

Letters to the editor

Routine replacement of short peripheral IV catheters

Routine replacement of short peripheral intravenous catheters – possibly an unnecessary practice in children but certainly not in adults

We read with interest the paper from our hospital (The Canberra Hospital – TCH) in the December edition, which concluded that the routine replacement of short peripheral intravenous catheters was not necessary in children¹. This conclusion is the same as recommended in the CDC 2002 *Guidelines for the prevention of intravascular catheter-related infections*, which recommend in children leaving peripheral venous cannulae in place until IV therapy is completed, unless a complication occurs². This recommendation for the replacement of peripheral intravenous cannulae in children is categorised as 1B, ie, strongly recommended for implementation, supported by some experimental, clinical or epidemiologic studies, and with a strong theoretical rationale.

We, however, have misgivings about both the conclusions from this recent study and the CDC recommendations. Since 1998, the infection control unit at TCH has prospectively conducted surveillance on all blood stream infections (BSIs), with a special focus on those that had an IV catheter as the source of their sepsis. This programme has resulted in the implementation of many changes at this hospital and has seen the number of BSIs caused by IV devices fall from 109 to 41 episodes per year (a 60% reduction). Most episodes are related to central venous catheters (CVCs). However, many cases continue to be caused by short peripheral cannulae (since 1998, 29 BSIs at our hospital or 7% of the total IV related episodes). When these cases were examined and when the duration of catheter insertion time was recorded, in the majority, the cannula has been left in place for more than 48 hours and, in most, for more than 96 hours. In a separate study in adult medical and surgical wards at our hospital in 1998, out of a total of 249 short peripheral cannulae, only 12% were in place for more than 72 hours (and 9% for >96 hours).

Therefore there is obviously a clear association with extended times *in situ* and a much greater likelihood that an episode of BSI will occur with the short peripheral cannulae. Such associations have been noted before and IV catheter sepsis prevented by the implementation of a 48 hour removal rule for these cannulae³. It is also obvious that the disproportionate number of episodes occur with catheters in place for more than 72 hours.

In this hospital, in adults, we have not adopted the CDC guidelines recommendation that short peripheral cannulae be replaced every 72-96 hours². This recommendation was based on the end point of phlebitis, which has improved with the introduction of better plastics in IV cannulae. However, while it is true that most episodes of sepsis with peripheral IV cannulae

are associated with phlebitis, the converse is *not* true. The vast majority of phlebitis associated with catheters are thought to be non-infective in origin. Hence using phlebitis as an end point to recommend the safety of prolonged IV access from an infection perspective is inappropriate. The only end point that matters are BSIs. However, the incidence of BSIs with peripheral IV cannulae is very low (0.36 per 1,000 catheters)⁴. Hence the studies needed to answer this issue (regarding safe times *in situ* to minimise infections) would have to be very large if this end point was used (probably over 50,000 in each arm).

Very large studies have not been done and are unlikely to be undertaken. Hence, while conclusions regarding phlebitis can be made with these types of studies, we believe no conclusions can be made regarding the most important infective complication (i.e. BSIs). The available evidence still suggests that, when these cannulae are in place for more than 48 hours, the risk of BSI greatly increases³. We believe that 48 hours should remain as the recommendation in adults and that the CDC should reconsider its recommendations as they are based on an erroneous end point (i.e. phlebitis rather than BSIs). While we do not know what the situation in children is, we believe the small sample size of all studies that have addressed this issue (including this recent study) means that we still need to be circumspect before accepting that short peripheral cannulae should remain in place for more than 48 hours.

References

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Reply

Thank you for the opportunity to respond to this letter.

TCH can be justly proud of their reduction in the rate of BSIs caused by intravenous access devices. In fact, one of the authors of the December paper under discussion (A Gardner), was part of the TCH surveillance programme team. We concur with the argument where it relates to the optimum dwell time of peripheral cannulae in adults.

However, our paper relates to the relative risks and benefits of short dwell times for peripheral cannulae in children. Dreimanis *et al* do not state how many of the 29 BSIs attributable to peripheral cannulae occurred in children. The paediatric study participants would be included in their surveillance data because the study on which this report is based took place in the same hospital during the surveillance period cited¹.

We used phlebitis as one of our outcome measures. This is an imperfect marker for risk of BSIs but, as Dreimanis *et al* indicate, the rate of BSIs caused by peripheral cannulae is extremely low, making it difficult to study directly. It is very rare for BSIs to have peripheral cannulae as their primary source of infection in the absence of phlebitis, so the use of phlebitis as a surrogate outcome measure is a frequently used, practical and conservative alternative.

There is a commonly held perception that infection rates of paediatric peripheral cannulae are lower than adult peripheral cannulae infection rates. The empirical evidence for this lower infection rate is not strong, perhaps due to the difficulties both of studying such a rare event and of distinguishing in practice between non-infective and septic phlebitis, but Nelson & Garland reported a rate of paediatric phlebitis about half that of adults². This finding is comparable with other studies indicating that extravasation is more common in children when compared with adults^{3,4}, while phlebitis is more common and significant for adults. Vasoconstriction may be more common in children because they have smaller, more reactive veins⁵. For this reason, vasoconstriction is thought to lead more frequently to extravasation than phlebitis in children.

At the very least, these physiological differences suggest that it may be methodologically inappropriate to combine adult and paediatric data and our study contributes to the limited body of paediatric literature. Nonetheless, as TCH data indicate, the need for any peripheral cannula to remain in place should be carefully and frequently re-evaluated and clinical decisions made on an individual basis.

References

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