possible poor primary site choice resulting in subsequent technical difficulty cannulating the fistula. In one case the patient requested a change due to local discomfort. Eight patients (23.5 % of established patients) have had great difficulty transferring onto blunt needles often requiring intermittent use of sharp needles. In 2 cases no blunt needles have been able to be inserted at any stage although sharp needles are repeatedly used with minimal difficulty in the tract.

Four patients were excluded from receiving a questionnaire due to limited number of button-hole cannulations and 2 patients had died during the period of study. Thirty-six questionnaires were distributed with a 94.4% response rate (n=34). 67% found establishing the tracks only mildly or not painful and 82% found needling the established tracks only mildly or not painful. Of those converted 77% preferred the button-hole technique. 82% felt the benefits continued to improve the longer the technique was used on their fistula.

Questionnaires were distributed to 21 nurse cannulators with a 100% response rate. From their experience 71% felt the patients described less pain with the button-hole technique. 71% of patients also expressed to the nursing staff their preference for the technique. Nurse cannulators found establishing the tracks either easy or quite easy in 90% cases with only 5% finding needling the established track difficult. 61% of nurses preferred the button-hole technique with 28% not stating a preference.

Discussion

Previous reports have shown the importance of limiting the number of staff involved establishing the track to minimise damage to the developing track. Although we attempted to minimise this by changing shift patterns, nursing staff in our main centre felt this was the commonest barrier to early transfer to blunt needles. In our satellite units a trained member of staff visited each site to instruct and observe the development of a button-hole programme. As would be expected when the same staff members performed the cannulations at each session, the transfer to blunt needles was the most rapid.

It is of note we had no local or systemic infections from introducing the technique. Since its earliest reports the necessity for an aseptic technique with careful removal of the scab and 12 hours of subsequent bandaging has been repeatedly described. We feel our experience probably reflects nursing vigilance and care resulting from thorough training. In seven instances a change of site was required and often this was subsequently felt to result from a possible poor primary site choice. Along our learning curve this has significantly reduced as expertise develops. Previous reports have described the “trampoline effect” where some patients are unable to be accessed by blunt needles at any stage.⁵ Our experience supports this observation with some patients consistently requiring sharp needles throughout the study period.

The positive reaction to the introduction button-hole technique in our area is evident in the strong support from patient and nursing responses. This has resulted in some patients requesting conversion from older methods and we now plan to commence the technique in most new native fistula patients. Staff especially in satellite units have rapidly adopted the technique and feel in smaller centres it has simplified cannulation considerably. It is increasingly felt the button-hole technique may be the preferred method of home haemodialysis access and one patient in our series has moved to home dialysis. A further three patients are actively self cannulating in our main dialysis centre and may opt for subsequent home dialysis.

Our experience of the button-hole technique confirms that of other reports: it is easy to establish, that patients and nurses prefer it and there is rapid adoption of the technique. We now need to examine if the technique improves fistulae survival.

References

- (1) Twardowski Z, Lebek R, & Kubara H. Szecioletnie kliniczne doswiadczenie z wytwarzaniem I uzytkowaniem wewnetrznych przetok tetnichzo-zylnych u chlorych leczonych powtarzanymi hemodializami. Polish Archives of Internal Medicine 1977; 57(3): 205-214
- (2) Kronung G. Plastic deformation of Cimino fistula by repeated puncture. Dialysis & Transplantation 1984; 13: 635-638
- (3) Toma S, Shinzato T, Fukui H, Nakai S, Miwa M, Takai I, et al. A timesaving method to create a fixed puncture route for the buttonhole technique. Nephrology Dialysis Transplantation 2003 Oct;18(10):2118-2121.
- (4) Marticorena RM, Hunter J, Macleod S, Petershofer E, Dacouris N, Donnelly S, et al. The salvage of aneurysmal fistulae utilizing a modified buttonhole cannulation technique and multiple cannulators. Hemodialysis International 2006 Apr;10(2):193-200.
- (5) Ball LK. The buttonhole technique for arteriovenous fistula cannulation. Nephrology Nursing Journal: Journal of the American Nephrology Nurses' Association 2006 May-Jun;33(3):299-304.
- (6) Twardowski Z, Kubara H. Different sites versus constant sites of needle insertion into arteriovenous fistulas for treatment by repeated dialysis. Dialysis & Transplantation 1979; 8(10); 978-980