Partnering With Patients Undergoing Hemodialysis to Prevent Catheter-Associated Bloodstream Infections

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Abstract

The threat of catheter-associated bloodstream infections (CABSIs) among hemodialysis patients is present beyond health care settings. With the rise of antimicrobial-resistant infections, the benefits of partnering with patients in preventing CABSIs cannot be overemphasized. Patient education is the cornerstone of patient engagement, and a prerequisite for other involvement strategies. The responsibility for educating patients is multidisciplinary and must be accentuated at all stages of hemodialysis care. Enhancing patient self-efficacy in preventing CABSIs requires them to have an adequate level of knowledge on infection prevention and the skills and confidence to self-care in the community. Providing patient education is the first step to empower patients, facilitating their ownership of their journey in care and safeguarding them from infections.

Keywords: *arteriovenous fistula, catheter-related infections, patient safety*

Introduction

Catheter-associated bloodstream infections (CABSIs) are the main threat to patient safety presented by suboptimal vascular access care. In the United Kingdom, these infections account for 10%-20% of all hospital-acquired infections.[1] The mortality rate from CABSIs is reported to range from 12%-25%.[2] The relative risk for CABSIs associated to the use of central vascular catheters (CVCs) is 64 times greater than to peripheral vascular catheters, presenting therefore CVCs as the main source of CABSIs.[3]

Patients receiving hemodialysis treatment are the most at risk to acquire CABSIs among long-term users of vascular access devices. In 2010, the incidence of dialysis-related CABSIs in the United States reported to be 116 events per 1000 patient-years, a 51% increase since 1993.[4] Historically, hemodialysis patients with CVCs are more at risk for CABSI than those with arteriovenous (AV) fistulas or grafts.[5-8] In 2008, an estimated 37,000 CVC-related bloodstream infections were reported among hemodialysis patients in the United States.[9] Each episode of CABSI in this group of patients had an average cost of $23,000 in hospitalization fees.[10] Therefore, prevention of CABSIs remains a high patient safety and economic priority for hemodialysis services.

Patients undergoing hemodialysis are among the few groups of patients who maintain vascular access devices outside of hospital settings, which potentially places them at a higher risk of contracting CABSIs. The type of vascular access used on a patient also influences their risk for infection. AV fistulas have the lowest risk for infection, whereas catheters have the highest risk.[11] Hence, using a fistula instead of a catheter is an effective intervention to prevent CABSIs. Not all patients are eligible for fistulas due to lack of suitable vessels for fistula formation, so other options like AV grafts and catheters are available. However, fistulas and grafts require maturation before they can be safely used. Additionally, whilst most AV fistulas require between 4 and 6 weeks to mature before commencing dialysis, for a considerable number of AV fistulas such a period of time is not enough.[12] The full maturation period stands at an average of 26 weeks and 39 weeks for fistulas and grafts, respectively.[11] If dialysis is required before maturation is achieved, then usually a temporary CVC is inserted.[13]

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The time requirements demonstrate how planning of care and interventions is essential. At the same time, advanced care planning offers numerous opportunities to integrate engagement activities for patients undergoing hemodialysis. In this context, patient engagement refers to the set of behaviors that individuals perform to achieve the optimal benefit from their care.[14] Patient engagement activities can be varied, from education to facilitating shared decision-making opportunities as well as monitoring the safety of health care worker practice.[15]

The successful application of patient engagement in the management of chronic conditions is recognized as a viable strategy to improve patient safety.[16] But considering the influence of infections as the second leading cause of mortality for patients undergoing hemodialysis,[17] infection prevention appears as a crucial patient safety domain. Such is the importance of patient empowerment within this domain that the World Health Organization stands at the forefront of emphasizing their role in supporting health care workers in complying with optimal hand hygiene.[18] There is a paucity of evidence assessing the influence of patient engagement in hemodialysis outcomes, particularly related to infection prevention and control. The current evidence about prevention of bloodstream infections in dialysis patients focuses on improving staff practices in vascular access care.[19,20] However, engaging patients in infection control processes by providing education and skills to challenge suboptimal staff practices appears to favorably influence infection outcomes among patients undergoing hemodialysis.[21]

Encouraging and supporting patients to challenge staff in complying with infection control practices is also effective in reducing infections in other patient groups,[22] to the extent that such strategy is now considered the cornerstone of patient engagement in infection prevention. The success of this practice relies on the rapport established between patients and health care workers.[23] The overall satisfaction of patients with their care was also a major determinant to challenge staff behavior.[24] Besides such relational aspects, it seems clear that patients must be knowledgeable about their health before they can meaningfully engage in their care. Thus, patient education remains an essential component in any infection prevention and control program within the hemodialysis realm and it is a prerequisite for any other patient involvement strategies such as shared decision making and patient empowerment.

Shared decision making reflects the relation between patients and clinicians where they discuss and clarify treatments or self-management options openly, sharing preferred outcomes and aim to achieve a mutually agreed optimal course of action.[25] In patients undergoing hemodialysis, the main opportunity for shared decision making occurs before initiation of hemodialysis. Despite many patients lacking multiple choices regarding the type of vascular access, they may have the option to decline initiation of dialysis. Further, asking patients for their preference about which hand to use for the vascular access can be among the most important aspects of preoperative planning,[26] facilitating self-care and comfort.

Shared decision making is certainly not the mere presentation of a list of options for patients to choose from. Its aim is for people to understand their health and health problems and ensure that available therapeutic options are consistent with their values and preference.[27] In this light, the predialysis discussion is an opportune time to emphasize patient education and involvement. Engaging patients at this stage will facilitate the discussion of concerns, overseeing of own care, and reporting complications.[28] This patient-centered approach evolves service users to service partners who embrace ownership of their own care.

To enable them to take ownership in their role of preventing bloodstream infections, patients require an adequate level of knowledge on infection prevention measures and awareness of the risks of CABSIs. Anderson et al[29] studied the level of awareness on the risks and consequences of CABSIs among patients with vascular catheters. Although this study reported a high level of awareness on CABSIs, patients requested to be more involved by providing optimal timing and frequency for the discussion of CABSIs. Most patients in this study received information about CVCs, including risks for infectious adverse events only once during their admission and for < 5 minutes.[29] No study has explored the level of awareness about CABSIs among patients undergoing hemodialysis, although some patients in the study by Anderson et al[29] were dialysis patients. In general, there is clamor from patients to get involved and be informed about health care-associated infections.[30]

Patient education must be accentuated at all stages of hemodialysis care. Education during the predialysis period increases the rate of early access placement with AV fistulas compared with grafts or temporary catheters.[31] With decreased use of temporary catheters, there would be less risk of bloodstream infection among these patients. Teaching points at the predialysis phase must include vein preservation, preventing the use of the nondominant arm for any procedures such as blood sampling, intravenous therapy, and medication administration.[32] Improved clinical outcomes are also linked to information about chronic kidney disease at this stage.[33] Typically, nephrologists and specialist vascular nurses provide the initial education session to patients undergoing hemodialysis at predialysis. However, patient education must not stop at that point. Finkelstein et al[34] demonstrated how increasing the number of educational sessions was associated with significantly greater patient knowledge about hemodialysis. Additionally, patients exposed to multidisciplinary education experienced a 51% decrease in mortality and 40% reduced risk for hospitalization.[35]

The majority of health care interactions will involve patients and dialysis nurses, who are instrumental in providing and reinforcing self-care measures that are vital to prolonging vascular access lifespan and avoiding infection.[36] Areas such as access management, catheter care, hand hygiene, and compliance with best practices in infection prevention are crucial elements in infection control programs in outpatient hemodialysis units.[37] These components are consistent with the recommended elements of education for patients undergoing hemodialysis as endorsed by international societies such as the Infectious Diseases Society of America.[19]