Role of patient awareness in prevention of peripheral vascular catheter-related bloodstream infection.

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5. Hidron AI, Kourbatova EV, Halvosa JS, et al. Risk factors for colonization with methicillin-resistant *Staphylococcus aureus* (MRSA) in patients admitted to an urban hospital: emergence of community-associated MRSA nasal carriage. *Clin Infect Dis* 2005;41(2):159–166.
6. Peterson LR, Hacek DM, Robicsek A. 5 Million lives campaign case study: an MRSA intervention at Evanston Northwestern Healthcare. *Jt Comm J Qual Patient Saf* 2007;33(12):732–738.
7. Warren DK, Guth RM, Coopersmith CM, Merz LR, Zack JE, Fraser VJ. Epidemiology of methicillin-resistant *Staphylococcus aureus* colonization in a surgical intensive care unit. *Infect Control Hosp Epidemiol* 2006;27(10):1032–1040.
8. Haley CC, Mittal D, Laviolette A, Jannapureddy S, Parvez N, Haley RW. Methicillin-resistant *Staphylococcus aureus* infection or colonization present at hospital admission: multivariable risk factor screening to increase efficiency of surveillance culturing. *J Clin Microbiol* 2007;45(9):3031–3038.
9. Heymann DL. Control of Communicable Diseases Manual. 18th ed. Washington, DC: American Public Health Association; 2004.
10. Elston DM. Community-acquired methicillin-resistant *Staphylococcus aureus. J Am Acad Dermatol* 2007;56(1):1.

Role of Patient Awareness in Prevention of Peripheral Vascular Catheter–Related Bloodstream Infection

Catheter-related bloodstream infections account for 7% of all healthcare-associated infections.[1,2] Interventions to prevent bloodstream infections that are associated with peripheral venous catheters (PVCs) include appropriate hand hygiene, aseptic technique, skin asepsis, and daily PVC review.[3,4] Best practice guidelines suggest that, in the absence of a dedicated intravenous-catheter monitoring team, the duration of cannulation should be limited to 72 hours or less.[5,6] Recently, healthcare providers have involved patients in playing a more active role in ensuring that best practice is followed by healthcare workers. Partners in Your Care, a US patient education behavioral model for increasing hand hygiene adherence and for empowering patients with responsibility for their own care, has increased hand hygiene adherence among healthcare workers.[7-9] Similar patient-empowering programs have yet to be developed for other aspects of healthcare-associated infection prevention, including prevention of catheter-related bloodstream infections. The objective of our study was to review adherence to best practice guidelines for the prevention of PVC-associated infection and to determine whether patient awareness of the indication for cannulation had an influence on PVC care.

Beaumont Hospital (Dublin, Ireland) is a 631-bed, acute tertiary referral hospital with national centers for neurosurgery; renal, pancreas, and small bowel transplantation; and cochlear implantation. The study was performed on 4 general surgical wards from July 1 through November 30, 2009. Specific data collection forms were designed using Teleform data capture software (Cardiff). Data were obtained from the patient's medical chart and from ward nursing staff. Patient awareness of the indication for PVC placement was assessed by questioning the patient. Patients unable to communicate their awareness of the indication for PVC insertion or their consultant's name were excluded from further analyses. The analysis was based on the PVC (case level) rather than on the patient—that is, patients with more than 1 PVC had their PVCs assessed independently. The necessity for the PVC was prospectively assessed—that is, a PVC inserted initially for intravenous antibiotics that were subsequently discontinued was deemed to be unnecessary. Peripherally placed central venous catheters were excluded from the study. Statistical analysis was performed using Excel 2007 (Microsoft) and SPSS, version 17 (SPSS), with $P < .05$ considered to be statistically significant.

In total, 275 PVCs were assessed. Of these, 104 (38%) were no longer required ("unnecessary"), and 171 (62%) were considered to be still necessary. Patients were questioned on the indication for their PVC in 178 cases; for 97 PVCs, it was not possible to question the patient. Although 111 (62%) of the 178 patients were aware of the reason for their PVC, 67 (38%) were not. The patient's lack of awareness of the indication for their PVC was significantly associated with the patient having an unnecessary PVC in situ ($P < .001$). Patients who were unaware of the reason for their intravenous catheter cannula were approximately 7 times more likely (odds ratio, 6.935 [95% confidence interval, 3.523–13.650]) to have an unnecessary peripheral intravenous catheter cannula in situ (Figure 1). With regard to the dressings of the 275 PVCs, 240 (87%) were intact and clean, and 35 (13%) were not. The majority of PVCs (242 [88%]) were in situ for 72 hours or less per hospital policy, 29 (11%) were in situ for more than 72 hours, and for 4 PVCs the duration could not be ascer-

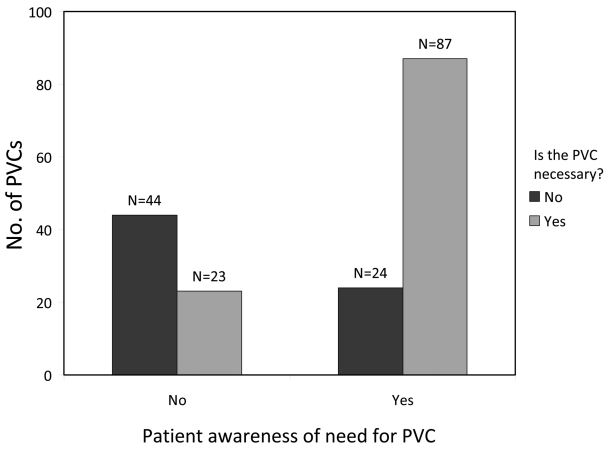

FIGURE 1. The relationship between the necessity for a peripheral venous catheter (PVC) and awareness of the indication for the PVC among 178 patients. Lack of awareness of the indication for the PVC was significantly associated with the patient having an unnecessary PVC in situ ($P < .001$).

tained. However, patient awareness was not found to be significantly associated with whether the PVC dressing was intact and clean ($P = .658$) or whether the PVC was in situ for more than 72 hours ($P = .645$). Furthermore, there was no significant difference in patient awareness between different surgical teams. A subgroup analysis of 255 patients indicated that 213 (84%) did know their consultant's name, whereas 42 (16%) did not. Of these 42 patients, 14 (33%) had at least 1 unnecessary intravenous catheter cannula in situ.

This study showed that, in our institution, a large proportion (38%) of PVCs were unnecessary and that patient awareness was significantly associated with having an unnecessary PVC in situ. This may well represent a deficiency in communication between healthcare workers and patients, given the proportion of patients who were unaware of their consultant's name (16%). The importance of patient awareness with regard to prevention of healthcare-associated infection through hand hygiene adherence has been demonstrated elsewhere,[7-9] and educational programs to improve patient awareness and empowerment have increased hand hygiene adherence by up to 50%.[9] To our knowledge, this is the first study to assess the role of patient awareness in prevention of catheter-related bloodstream infection. The limitations of our study include being performed in a single center over the relatively short period of 5 months. Also, not all patients could be asked all questions, so these patients were excluded from the study.

In conclusion, our study demonstrated that patients who did not know the indication for their PVC were almost 7 times more likely to have an unnecessary PVC in situ, thus being at increased risk of catheter-related bloodstream infection. Subsequent to this study, we introduced a patient information leaflet on PVCs for all patients at the time of their PVC insertion. This leaflet highlights the indications for PVC insertion, features of PVC-related infection, expected duration of PVC placement, and the ways in which the patient can play a role in preventing PVC-related infection.

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REFERENCES

1. Smyth ET, McIlvenny G, Enstone JE, et al. Four-country healthcare-associated infection prevalence survey 2006: overview of the results. *J Hosp Infect* 2008;69(3):230–248.
2. Humphreys H, Newcombe RG, Enstone J, et al. Four-country healthcare-associated infection prevalence survey 2006: risk factor analysis. *J Hosp Infect* 2008;69(3):249–257.
3. O'Grady NP, Alexander M, Dellinger EP, et al. Guidelines for the prevention of intravascular catheter–related infections. *Infect Control Hosp Epidemiol* 2002;23(12):759–769.
4. Strategy for the Control of Antimicrobial Resistance in Ireland (SARI), Prevention of Intravascular Catheter–Related Infection Subcommittee. Prevention of intravascular catheter–related infection in Ireland. http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHealthcare-AssociatedInfection/IntravascularIVlines/Publications/File,4115,en.pdf. Published 2009. Accessed October 21, 2010.
5. Cercenado E, Ena J, Rodriguez-Creixems M, Romero I, Bouza E. A conservative procedure for the diagnosis of catheter-related infections. *Arch Intern Med* 1990;150(7):1417–1420.
6. Maki DG, Ringer M. Risk factors for infusion-related phlebitis with small peripheral venous catheters. A randomized controlled trial. *Ann Intern Med* 1991;114(10):845–854.
7. McGuckin M, Taylor A, Martin V, Porten L, Salcido R. Evaluation of a patient education model for increasing hand hygiene compliance in an inpatient rehabilitation unit. *Am J Infect Control* 2004;32(4):235–238.
8. McGuckin M, Waterman R, Porten L, et al. Patient education model for increasing handwashing compliance. *Am J Infect Control* 1999;27(4):309–314.
9. McGuckin M, Waterman R, Storr IJ, et al. Evaluation of a patient-empowering hand hygiene programme in the UK. *J Hosp Infect* 2001;48(3):222–227.