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Research paper

A real time auditing and feedback program of peripheral intravenous cannulas with a focus on improving rates of redundancy☆

Andrew Henderson [a,*], Fiona Fullerton [b], Reto Federi [b], Tracey Vidler [b], Elliot Geoffrey Playford [b]

[a] *Pathology Queensland, Australia*
[b] *Infection Management Services, Princess Alexandra Hospital, Brisbane, Australia*

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Abstract *Objectives:* Redundant (unused) peripheral intravenous cannulas (PIVCs) can lead to patient discomfort and potential harm. The aim of this study was to improve the post insertion management of PIVCs with a focus on redundancy.
Methods: A regular auditing and feedback program was introduced as an intervention to improve the rates of redundant PIVCs. We performed consecutive daily audits without any feedback over a 2 week period immediately prior to the intervention and 6 months post-commencement. Pooled rates of redundant devices during those periods were compared to assess the intervention impact. A multivariate logistic regression model was created to identify variables associated with redundant devices over the 15-month intervention period.
Results: The pooled rate of redundant devices in the pre-intervention period was significantly higher than in the 6-month period following commencement of the intervention (41.4% versus 31.7%; $p = 0.02$). From the intervention period, 994 PIVCs were used to create a logistic regression model. The use of a device care plan (OR 0.60 95% CI 0.37–0.88, $p = 0.02$), insertion in a medical ward (OR 0.45 95% CI 0.32–0.65, $p < 0.001$), days the device was in-situ (OR 1.41 95% CI 1.20–1.68, $p < 0.001$) and days from the start of the intervention (OR 0.99 95% CI 0.99–1.00, $p < 0.001$) were associated with redundant devices.

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* Corresponding author. Microbiology Department, Townsville Hospital, 100 Angus Smith Drive, Townsville, Qld, 4814, Australia. Fax: +61 744332415.
E-mail addresses: Andrew@hendonet.com, Andrew.henderson@health.qld.gov.au (A. Henderson), Fiona.fullerton@health.qld.gov.au (F. Fullerton), Reto.Federi@health.qld.gov.au (R. Federi), Tracey.Vidler@health.qld.gov.au (T. Vidler), Geoffrey.Playford@health.qld.gov.au (E.G. Playford).

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Conclusion: Removal of redundant PIVCs is an important aspect of post insertion management of PIVCs. Rates of redundant devices can be reduced through a real-time auditing and feedback program.

Highlights

- High rates of redundant PIVCs are observed in medical wards.
- Redundant devices were more likely to have been inserted in the ED or an ambulance.
- Realtime feedback of device management has sustained effects.
- Use of a device care plan is associated with fewer redundant devices.

Introduction

Peripheral intravenous cannulas (PIVCs) are an important part of routine patient care. From previous studies, it is estimated that between 30% and 80% of admitted patients have at least one PIVC inserted during their stay [1—3]. Although it is widely accepted that central venous catheters pose a greater risk for bloodstream infections, due to the absolute number of PIVC devices that are inserted each year, a significant proportion of hospital acquired bloodstream infections arise from PIVCs [4,5].

In addition to correct insertion using aseptic technique, the post insertion management of PIVCs is important for minimizing the risk of developing phlebitis and bloodstream infections. Few studies, however, have demonstrated processes that improve post insertion management. Conflicting opinion exists as to whether routine replacement is still an appropriate practice in comparison to clinically indicated replacement of PIVC devices. However, it is well recognised that the removal of non-essential intravenous devices is an important component of post insertion management. Any bloodstream device left in-situ unnecessarily can potentially lead to harm and may impact patient welfare and comfort. The concept of the idle cannula was first introduced in medical literature in a 1992 study that found up to 35% of intravenous devices are unused following insertion [6,7]. Although the idle cannula has become a commonly recognized description, the term redundant is used in this article to represent and encompass the notion of potential harm from an unused device remaining in-situ.

Within our hospital, up to 40% of PIVCs observed within general medical wards were redundant on the day of auditing during point of prevalence surveys (unpublished data). This contrasts with the lower number of redundant PIVCs amongst surgical and medical sub-specialty wards in our audits. We hypothesized that through a real time audit and feedback process to both the relevant medical and nursing teams, we could improve the documentation and post-insertion management of PIVCs on our medical wards, with an emphasis on resolving an issue of redundant PIVCs.

This study was conducted at the Princess Alexandra hospital (PAH), which is a 700 bed, tertiary referral hospital within the Metro South health district of Brisbane. It has adult general, specialist medical and surgical units with a 30 bed intensive care unit. Patients are admitted to medical wards direct from emergency, through an elective booking process, or, after a transition period through a Medical Admission Planning Unit (MAPU).

Methods

Overview

The aim of this quality improvement study was to reduce the rates of redundant PIVC devices in medical wards at the PAH. We implemented a regular auditing and feedback program as an intervention. Ipads were used for direct data entry at the time of the audit and a Filemaker database generated personalized letters to consultants and nurse unit managers on the day of the audit. The audit results presented in the letters were individualized and provided the rate of redundant devices for patients admitted under the consultant addressed to in the letter, and a comparison of their redundant rates to other medical teams. In addition, letters provided further details of the use of device care plans and device logs and any documentation of appearance or use in medical charts. This intervention was performed over a 15 month period between July 2013 and November 2014.

Each audit was conducted as a point of prevalence survey to assess PIVCs present on the day of the audit. Using this method, where a patient had multiple PIVCs in-situ, each was treated as an independent device. In order to determine whether a device was used, a review was conducted of the bedside chart, medical chart and patient. Where multiple PIVCs were present in the same patient, an assessment was made for the need for multiple devices. If one (or more) device were then assessed to not be required, the redundant device was attributed to as the most recent PIVC inserted according to the device log. The audits were performed at least 10 days apart and this ensured that the same PIVC was not recorded across two audit periods.

Insertion and monitoring of PIVCs

At the PAH, PIVCs are routinely replaced every 72—96 h by credentialed ward nurses, or medical officers responsible for the patient's care. A vascular access device log and vascular access care plan are an established part of routine paper work kept at the patient's bedside chart. The device log records insertion details of devices, such as location, whom the device was inserted by and the date of insertion.

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