Reducing Hospital-acquired Staphylococcal Bacteraemia by Implementation of a Peripheral Vascular Catheter Care Plan

Lees B.C., Kiernan M.A., Jukka C.M., Bowley J.A., Chalmers A.Q.

Department of Infection Prevention and Control, Southport and Ormskirk NHS Trust, Southport, Merseyside, UK

Introduction

- Insertion of peripheral vascular catheters (PVC) is a common invasive procedure that forms part of the management of many in-patients. However, this type of device has associated risk of bacteraemia[1].
- *Staphylococcus aureus* accounts for 25% of cases of blood stream infection (BSI) associated with all types of intravenous catheters[2].
- The 3rd Prevalence survey of Healthcare Associated Infection (HCAI), showed that Meticillin-resistant strains accounted for 40-45% of all *Staphylococcus aureus* infections[3].
- Winning Ways[4] stated that PVC insertion sites should be regularly inspected for signs of infection and removed if necessary and that all PVCs be changed at 72 hours irrespective of clinical signs of infection
- Reducing bacteraemia caused by Meticillin resistant Staphylococcus aureus (MRSA) and meeting targets relating to this has been a great challenge for many hospitals in England. Root Cause Analysis (RCA) of MRSA BSIs within our Trust for the time period 2006-07, identified a number of infections relating to PVCs. Issues included sub-optimal documentation resulting in prolonged dwell times and lack of personal accountability in PVC management.
- We describe how a policy for review, routine replacement at or before 72hrs and enhanced documentation and audit has reduced the incidence of bacteraemia associated with PVCs

Methods

- Southport and Ormskirk NHS Trust is a 550-bedded acute hospital across two sites.
  - Routine in-house bacteraemia surveillance demonstrated that between January 2005 and March 2007 there were 42 cases of hospital acquired *Staphylococcus aureus* bacteraemia (MRSA & MSSA). Fifteen (35%) of these cases were associated with PVCs[5].
  - Prior to Department of Health guidelines[4] PVCs were changed based on clinical need. A care-plan implementing this new guidance was introduced across the Trust. However, HCAI blood stream MRSA and MSSA infections continued to be associated with PVCs.
  - In April 2006, the PVC care plan was modified to include documentation at each change of nursing shift and mandatory PVC removal at 72 hours.
  - The care plan is available in a designated area on the Trust intranet.

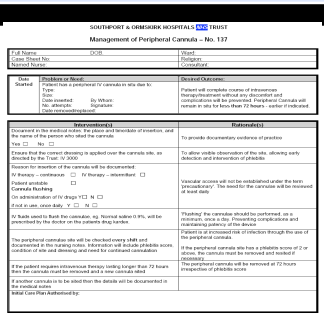
Care plan design

Version 1 April 2005 - 2006

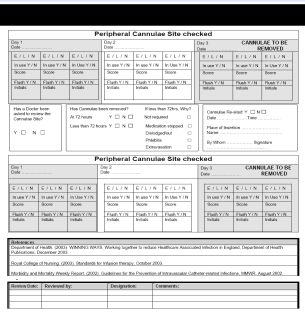
- Insertion signature and date
- Documentation of the requirement for the continuance of the device
- Daily check & documentation of the PVC site using the visual infusion phlebitis score[6] (VIP)
- Removal at 72hrs regardless of integrity

Version 2 April 2006 to date

- As above but PVC site checked and documented each shift
- This improved standard care plan is used throughout the Hospitals and ensures that PVCs are managed in a consistent manner throughout the organisation
- The requirement for the continued clinical need for this invasive device is assessed and recorded during each shift, along with an assessment of the VIP score


SOUTHPORT & ORMSKIRK HOSPITALS NHS TRUST

Management of Peripheral Cannula – No. 137


Peripheral Cannulae Site checked

Audit

- Infection Prevention Team undertake regular audits which are reported to the Director of Nursing and fed back through the Matron for action within that clinical area
- The audit assesses :-
  - Integrity of the PVC site and dressing type
  - Date and signature for insertion
  - Signature every shift showing PVC assessment
  - PVC removal at 72hrs
- Matrons undertake a monthly checklist which incorporates all areas of practice on a ward, including PVC care and documentation. This is reported to the Director of Nursing and fed back to individual areas for action

Root Cause Analysis

- Suspected PVC infections are assessed by the IP&C Team and a root cause analysis is undertaken by the Matron for the area in conjunction with the clinical team

IV site appears healthy	0	No signs of phlebitis OBSERVE CANNULA
One of the following is evident: • Slight pain near IV site or slight redness near site	1	Possible first signs of phlebitis OBSERVE CANNULA
Two of the following are evident: • Pain at IV site – Erythema - Swelling	2	Early stage of phlebitis RESITE CANNULA
All of the following signs are evident: • Pain along path of cannula – Erythema - Induration	3	Medium stage of phlebitis RESITE CANNULA CONSIDER TREATMENT
All of the following signs are evident and extensive: • Pain along path of cannula – Erythema – Induration – palpable venous cord	4	Advanced stage of phlebitis or start of thrombophlebitis RESITE CANNULA CONSIDER TREATMENT
All of the following signs are evident and extensive: • Pain along path of cannula – Erythema – Induration – palpable Venous Cord - Pyrexia	5	Advanced stage of thrombophlebitis INITIATE TREATMENT RESITE CANNULA

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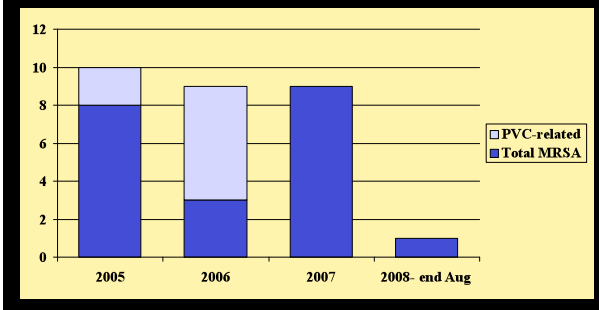

Figure 1 - Hospital-acquired MRSA bacteraemia 2005-date

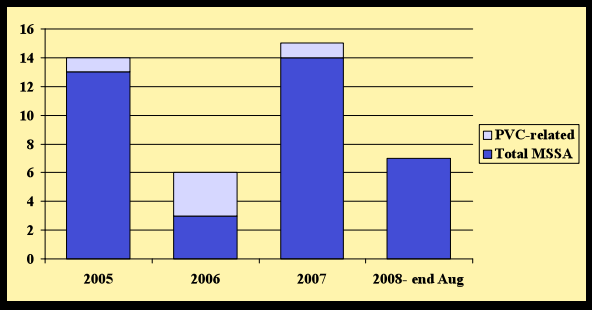

Figure 2 - Hospital-acquired MSSA bacteraemia 2005-date

Results (Figures 1 & 2)

- In the period 2005-06, prior to the introduction of the new care pathway 4 of 20 (25%) of MSSA and 8 of 19 (42%) of MRSA hospital acquired BSIs were associated with PVCs.
- Following pathway implementation only 1 of 32 (3%) of *Staphylococcus aureus* (MSSA and MRSA) bacteraemia has been associated with a PVC

Discussion and Conclusions

- No other measure was introduced during this time
- Improving the PVC care plan and documentation has been a successful intervention in reducing PVC associated *Staphylococcus aureus* (MSSA & MRSA) bacteraemia within our Trust.
- Continued clinical need for this invasive device is recorded during each nursing shift, along with an assessment of the VIP[6] score.
- The care plan reinforces personal accountability for nurses caring for PVCs and authority to remove a PVC at 72 hr
- Audit has demonstrated improved practice, especially relating to dwell times and PVC removal.

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