

Tunneled Dialysis Catheters: Indications, Technique, and Clinical Considerations

Introduction

Tunneled dialysis catheters (TDCs) are an essential component of vascular access for patients requiring hemodialysis, particularly when permanent access such as an arteriovenous fistula or graft is not immediately available. Unlike non-tunneled catheters, TDCs are designed for intermediate- to long-term use and provide reliable central venous access. Their subcutaneous tunnel and cuff reduce the risk of infection and improve catheter stability, making them a preferred option for patients awaiting fistula maturation or those with limited access options [1,2].

Discussion

Tunneled dialysis catheters are typically inserted into central veins, most commonly the internal jugular vein, under ultrasound and fluoroscopic guidance. The catheter is advanced into the right atrium or superior vena cava to ensure optimal blood flow rates during dialysis. A subcutaneous tunnel is created between the venous entry site and the catheter exit site, with a Dacron cuff positioned within the tunnel to promote tissue ingrowth and act as a barrier to infection [3,4].

The primary indications for TDC placement include urgent initiation of hemodialysis, temporary access while permanent vascular access matures, and long-term dialysis in patients who are not candidates for fistula or graft creation. TDCs offer immediate usability, eliminating the delay associated with fistula maturation. However, they are associated with higher rates of complications compared with permanent access options.

Infectious complications remain the most significant concern, including catheter-related bloodstream infections and exit-site infections. Thrombosis, central venous stenosis, catheter dysfunction, and inadequate dialysis flow rates are additional challenges. Strict adherence to aseptic technique during insertion, proper catheter care, and routine surveillance are critical to minimizing these risks. Advances in catheter materials, antimicrobial coatings, and locking solutions have contributed to improved safety and longevity [5].

Despite their limitations, tunneled dialysis catheters play a vital role in comprehensive dialysis access management. They often serve as a bridge to permanent access and can be life-saving in patients with limited vascular options.

Conclusion

Tunneled dialysis catheters provide essential, reliable vascular access for hemodialysis patients when permanent options are unavailable or unsuitable. While associated with higher complication rates than arteriovenous fistulas or grafts, careful patient selection, meticulous insertion technique, and diligent maintenance can significantly reduce risks. TDCs should be viewed as part of a broader access strategy, with ongoing efforts to transition patients to permanent access whenever possible. Through multidisciplinary collaboration and adherence to best practices, tunneled dialysis catheters continue to

Peter Novak*

Dept. of Nephrology, Charles River University, Czech Republic

*Author for correspondence:

p.novak@cru.cz

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play a crucial role in the care of patients with end-stage renal disease.

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