

BUTTONHOLE CANNULATION: SHOULD THIS BECOME THE DEFAULT TECHNIQUE FOR DIALYSIS PATIENTS WITH NATIVE FISTULAS?

Summary of the EDTNA/ERCA Journal Club discussion Autumn 2007

A discussion based on 'Cannulating in haemodialysis: rope-ladder or buttonhole technique?' by Annemarie M. Verhallen RN, Menno P. Kooistra MD and Brigit C. van Jaarsveld MD of the Dianet Dialysis Centres, Utrecht, the Netherlands. The paper was published in Nephrology Dialysis Transplantation, the official publication of the European Renal Association-European Dialysis and Transplant Association.

Edited by: Gareth Murcutt¹, based on contributions from Riitta Muroma-Karttunen², Marc Boogaerts³, Beate Spindler⁴, John Wright⁵, Lynda Ball⁶, Maria Cruz-Casal⁷, Lillian Pickering⁶, Tony Goovaerts⁸, Jackie Ross⁵, Jacqui Annand⁵, Jean-Pierre Van Waeleghem⁸, Stanley Shaldon⁹, Julia Csender⁹, Deborah Brouwer⁶, Gordon Farquhar⁵, Diane Walker⁵, Rosie Simmonds¹², Jennie King⁵, Jean-Yves De Vos⁸, André Stragier⁸, Annemarie M. Verhallen¹³, Brigit C. van Jaarsveld¹³

¹Center for Nephrology, Royal Free and University Hospital Medical Schools, Royal Free Hospital Campus, London, UK;

²Finland, ³France; ⁴Germany; ⁵UK; ⁶USA; ⁷Spain; ⁸Belgium; ⁹Monaco; ¹⁰Canada; ¹¹Germany; ¹²Australia; ¹³the Netherlands

SUMMARY

The paper discussed during autumn 2007 was a report entitled 'Cannulating in haemodialysis: rope-ladder or buttonhole technique?' published in *Nephrology Dialysis Transplantation*. The authors agreed to follow the discussion and respond to points raised. Twenty-three expert contributors from 13 different countries provided evidence, opinion and historical insights into vascular access techniques for chronic haemodialysis patients. All contributors who had introduced the buttonhole technique for patients with native arterio-venous fistulas (AVFs) had found benefits for patients in terms of ease of cannulation, reduced pain and even reduced aneurysm formation. The discussion included expert advice on needling protocols, track formation and the sharp versus blunt needles debate. The buttonhole technique is virtually unheard of in some countries and the discussion covered some of the potential barriers to its introduction and offered advice on also how to overcome some of these issues.

KEY WORDS Buttonhole • Cannulation • Fistula • Rope-ladder • Vascular access

INTRODUCTION

The paper discussed during the EDTNA-ERCA Journal Club Discussion (Autumn 2007) was 'Cannulating in haemodialysis: rope-ladder or buttonhole technique?' by Verhallen *et al.* (2007). The paper was an observational study in their self-cannulating, home haemodialysis patients in the Netherlands, comparing the introduction of the buttonhole technique (BH), with their use of the traditional rope-ladder method of puncturing native arterio-venous fistulas (AVFs). The BH is a method of puncturing native AVFs where the exact same point of puncture and alignment are used in consecutive dialysis sessions, rather than moving the point of entry on successive dialyses up and down the fistula (rope-ladder). By using the exact same entry point for a period of weeks, a tunnel is formed from the surface to the fistula, surrounded by a wall of scar tissue. With care, this tunnel can be repeatedly used to access the fistula until it acts as a guide for the cannulator, helping to ensure the correct placement of the needle. The authors concluded that with the correct training and guidance, use of the buttonhole method could reduce cannulation pain and fear of 'bad sticks' while improving cannulation ease and the quality of life of their patients.

WHICH PATIENTS ARE SUITABLE FOR USING THE BUTTONHOLE TECHNIQUE?

The author's trialled the BH in their home haemodialysis (HHD) patients, but there were a variety of views expressed about the selection of patients suitable for the BH. Riitta Muroma-Karttunen commented, 'We have always used the buttonhole as the standard technique in all native fistulas. We have used the same guidelines for our cannulation procedures as those described by the authors and, overall, we found cannulating pain decreased'.

Marc Boogaerts added... 'We have much experience using the BH since it was introduced into our unit after the publication of the article by Twardowski & Kubara 1979. In my opinion the advantages of the technique are multiple: less haematoma and infiltration, fewer missed sticks, easier and quick puncture, less pain and, dependent on the type of material used, no aneurysm formation. It would be a mistake not to let all patients benefit from it'.

Meanwhile, Beate Spindler commented, 'There are many benefits of the BH, especially in the home setting. For these

patients, it means that the needle is always in the same place, and this helps the patient ensure that the needle is correctly taped onto the arm preventing accidental disconnection. Another benefit of the technique is that patients are able to check the arterial and venous pressures because it should be the same pressure every session'. These are important points, especially given the previous JC discussion (EDTNA/ERCA 2005) on venous needle disconnection.

Tony Goovaerts said, 'We have been using the BH cannulation technique since 1997 and are very satisfied with the outcomes. We started with our home patients, then in our self-care units and finally in all our in-centre patients with an AV fistula! The BH is probably the best cannulation technique for all patients with an AV fistula! Many dialysis facilities claim to use the rope ladder technique but in reality do area cannulation, which is without doubt the worst method. With more, older, diabetic patients on dialysis, who often don't have long veins to puncture, the BH should probably become the standard cannulation technique'.

Jackie Ross and Jacqui Annand commented, 'We started using the BH in April 2006. We did some research and were so impressed by the evidence we decided gradually to convert all of our patients. Area puncture can cause aneurysm, stenosis, scarring, disfigurement and sometimes, prolonged haemostasis post-dialysis. To date, we have 119 patients on BH with only 44 left to convert. All new patients with native AVFs are commenced on the technique. We have discovered, through photographic audit, that once patients have been converted from area puncture to BH, aneurysms shrink and scarring fades. The majority of patients experience less pain on cannulation and shorter bleeding times post dialysis'.

Jean-Pierre Van Waeleghem commented, 'History is always strange—my team and I have been using the buttonhole technique since 1972. In the 1970s, we did a lot of single-needle dialysis and investigated the impact of single-needle compared to double needle as far as vascular access complications and cumulative patency was concerned. In this multi-centre study (Van Waeleghem *et al.* 1984), we found there was a group of patients always using the same site for cannulation (we called this Single Puncture Site or SPS) and others always used different places (Multiple Puncture Site or MPS). In the publication, we demonstrated in 1984 that using the SPS (which is now

called the buttonhole) there were less vascular access complications and also better vascular access survival was observed with this technique'.

Rosie Simmonds provided the following... 'We have been advocating the BH in our home program since 2002 and in our in-centre units for the past couple of years. We originally introduced this technique for cannulation of a very short AVF with limited areas for puncturing in an elderly diabetic patient. As I see it, the key to good cannulation and AVF care is good technique whether that be the rope-ladder or buttonhole. The BH has been a great addition to our unit, not only for our self-care patients but also for those patients, of whom we are increasingly seeing more of, who are elderly, frail, diabetic and who are having AVFs created that develop poorly and/or that have limited areas to cannulate'.

BUTTONHOLE TRACK CREATION AND TRAINING PROGRAMMES

Many contributions were provided on the best method of creating BH tracks. Marc Boogaerts said, 'Vascular access is a major concern in our unit, and only the vascular access coordinator will puncture new patients during the break in period—until the tunnel track has been created. This person is then able to divide new patients into three categories. After the break-in period, patients with an easy access (65%) will be needled by all the nurses, patients with a difficult access (25%) will be punctured by only four expert nurses and patients with very difficult or fragile access (10%) will be cannulated, when possible, only by the vascular access coordinator'.

John Wright added, 'We currently have 27 patients on blunt needles using the BH technique. The nurse leading the programme said there was some difficulty disseminating the technique to the rest of the staff in the unit. One problem was describing the needle angle and direction when forming tracks, and it was helpful to use a digital camera to give the staff images to follow. Some staff were reluctant to learn new techniques; however, the patients were enthusiastic, especially given the positive feedback from others. We use the BH on all categories of patient as it seems to reduce pre-existing aneurysms caused by area puncture'.

Tony Goovaerts commented that 'It is not easy for a nursing team to swap from rope-ladder or area cannulation

to BH, indeed, it takes some time and practice to become a skilled buttonholer. The key to success is probably to start with a small team of two to three nurses, with an interest in vascular access and puncture techniques, initiating the technique in a few patients. There are videos and posters available showing the technique. When the initial core group of cannulators are acquainted with the technique, they can become the teachers and more nurses and patients can be involved'.

Jackie Ross and Jacqui Annand pointed out, 'Problems include the rostering of track formers to coincide with patient appointment times, formation of a "false track" caused by going in at slightly different angles and patients dialysing in a unit who do not use the technique. We encourage patients going on holiday to self-cannulate and take their blunt needles with them'.

Lynda Ball has been very influential in promoting the BH in America said, 'We've found that it is important to have a single cannulator to create the track, but our staffing patterns make this difficult to achieve. Having one person who is very excited about this technique, and who will change their schedule to match the patient, usually leads to success'.

Julia Csender added, 'Our experience with BH is positive since we started in 2006. It is important to do a good assessment of the AVF prior to starting the BH and to ensure a maximum of two or three nurses cannulate in the first two weeks and we developed a form to note if any complications were encountered. All nurses are trained in the technique and new staff are taught the BH during their orientation period. As the vascular access nurse clinician, I am responsible for follow-up, but really it is down to good teamwork. We have found it is very rare to see haematomas or infiltrations and patients are not as afraid of needling because the BH is less painful. We also believe we preserve better the outflow vein'.

Jackie Ross and Jacqui Annand commented, 'This change of practice involved an education programme for the nursing staff. Recently, we decided that new nurses would learn cannulation on BH using established tracks and blunt needles, then progress to patients on rope-ladder using sharp needles. Learning to cannulate using blunt needles is preferable due to the lower rate of infiltration. Through local audit, we found that patients on BH experienced less pain, had quicker

haemostasis post dialysis, quicker cannulation and improved body image. The nursing questionnaire revealed that the nurses found the technique easy to learn and they preferred it to other techniques. Some staff were concerned that they would lose their cannulation skills by using buttonhole, but as not all patients are suitable for the BH (synthetic grafts and unconvertible fistulae) we have advised staff to make a point of regularly cannulating these patients. We hope to show that patients commenced from the start on buttonhole do not need their hours increased, as recirculation will be prevented due to less aneurysm and stenosis'.

Tony Goovaerts and Marc Boogaerts asked why the authors started training patients to use the rope-ladder technique, rather than immediately introducing them to use the buttonhole. Brigit C. van Jaarsveld responded: 'We advise not to start the BH in patients who have no cannulation experience at all. We want them to develop some practical needling skills first. Patients without cannulating skills underwent a training course of three weeks before establishing a buttonhole. This was considered necessary in order to obtain practice in cannulation and to develop a stable technique'.

SHARP OR BLUNT NEEDLES?

Various opinions were expressed on the suitability of different types of needle and cannula though this often depended on what was available locally. Marc Boogaerts stated, 'We use a soft silicone fistula catheter type MF Cath® (www.beldico.be) 14G, 32 mm with a sharp mandrain. For six months, we have been using the blunt version with 10 patients—the results are OK but sometimes we have problems with deep fistulae and have found the created track is completely modified. We need more time to evaluate this practice. We have 183 patients and we divided these 366 buttonhole sites into two groups: 15 sites were punctured with a sharp needle (25 mm 15 G) and 351 sites were cannulated with a soft Teflon fistula catheter (32 mm 14 G) and a sharp mandrain. We observed in the sharp needle group, 12 aneurysms on the puncture site and 13 puncture sites without aneurysms. In the soft Teflon catheter group, we observed no aneurysms at all on the puncture sites.

Lynda Ball added, 'We are seeing a steady increase in the number of patients utilizing the BH in the United States. Through a nationwide BH survey, one of the biggest issues we have identified is the inability to make the transition from the sharp to

the blunt needles (Note: Blunt needles may also be referred to as dull). Dr. Twardowski has spoken to the manufacturers of blunt needles to encourage them to make a needle that is not quite so blunt. It seems our patients with really thick, well-developed fistulae are those who are having the transition problems, which we call the 'Trampoline Effect'. These patients are using sharp needles all the time, but we caution them to observe for any aneurysm formation or excessive bleeding during dialysis'.

Lillian Pickering asked, 'Apparently in Europe, you are able to obtain catheter-type fistula needles, which makes us in the United States quite envious. Can anyone suggest a supplier and why these devices are not approved in the United States?'

Tony Goovaerts said, 'We used sharp needles because the blunt needles were simply not available in Europe before 2004. Now we are convinced that blunt needles are better (straighter tunnel track, less haematoma, smaller scabs, complete disappearing of oozing) especially when multiple nurses cannulate'.

Jean Pierre Van Waelegem added, 'In cannulating an AV fistula with sharp needles, there are two manipulations: First you cannulate the vessel and second you then position the needle correctly in the vessel. The last action may cause some damage at the intima of the vessel. Using catheters or Teflon needles for cannulation of the AVF the second action is not harmful because they can't perforate or damage the intima. Teflon needles are now sold with sharp, blunt or dull mandrain for use of the buttonhole technique. Moreover, the shape of the Teflon needle has been changed from cylindrical into a bevel shape, which improves the blood flow. These are available in the EU via Beldico. The benefit of using blunt needles is that there is only one manipulation. The time to move from sharp to blunt cannulae can be determined quite easily: when sharp needles are used to create the track, at a certain moment, you will observe less resistance with the sharp needle. This is the time to make the transition from sharp to blunt needles. One patient had an AV graft in the upper arm. We used the buttonhole technique but changed the site every month or two. This was very successful as the graft is now 3.5 years old has not suffered any major vascular access complications'.

Rosie Simmonds added, 'In our self-care and HHD group we buttonhole immediately as our experience shows this reduces

cannulation pain and minimises patient fear. In our in-centre units we have found this technique is reassuring for both patients and staff. Our HHD patients are doing nocturnal dialysis up to six nights a week, and we advise them to develop only one arterial and venous site. Occasionally, we suggest a third site between the two that can be rotated as either and all sites are antegrade to the AVF blood flow. Prior to blunt needles being available (we use 15 g, 25 mm, with back eye, AVF blunt needles) we did see an increase in our infection rates. Since instituting blunt needles our infection rates have not been significantly different from the rope-ladder group. We insist that a sharp needle should never be placed in a buttonhole track once it is established. We are concerned that the cutting/slicing action of the sharp needle down an established track will lead only to a perfect bed for infection. The buttonhole technique now forms part of our cannulation education & competency package for all nursing staff and is generally well received. However, I still think a good rope-ladder in an appropriate AVF is every bit as valuable'.

Deborah Brouwer commented, 'The sharpness of the needles was very carefully evaluated before the blunt needles were finalized. The needle bevel is sharp enough to guide the needle into the tunnel track and displace the vessel flap, but not sharp enough to cut the subcutaneous tissue or the vessel. The needles we use are also safety needles. When Dr. Twardowski first used the buttonhole technique there was a shortage of single-use needles and they were disinfected and reused. This reuse dulled the cutting bevel and effectively created a blunt needle. The concept is like a pierced earring. The starter earring is sharp to cut the tissue and create the tunnel track, but then blunt earrings are used to prevent trauma to the tunnel track long term'.

Stanley Shaldon asked, 'What is the average internal diameter of the buttonhole catheter? My concern is the pressure generated in the long narrow tube regarding haemolysis, air introduction and even degassing of the blood. My impression is that there is a negative pressure between the outflow catheter and the blood pump at flows of 300–400 ml/min'.

Jean Yves-de Vos replied, 'According to 2006 data, 49% of fistula needles used in Belgium are Teflon catheter-needles (Picavet *et al.* 2006). Single- and double-needle varieties are available and there is a choice of sharp or blunt mandrains. The gauges go from 13 G to 18 G in lengths of 20, 25 or 32 mm

**BUTTONHOLE CANNULATION: SHOULD THIS BECOME THE DEFAULT
TECHNIQUE FOR DIALYSIS PATIENTS WITH NATIVE FISTULAS?
Summary of the EDTNA/ERCA Journal Club discussion Autumn 2007**

catheters. The outer diameters of the catheters vary from 2.3 mm (13 G) to 1.8 mm (18 G) with the inner diameters ranging from 1.8 mm to 0.89 mm, respectively. We had experience using these types of catheter needles in which no haemolysis or red cell fragmentation (RCF) was observed in single- or double-needle mode. In the late 1970s, we noticed hidden RCF by monitoring LDH levels before and after dialysis sessions and found the Teflon needles used had either no side holes or round side holes that were too small. This RCF completely disappeared when we introduced the Teflon needles with big oval-shaped side holes. It is possible to cause a kink in a Teflon catheter if the patient bends their arm. Though not visible, a kink such as this may cause RCF, possibly resulting in a patient who feels unwell at the end of a session, as was highlighted in the last JC discussion (EDTNA/ERCA 2007).

MANAGING POTENTIAL COMPLICATIONS ASSOCIATED WITH BUTTONHOLE

INFECTION RATES AND CLEANSING PROTOCOLS

Lynda Ball said, 'One of our concerns is the cleansing of the arms and removal of the scabs. We often find that when new programmes begin, there is a period of infections. A physician and I will be working on a skin cleansing protocol for the technique that involves cleaning the site twice (two-step), before and after scab removal. Scab removal is varied as well, and there are both good and bad techniques. A technique called 'Cushion Cannulation' involves placing a piece of wheelchair foam in the axilla area of the access arm, which hyper-extends the elbow (Mott & Prowant 2006). This provides stability for upper arms with excess tissue and enables the creation of a nice straight buttonhole track. Once the needles are placed, the foam is removed and the arm placed in a comfortable position. Marc Boogaerts commented, 'In our unit, we observed 7 infections on buttonhole sites in 2006 for a total of 45,000 punctures' and Tony Goovaerts added, 'In our opinion, you must have a good disinfection technique, disinfecting the puncture sites before and after removal of scabs, and respecting the contact time of the disinfectant'.

Jackie Ross and Jacqui Annand said, 'Our audit showed a buttonhole infection rate of 1.7%. We are reviewing our scab removal/disinfection protocol and now ask patients to wash their arm with warm soapy water on arrival. We then disinfect the skin prior to, and after, scab removal. If the patients hold

their own needle site post-dialysis we ask them to use alcohol hand rub first. To remove the scabs, we soak with saline for 10 minutes then remove using a scraping motion with the edge of a hypodermic needle, not the sharp point. We hope to find a blunt needle supplier that provides a scab remover in the needle pack because if the scab is broken up pieces of it could cause tunnel/systemic infection. Scabs are loaded with bacteria, predominantly *Staph. aureas*, the organism identified in our patients who have had infected buttonholes'.

THE TRAMPOLINE EFFECT

Jackie Ross and Jacqui Annand reported, 'The complication rate has been low though about 24% of patients experience the trampoline effect and intermittently return to sharp needles—this is only done by the original track formers. About 8% of patients have required a site change due to painful cannulation with blunt needles.

Deborah Brouwer on behalf of the Fistula First Professional Education Committee (FFBI) added that the term 'Trampoline Effect' has caused confusion. Deborah explained, '...The term was originally used to describe when a blunt needle bounces off the vessel, usually because it's inserted at slightly the wrong angle. The corrective action is not to pull out the needle and insert a sharp needle, but to re-adjust the angle and move up or down on top of the vessel until the flap angle is correctly mated and the needle will displace the vessel flap and drop into the vessel. The correct angle into the tunnel track can be off only slightly and the blunt needle will not cut the vessel flap to allow the needle to enter the vein. A sharp needle poses harm because it can cut the vessel flap extending the flap or cut a new flap in the vessel. This can lead to damage to the vessel and goes against the entire concept of buttonhole. Sharp needles can create a one-site-itis and lead to aneurysm formation'. Since the term 'Trampoline Effect' has been misinterpreted the FFBI group has dropped it, though it persists in general usage.

Rosie Simmonds commented, 'If the trampoline effect occurs we advise that the needle is withdrawn, re-swab and reinsert a new blunt needle into the same track. We think this works about 80% of the time'.

Jackie Ross and Jacqui Annand replied 'The comments made by Deborah Brouwer about the trampoline effect are very enlightening. Our unit currently inserts a sharp (original track

former only) if the blunt needle bounces off the vessel wall, but will now review our practice following her comments’.

ANEURYSMAL FISTULAE

Diane Walker drew the following response from Jackie Ross and Jacqui Annand ...’ When salvaging aneurysmal fistulae, we use brand new sites and avoid forming tracks into aneurysms or heavily scarred areas. Use straight areas and have the needles a minimum of two inches apart. If new sites are not available we convert them to rope-ladder. We found a relevant paper when researching the literature for salvaging aneurysmal fistulae that said ‘...the sites for the buttonhole tunnel tracks were selected in areas of maximum skin integrity and least skin haematoma, also avoiding any intra-aneurysmal thrombus with the use of bedside ultrasound. Cannulation was performed at the base of the aneurysm in all cases’ (Marticorena *et al.* 2006). We are considering creating a third buttonhole for each patient, with all three used in rotation so there is always a spare as a back up. We have observed no aneurysmal formation during the 18 months we have been practicing buttonhole’.

OTHER DEVELOPMENTS

Annemarie Verhallen, one of the authors, asked if anyone had experience of the Biohole® plug (Nipro Corporation, Belgium). Jennie King replied, ‘I researched the literature and found much observational evidence to support the Buttonhole technique; however, I could not find a randomised control trial (RCT) anywhere. I enlisted the support of a consultant colleague and between us; we designed a simple RCT to compare normal practice needling with the Buttonhole technique in both new and existing haemodialysis patients. Although we had been planning the study for some time, we held off until the Biohole polycarbonate peg attained the European CE quality approval and we are using the peg to help develop the tunnel track. I aim to publish the results within two years, giving at least one year’s data from a significant number of patients’.

Diane Walker suggested that modern ultrasound devices can be employed as tools to check the formation of a BH track or to detect signs of infection.

WHY IS THE BUTTONHOLE NOT UNIVERSALLY AVAILABLE?

Jenny King responded, ‘I was inspired to try and get the buttonhole needling technique introduced into my dialysis unit. Needling of fistulae is primarily nurse-lead and I wonder if this

has been a reason for nurses sticking to a traditional method such as rope-ladder or the area dilatation technique. Are we ready to embrace change or is it just easier to stay with what we know’?

Lynda Ball stated ‘It is still a challenge to get permission to use the BH as our physicians and surgeons would like to see more current research indicating that it is safe. Some regions of the country have had great success, others not so good. I think the training they receive has a lot to do with the success of the program. There are many good papers to support the BH and I send these along with my teaching articles to physicians and surgeons to support the practice’. Gordon Farquhar said ‘at my unit they do not currently use the buttonhole but I can see the technique being of great use for home patients particularly those wishing for more frequent dialysis. It could also prove useful in encouraging self-cannulation by unit-based patients’. Meanwhile, Maria Cruz Casal commented, ‘It’s really interesting to see the positive opinions of many experts and nevertheless this technique is not an option in the majority of Spanish hospitals’.

DISCUSSION

Every single contributor to the discussion found that the buttonhole technique offered significant benefits to patients and staff alike. This could be because all had introduced the buttonhole technique and were therefore biased in favour of it; however, there were no comments at all about any advantages of using the rope-ladder or area cannulation methods. The contributors openly acknowledged and discussed potential complications sometimes associated with the buttonhole and offered thoughts and evidence to provide answers to these issues.

Though it was acknowledged that the cannulation techniques used in the BH are significantly different from the rope-ladder method, it was felt that there was enough guidance available on the Internet, and in the literature, to prevent this becoming an obstacle. There was general agreement on how to introduce a buttonhole programme into a dialysis unit or home programme; however, there were differences in the procedure used that appeared to depend on the buttonhole experience of the nursing team. It was noticeable that experienced teams were more confident in letting multiple nurses help form the buttonhole track compared to units introducing it as a novel technique. Naturally, these units took a more cautious

approach to this and also seemed less at ease with the introduction of blunter needles. Ignoring these expected differences, it is still possible, from the expert advice given, to produce a bullet-point guide to a typical method of introducing the buttonhole technique.

- First, a small number of nurses with a strong interest in vascular access are required and medical and surgical support for the project must be won. A literature search may prove useful.
- Home dialysis and self-cannulating unit patients often appear to be suitable candidates in the early phases of a programme because of the continuity of needling technique.
- Use of video and still photos can be useful educational tools for patients and staff.
- Each fistula must be carefully assessed to find the best puncture sites prior to the introduction of the technique.
- Scab removal and cleansing protocols must be reviewed to include two-step cleaning (pre- and post-scab removal).
- A baseline audit may be a useful tool to employ, as part of a change management programme, prior to the introduction of the buttonhole technique.
- Ideally, only the same two or three nurses should do the track formation. It was acknowledged that this may be difficult due to nursing shift patterns but it remains the preferred option.
- Post track-formation, the timing of any transition to blunter needles has to be made on an individual basis and is dependent on the options available.
- Once the technique is established a nursing education programme must be started to involve all existing and new cannulators. As with any programme of change, it should be realistic and acknowledge that setbacks are bound to occur. Guidance should be incorporated into the training on how to spot and manage potential complications such as the Trampoline Effect.

Contributors agreed with the authors that the benefits of a well-managed buttonhole programme are numerous in virtually all aspects of vascular access. If the buttonhole offers so many advantages, why is it not used on suitable patients everywhere? Some of the barriers identified to the introduction of the buttonhole technique were a general 'reluctance to change' alongside a fear of the unknown. Some nursing staff had concerns about becoming de-skilled in cannulation though these diminished

once the practice became established. Some medical staff also required persuading of the benefits of the buttonhole technique.

FINAL COMMENTS

Annemarie Verhallen and Brigit C. van Jaarsveld, two of the authors of the original paper, provided these insightful comments to help surmise the Journal Club discussion.

'From the discussion over the past weeks it became obvious that the buttonhole method can improve the quality of life of both in centre and HHD patients alike. It is remarkable that some centres are using the buttonhole method as the standard of care, whereas others are in the pioneering phase or reluctant to use the technique. We believe the main reason for this difference is, as we say in Dutch, 'unknown makes unloved': fear of the unknown, and of possible complications such as bleeding alongside the needle and increased infection rates give medical staff arguments to block the development of a buttonhole program. Because of the lack of comparative research, it takes a lot of conviction to start an experimental program like this.

Thanks to the enthusiastic input of all the colleagues involved: we have made a big step forward in sharing the available knowledge and personally, it has greatly increased our confidence in the technique. Still much research has to be done: what is the best method of creating buttonholes and of removing scabs, will the Biohole® plug turn out to be a valuable tool, and will we be able to banish the infection problem to the past? We would like to encourage all of you who work with this technique to write down your experiences in scientific papers, and, if possible, to perform comparative or randomised studies to convince others of the usefulness of the technique. Indeed, the quality of the vascular access remains of major importance to our patients, and maybe we can help make the buttonhole technique available to patients all over the world!

ONLINE BUTTONHOLE RESOURCES

Many thanks to Lynda K. Ball, RN, BSN, CNN, Quality Improvement Director, Northwest Renal Network, Seattle, USA who kindly supplied the following links:

<http://www.nwrenalnetwork.org/fist1st/ffcannu.htm>

<http://www.nwrenalnetwork.org/fist1st/ButtonholeBrochureForPatients1.pdf>

<http://www.nwrenalnetwork.org/fist1st/usandobuttonhole.pdf>

<http://www.nwrenalnetwork.org/fist1st/buttonholerussian.pdf>

REFERENCES

- EDTNA/ERCA. (2005). Journal Club discussion. *EDTNA/ERCA Journal* **XXXI**(4), 220-227. http://www.edtnaerca.org/pages/journalclub/discussion/-summ2005_2.php (accessed 1 February 2008).
- EDTNA/ERCA. (2007). Journal Club summary. *Journal of Renal Care* **XXXIII**(4), 191-195.
- Marticorena R., Hunter J. *et al.* (2006). The salvage of aneurysmal fistulae utilizing a modified buttonhole cannulation technique and multiple cannulators'. *Hemodialysis International* **10**, 193-200.
- Mott S. & Prowant B. (2006). Cushion cannulation technique. *Nephrology Nursing Journal* **33**(6), 683.
- Picavet., Boulle S., De Vos J.Y. *et al.* (2006). European Practice Database in Belgium. *EDTNA/ERCA Journal*. **XXXII**(1), 27-32.
- Twardowski Z. & Kubara H. (1979). Different sites versus constant sites of needle insertion into arteriovenous fistulas for treatment by repeated dialysis. *Dialysis & Transplantation* **8**, 978-980.
- Van Waeleghem J.P. *et al.* (1984). A multicenter comparative study of the vascular access in hemodialysis patients treated with single- or double-needle techniques. In *First International Symposium on Single-Needle Dialysis* (eds Ringoir S. *et al.*), p 136. Cleveland, USA: ISAO Press.
- Verhallen A.M., Kooistra M.P. & van Jaarsfeld B.C. (2007). Cannulating in haemodialysis: rope-ladder or buttonhole technique? *Nephrology, Dialysis, Transplantation* **22**, 2601-2604.