Australasian Emergency Nursing Journal (2016) xxx, xxx–xxx

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/aenj

RESEARCH PAPER

Peripheral intravenous catheter insertion in the Emergency Department

Kelly Decker, RN, MN [a,b,*]
Sharyn Ireland, RN, M.Ed, D.Nursing [a,c]
Lorna O'Sullivan, RN, GradCert. Emergency Nursing [a]
Sue Boucher, RN, GradCert. Emergency Nursing [a]
Lauren Kite, RN, GradDip. Emergency Nursing [a,c]
Deb Rhodes, RN, CICP [a]
Biswadev Mitra, MBBS, MHSM, PhD, FACEM [a,d]

[a] *Emergency & Trauma Centre, Alfred Health, 55 Commercial Road, Melbourne, Victoria 3004, Australia*
[b] *Monash University, School of Nursing and Midwifery, Peninsula Campus, McMahons Road, Frankston, Victoria 3199, Australia*
[c] *La Trobe University, School of Nursing and Midwifery, Plenty Road and Kingsbury Drive, Melbourne, Victoria 3086, Australia*
[d] *Monash University, Department of Epidemiology & Preventive Medicine, 99 Commercial Road, Melbourne, Victoria 3004, Australia*

Received 16 June 2015; received in revised form 10 December 2015; accepted 15 December 2015

KEYWORDS
Emergency Service, hospital;
Catheterization, peripheral;
Emergency treatment

Summary
Background: Growing research suggests that a large number of peripheral intravenous catheters (PIVCs) inserted in the Emergency Department (ED) are unused. The aim of this study was to assess the proportion of unused ED inserted PIVCs in a before-and-after interventional study. Additional aims were to ascertain indications for PIVC insertion in the ED and to increase the appropriateness of PIVC insertion.
Method: A prospective interventional study was conducted. Data were collected on 150 cases in the pre- and a further 150 cases in the post-intervention phase. During the intervention phase strategies were implemented to increase appropriate PIVC insertion in the ED. Interventions included introduction of insertion and removal stickers, new venepuncture devices, changing the intravenous (IV) trolley layout, and an educational campaign.
Results: Results from this study demonstrate that the number of PIVCs used (50 vs. 28) remained unchanged, however the number of PIVC insertions initiated by nursing staff reduced

* Corresponding author at: Emergency & Trauma Centre, Alfred Health, 55 Commercial Road, Melbourne, Victoria 3004, Australia. Tel.: +61 3 9076 3799.
E-mail address: k.decker@alfred.org.au (K. Decker).

http://dx.doi.org/10.1016/j.aenj.2015.12.003

Please cite this article in press as: Decker K, et al. Peripheral intravenous catheter insertion in the Emergency Department. *Australas Emerg Nurs J* (2016), http://dx.doi.org/10.1016/j.aenj.2015.12.003

significantly ($p = 0.049$). With regard to the indication for PIVC insertion, the implementation of the interventions was associated with significantly fewer PIVCs being inserted for routine blood collection ($p = 0.006$) and for PIVCs inserted for a potential need of medication and intravenous fluid administration ($p = 0.03$). There was a significant reduction in the number of PIVCs inserted following the intervention (74 vs. 50: $p = 0.005$).

Conclusion: This study demonstrated a high proportion of unused PIVCs in the ED. A composite intervention strategy was developed and significantly reduced the ''just-in-case'' PIVCs inserted.

What is already known

- Growing research suggests that a large number of peripheral intravenous catheters (PIVCs) inserted in the Emergency Department (ED) are unused.
- PIVC insertion has been associated with complications.
- No national standards on the indications for PIVC insertion/non-insertion in the ED currently exist in the literature.
- There is also a paucity of research that informs strategies to decrease inappropriate PIVC insertion in EDs.

What this paper adds

- The first major finding of this study was the identification that there were a high proportion of unused PIVCs in our ED.
- The second major finding was that simple interventions were successful in reducing the number of PIVCs inserted.
- The findings from this study highlighted that indications for the appropriate insertion of a PIVC in the ED is an area requiring further research.

Introduction

Peripheral intravenous catheter (PIVC) insertion is a common procedure performed on patients presenting to an Emergency Department (ED). PIVCs facilitate immediate or anticipated medication or fluid therapy that is often vital during care in the ED. However, growing research suggests that a large number of PIVCs inserted in the ED are unused.[1–3] PIVC insertion takes time and has been associated with complications.[4–6] Documented risks of insertion and evidence of a high proportion of unused PIVCs has not translated to national standards on the indications for PIVC insertion/non-insertion in the ED. There is also a paucity of research that informs strategies to decrease inappropriate PIVC insertion in EDs.

Background

EDs are an accessible front door into the health care system, and as such the demand for emergency services is increasingly high. With the introduction of the nationwide National Emergency Access Targets, emergency clinicians are expected to complete assessment and management of patients within 4 h of their arrival. Under time pressure, risk aversion, and the increasing expectations of the consumer, growing evidence suggests that PIVC insertion in the ED is routine rather than guided by clinical indications.[1–3] Evidence of PIVC insertion and usage rates are limited, however 15–26% of patients that present to ED have a PIVC inserted in ED.[1–3] From the same data sets, of the PIVCs inserted in the ED, 35–50% remain unused during the patient's stay in the ED.[1–3] It has also been reported that among patients who had an unused ED inserted PIVC, 44% had an unused PIVC 72 h after admission to a ward.[1]

PIVCs are associated with a number of complications including phlebitis, thrombophlebitis, infection, and pain.[4–7] Infections associated with PIVCs have been frequently reported, ranging from minor irritation of a localised site to increased morbidity and mortality from bloodstream infections.[5,8] Almost 25% of health care associated *Staphylococcus aureus* bacteraemia (SAB) cases have been attributed to PIVCs.[4] It has also been reported that 39.6% of PIVC associated SAB cases were from PIVCs inserted in the ED.[4] Serious infectious complications produce considerable annual morbidity because of the frequency with which PIVCs are used. Up to 80% of hospitalised patients having a PIVC inserted during their hospital stay.[8] Evidence for improved management of PIVCs during and after insertion to minimise the associated complications with PIVCs is increasingly found within the literature, however it is important that PIVC insertion is limited to those patients in need of the device.[9–14]

The Australian Commission for Safety and Quality in Health Care (ACSQH) present recommendations to prevent infection related to invasive devices in Standard 3: Preventing and Controlling Healthcare Associated Infection.[15] The Department of Health for New South Wales and Queensland also have PIVC guidelines available in the public forum.[16,17] The New South Wales and Queensland PIVC guidelines are available documents that inform health care professionals about requirements for PIVC insertion. The documents discuss PIVC insertion as a skill that a competent clinician can undertake based on the indication for PIVC insertion. The term 'indication' for PIVC insertion is broadly defined by the New South Wales Department of Health as ''ensure that a PIVC is required, alternatives have been considered, and the benefits outweigh the risks''.[16(p.8)] In Queensland, before clinicians insert a PIVC they should consider ''risk of complications including infection, and patient factors''.[17(p.2)] There are no currently accepted guidelines in the literature about when a PIVC is indicated in the ED.

Please cite this article in press as: Decker K, et al. Peripheral intravenous catheter insertion in the Emergency Department. *Australas Emerg Nurs J* (2016), http://dx.doi.org/10.1016/j.aenj.2015.12.003