Letters and Replies

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Arteriovenous fistula buttonhole cannulation: early experience in an Irish haemodialysis unit

Sir,

We read with interest the article by van Loon et al. [1] and the reply by Gray [2] regarding the potential benefits but possible increased infection rate using a buttonhole (BH) technique for arteriovenous fistula (AVF) cannulation. Shortly afterwards, this technique was adopted on a trial basis in our unit, commencing September 2010.

We introduced the BH technique in 13 of 31 stable haemodialysis outpatients with a functioning native AVF, all of whom were receiving thrice weekly dialysis. Our protocol involved two experienced cannulators for initial needling with sharp needles and blunted needle passage, and when satisfied that the tracks were formed, all staff was involved in placing blunted needles. Aseptic technique involved disinfecting the BH sites, before and after scab removal, with chlorhexidine prior to needle insertion. All patients used topical lidocaine/prilocaine for 1 h prior to disinfection.

Historically, there had never been a recorded bacteraemia due to AVF cannulation in our dialysis unit over the 5 years in operation. Following the introduction of the BH technique, we recorded four episodes of Staphylococcus aureus bacteraemia in three patients using the BH technique compared to none in the remaining rope-ladder technique patients (Fisher exact P = 0.02). The mean duration of BH technique use was 212.4 days (SD 37.1). The median interval from commencement of BH technique to infection was 184.5 days (range 139–229 days). The median number of sharp needles required until both arterial and venous sites were using blunted needles was 9 (range 6–20). We noted a significantly increased risk of infection in those patients requiring >10 sharp needles before transferring to blunted needles (Fisher exact P = 0.01).

Paramount to the success of the BH technique is absolute consistency when needling the AVF each time so that there is no variation in site, angle or depth of cannulation. Variation or manipulation of the needle during passage can create false passages and disruptions in the epithelial lining of the track, creating a nidus for bacterial colonization. This may explain our findings of a higher associated risk of infection in patients in whom it has taken longer to form a satisfactory track.

The advent of AVF-related bacteraemia related to the use of the BH technique has prompted us to temporarily cease its use, until a thorough review of the protocol and technique has been conducted.

Conflict of interest statement. None declared.

Editorial Note: Dr Gray had no further comments on this letter.


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Reply

We thank Dr Ward et al. for the letter to our article.

The implementation of the buttonhole (BH) technique in a busy haemodialysis facility with multiple cannulators is a great challenge. The BH technique requires different skills of the dialysis nurse as compared to the rope-ladder technique [1]. The BH cannulation is not just a variation on the rope-ladder cannulation but rather an entirely different way of performing cannulation [2]. Every cannulation technique, including the BH method, is characterized by a learning curve. Therefore, successful implementation of the BH technique requires a high level of awareness and skills of the dialysis nurse, frequent monitoring and a continued evaluation and education of the technique. A motivated team, with commitment to make the outcome positive for both patients and staff, is of vital importance.

Cannulation is an invasive procedure. We agree with Ward, Holian and Watson that paramount to success of the BH technique is consistency when needling the AVF. Therefore, in order to prevent BH complications, a strict cannulation protocol should be followed. Literature showed that patients on dialysis have more Staphylococcus aureus on the skin and in the nares than the general population [3]. Therefore, adequate disinfection with respect to the contact time of the disinfecting agent, before and after scab removal, is crucial. Scab removal is often difficult and must be complete in order to avoid that small scab particles with bacteria enter the blood. In our study, the role of primary access nurses was essential for successful creation of the track for performance of difficult cannulations, for highlighting the importance of thorough scab removal and disinfection, together with the advocacy to use dull needles. This led to a dramatic decrease in use of sharp needles with concomitant reduction in infection rate. Caution should be taken to prevent and recognize this complication at an early stage so that adequate treatment can be initiated.