Technical Note

Dialysis catheter insertion with and without peel-away sheaths

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Tunneled central venous line (TCVC) as a long-term vascular access in haemodialysis patients started to be used in our unit in 1993. Although it is certainly not the optimal access type, its use is increasing because of increasing patient age associated with various comorbidities such as compromised cardiovascular system condition, peripheral vascular disease (diabetes mellitus, ischemic heart disease), etc. rendering creation of an AV-access practically impossible. Since 1993 until the end of 2006 we have inserted 444 lines. Conventional insertion procedure includes local anaesthesia, adherence to aseptic rules and use of modified Seldinger's technique, best under ultrasound guidance. The right jugular internal vein is preferred because this vessel has the lowest complication rate. First, the jugular vein is punctured with a needle. Then, a wire of about 20cm insertion length is introduced, after which the puncture needle is removed. A three to five centimetre long incision is made at the puncture site fastening up to the fossa supraventricularis minor laterally towards the thorax and the TCVC is drawn through it. The next step is the introduction of the peel-away sheath with a dilator over the guide wire into the vein. The dilator with the wire is then removed and the catheter is inserted through the sheath. During the insertion the sheath is concurrently being taken out and peeled away.

Because of possible complications with the long peel-away sheath, Bhat described a technique using a shortened sheath [1]. This work has been subsequently commented on by Shetty [2] who questioned the safety of the shortening the peel-away sheath and suggested the modified approach of sliding the sheath to just about half of the dilator length. We have also experienced various complications with the insertion of permanent catheters by the conventional technique, such as rupture of the superior vena cava, haemothorax, etc., that prompted us to introduce a less invasive technique not using the peel-away sheath at all.

For dilation of the subcutaneous tunnel we use dilators of the size (12–15F) matching that of the catheter used. The catheter is inserted via the guide wire only, similarly to the insertion of acute catheters. This procedure is used also during reinsetion when a permanent catheter is replaced by a new one or an acute catheter is exchanged for a permanent one. In those cases, access into the central vein is already performed by the previous line.

Blood flow obtainable from the catheter (regardless of insertion technique) is checked during the first haemodialysis using the Doppler-based HD01 instrument (Transonic Systems Inc., Ithaca, USA). Comparison of success rate (as defined by the K/DOQI guidelines [3]) has not shown any difference between catheters inserted by the conventional procedure (306 procedures) and those inserted without using the peel-away sheath (138 procedures). No difference was seen in the maximum obtainable flow (measured at a pre-pump pressure of −200 mmHg) either.

Insertion of the permanent cuffed catheters using only dilators without any peel-away sheath appears to be a less invasive procedure which is associated with fewer complications. Advantages of this approach include minimal blood losses, less discomfort for the patient but mainly lower risk of damage to the vascular venous system. Safe clinical applicability is supported by the 138 insertions performed by this technique in our unit so far.

Conflict of interest statement. None declared.

References


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