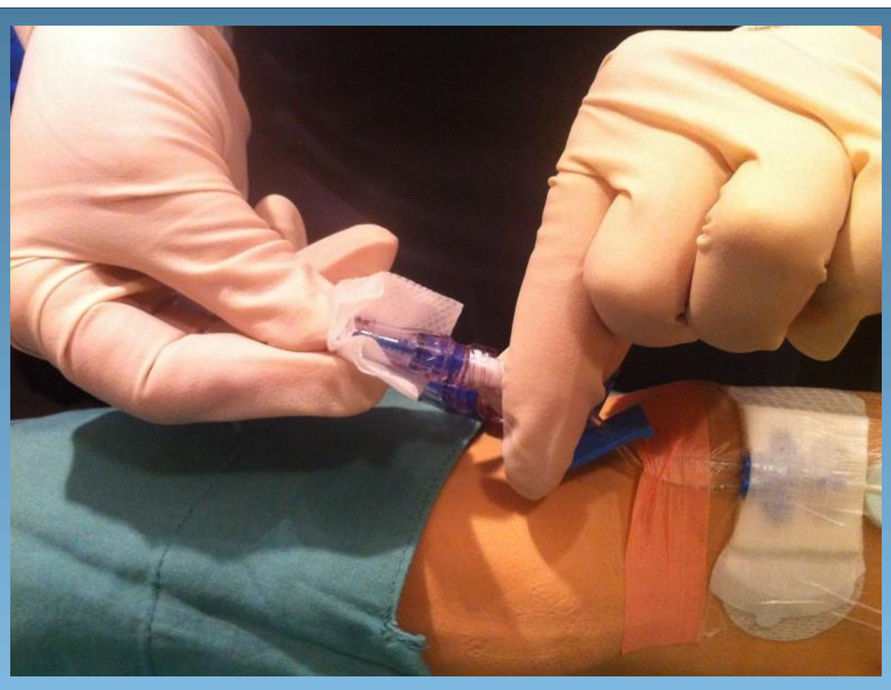
Building a central vascular access device registry in an adult intensive care unit: feasibility study

Mari Takashima[a], Nicole Gavin[a,b], Emily Larsen[a,b], Sarah Northfield[b], Gabor Mihala[a,d], Amanda Corley[a,c], Marc Ziegenfuss[c] & Claire Rickard[a,b,c]

[a] Alliance for Vascular Access Teaching and Research (AVATAR) group, Menzies Health Institute Queensland, Griffith University, Nathan, QLD 4111, Australia
[b] Cancer Care Services, Royal Brisbane and Women's Hospital, Herston, Qld, Australia
[c] The Prince Charles Hospital, Chermside, Qld, Australia
[d] Centre for Applied Health Economics, Menzies Health Institute Queensland, Nathan Campus, Queensland, Australia

Introduction

Central venous access devices (CVAD) provide vascular access for the majority of intensive care patients. However, no comprehensive registry for CVAD insertion, complications and failure exists for research and quality assessment purposes in Australia. The primary aim of this study was to examine the feasibility of a CVAD registry to measure peripherally inserted central catheter (PICC) outcomes.



Methods

This study used 12 months' retrospective data (1st April 2016 to 31st March 2017) from all patients who had a PICC inserted while receiving care at a 24-bed intensive care unit (ICU) within a tertiary-referral hospital in Australia. The cohort was followed until: removal of PICC, transfer to another facility, or death. Information was gathered primarily from electronic medical record (EMR) [Metavision], and then from paper charts if patients were discharged from ICU with the PICC.

Baseline data (patient demographic and PICC details) and information on PICC complications and failures were entered into the registry from the data management system. Laboratory data from the hospital electronic pathology system was accessed to obtain information regarding positive blood and/or other cultures. Confirmed CLABSI data was obtained from routine surveillance by the Infection Management & Prevention Service.

The primary outcome was registry feasibility as defined by the Australian Commission on Safety and Quality in Health Care (ACSQHC) feasibility criteria for clinical quality registries (see Table 1) (1). The secondary outcomes were PICC utilisation ratio; PICC numbers and days (dwell-time); demographics of patients and PICC details, reason for removal, and PICC failure per 1000 catheter days.

Results

Primary outcome: Feasibility outcomes

The registry met the feasibility criteria with the exception of criteria 3, 5, and 7. As a result, this study found it was not sustainable to maintain a PICC registry reliant on manual data entry without hospital-wide EMRs. However, if used to capture insertion only data, it successfully met six out of seven criteria, failing only criteria 3 as all of the insertion data were available on the EMR. Moreover, the operational requirement could be met if the registry questions were built into routine data collected by end-users into the EMR and then auto-populated to the registry. See Figure 1 for detailed assessment of feasibility against the ASCHQ feasibility criteria.

Conclusion

In conclusion, this study has demonstrated the feasibility of establishing and maintaining a CVAD registry but only in conjunction with hospital-wide EMRs. The adoption of registry fields into the EMR platform will have greater potential for time and cost efficiency by reducing manual data entry and auto-populating the registry at point of care.

Reference:
1 Australian Commission on Safety and Quality in Health Care. Framework for Australian clinical quality registries [document on the internet]. NSW, Australia: ACSQHC, 2014 [updated March 2014]. Available at:. Retrieved 19 January 2018. https://www.safetyandquality.gov.au/wp-content/uploads/2014/09/Framework-for-Australian-Clinical-Quality-Registries.pdf

Feasibility Outcomes

Criteria 1: Consistency ✓	• PICC failure was systematically identified in EMRs. • Type of device failure - only captured if it was recorded by the end users.
Criteria 2: Governance ✓	• Received both ethics and governance approvals.
Criteria 3: Operational requirements ✗	• Required 10-30 mins for each PICC data when using EMR. • The use of a research nurse is not sustainable in the long-term unless the EMR platform enables auto-population of the registry fields.
Criteria 4: Scope ✓	• Entire ICU population was captured.
Criteria 5: Capturing necessary data ✗	• Approximately 50% were transferred to a hospital ward that lacked EMR system. • Challenging and time-consuming task to gather the removal information from the paper charts.
Criteria 6: Clinically meaningful indicators ✓	• Used outcome indicators routinely collected for infection surveillance and other well established CVAD failure outcomes.
Criteria 7: Infrastructure ✗	• 20% of patients were lost to follow up post ICU-discharge due to lack of EMR in general wards. • Registry was able to capture 100% of eligible patients from EMRs.

Figure 1: Detailed assessment on feasibility against ACSQHC feasibility criteria (1)

280 PICCs inserted in 225 patient - total of 3000 catheter days	PICC utilisation ratio: 0.47 [Number of PICC days / Number of patient days of all ICU patients during study period]	81 premature PICC removals (29%) due to complications i.e. PICC failure
4 insertion failures (placement failure) (1%)	22 mechanical failures(8%): accidental dislodgement (2%), catheter migration (1%), catheter rupture/fracture (<0%), catheter related thrombosis (2%), and occlusion (3%)	51 other premature removals (18%)
33 PICCs removed due to suspected CLABSI (12%) despite only one confirmed CLABSI	Incidence rate: All failures (n=81): 27.0 per 1000 catheter days (95% C.I. 21.7-33.6)	Incidence rate: Without suspected CLABSI (n=48): 16.0 failures per 1000 catheter days (95% C.I. 12.1-21.2)

Figure 2: Secondary outcomes

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Contact Details:
Mari Takashima m.takashima@griffith.edu.au
Study Registered on ANZCTR: ACTRN12616000387426