



Letter to the Editor

Antimicrobial prophylaxis for dialysis catheter insertion: Does the infection data support it?



Dear Editor,

Tunnelled central venous catheters (TCVC) are frequently used as permanent haemodialysis access for patients with end-stage kidney disease (ESKD) where arterio-venous fistula (AVF) access is not possible, or has been unsuccessful. TCVCs offer many advantages, including quick and painless connection to dialysis, however they confer higher risk of infection, and thus the Kidney Disease Outcomes Quality Initiative (KDOQI) recommends that AVFs are the preferred method of vascular access [1]. Despite advances in catheter care, infection remains a prominent cause of morbidity and mortality in patients requiring haemodialysis, manifesting as exit-site infection, tunnel infection, or, most significantly, catheter-related bacteraemia (CRB).

The use of tunnelled catheters, in preference to non-tunnelled, decreases infection risk, with long subcutaneous tunnels and endothelialisation of cuffs acting as a seal against migration of organisms from the entry site. Additional strategies to reduce the incidence of CRB include the application of topical antimicrobial ointment or dressings to entry sites, and antimicrobial locking solutions [2]. These strategies mainly prevent exit-site contamination and intra-luminal entry of organisms. There is a paucity of evidence pertaining to the use of peri-procedural antimicrobial prophylaxis at TCVC insertion as a preventative strategy against early CRBs, and studies to date have demonstrated conflicting evidence [3].

While antibiotic prophylaxis has become standard practice during surgical interventions, percutaneous interventional radiology procedures have generally been associated with a low infection risk to the patient, and the administration of prophylactic antimicrobials is usually reserved for higher-risk procedures or patient groups [4]. Antimicrobial prophylaxis can be costly, and may lead to patient complications such as allergic reactions or toxicities, as well contributing to the emergence of resistant organisms such as Methicillin-resistant *Staphylococcus aureus* (MRSA) or vancomycin-resistant Enterococci (VRE).

Percutaneous dialysis catheter procedures carried out in our institution are performed without antimicrobial prophylaxis, although skin antisepsis with 2% Chlorhexidine gluconate in 70% Isopropyl alcohol is carried out as standard. Over a one-year

period, a total of 109 dialysis catheter procedures were carried out in our hospital on 76 patients. There were eight episodes of bacteraemia in the 30 day period post-procedure, with six of these occurring after TCVC insertion procedures, and one each occurring after TCVC exchange and removal procedures respectively. The main isolates identified were MSSA (n=4), *Staphylococcus epidermidis* (n=3), and *Klebsiella pneumoniae* (n=1). However, just two episodes of bacteraemia were deemed to be temporally and causally related to the dialysis catheter procedure itself, as distinct from care of the indwelling line. The first case involved MSSA bacteraemia occurring one day post-TCVC exchange. The second case involved *Klebsiella pneumoniae* bacteraemia occurring four days post-TCVC insertion. In both cases, the TCVC was sited in the internal jugular vein, and was subsequently removed.

Both surgical and minimally invasive percutaneous interventions can be associated with a risk of subsequent infection. Such infections can be a major source of morbidity and mortality. Several decades have witnessed the use of prophylaxis antibiotics in the prevention of infection during surgical as well as percutaneous interventions. While prophylactic antibiotics can be critically important for the prevention of infection, their use is not entirely devoid of complications. For instance, these agents can induce allergic reactions. Such adverse events can range from simple transient nausea, rash, and itching to a full blown anaphylactic shock. Importantly, the development of bacterial resistance and emergence of and minimally invasive percutaneous interventions can be associated with a risk of subsequent infection.

A 2011 Centre for Disease Control guideline on the prevention of intravascular catheter-related infections recommended against routine systemic antimicrobial prophylaxis before catheter insertion [5]. Additionally, a 2013 Cochrane systematic review examining the efficacy of antibiotic prophylaxis in preventing Gram-positive TCVC infections in oncology patients determined no significant benefit [6]. The results of our analysis support these findings, with just one bloodstream infection in our institution over a one-year period likely to have been prevented by the administration of prophylactic vancomycin. Emphasis should be placed on interventions such as sterile technique, education on correct CVC care; and limiting the number of staff accessing the TCVC hub. Our results are valuable to inform future guidelines and promote antimicrobial stewardship practices.

Ethical statement

Ethical approval was given by the Institutional Review Board of the Mater Hospital. IRB Ref: 1/378/2252 TMR.

<https://doi.org/10.1016/j.infpip.2022.100204>

2590-0889/© 2022 The Authors. Published by Elsevier Ltd on behalf of The Healthcare Infection Society. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Conflict of interest statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding

None declared.

References

- [1] Kidney disease outcomes quality initiative, <https://doi.org/10.1053/j.ajkd.2019.12.001>.
- [2] Barracough KA, Hawley CM, Playford EG, Johnson DW. Prevention of access-related infection in dialysis. *Expert Rev Anti-infect Ther* 2009;7(10):1185–200. <https://doi.org/10.1586/eri.09.100>.
- [3] American Society of Diagnostic and Interventional Nephrology: Section Editor: Stephen Ash: Catheter Management Protocol for Catheter-Related Bacteremia Prophylaxis. <https://onlinelibrary.wiley.com/doi/full/10.1046/j.1525-139X.2003.16087.x?sid=nlm%3Apubmed>.
- [4] Beddy P, Ryan JM. Antibiotic prophylaxis in interventional radiology—anything new? *Tech Vasc Interv Radiol* 2006 Jun;9(2):

69–76. <https://doi.org/10.1053/j.tvir.2006.12.005>. PMID: 17482103.

- [5] United States Center for Disease Control and Prevention. Guidelines for the prevention of intravascular catheter-related infections. 2011. <https://www.cdc.gov/hai/pdfs/bsi-guidelines-2011.pdf>.
- [6] van de Wetering MD, van Woensel JB, Kremer LC, Caron HN. Prophylactic antibiotics for preventing early Gram-positive central venous catheter infections in oncology patients, a Cochrane systematic review. *Cancer Treat Rev* 2005 May;31(3):186–96. <https://doi.org/10.1016/j.ctrv.2004.12.004>. Epub 2005 Jan 26. PMID: 15944048.

Niamh Reidy*, Dean Moore, Conor Mulrooney,
Shaza Abdalrahman, Grace Chan, Robert McWade,
Yvonne O'Meara, Deirdre Brady
Mater Misericordiae University Hospital, Dublin, Ireland

* Corresponding author. Address: Microbiology Laboratory,
Mater Misericordiae University Hospital, Eccles Street, Dublin
7, Ireland. Tel.: +35318545067.
E-mail address: niamhreidy@mater.ie (N. Reidy)

Available online 3 February 2022