Risk factors for central venous access device failure: an analysis of 1893 catheters

A Corley1,2,3,4, N Marsh1,2,3,5, E Larsen1,3, R Cocksedge6, C Rickard1,2,3

1Nursing & Midwifery Research Centre, RBWH; 2School of Nursing, Midwifery and Social Work, UQ; 3AVATAR; 4School of Nursing & Midwifery, Griffith University; 5School of Nursing, QUT; 6Centre for Applied Economics, School of Medicine, Griffith University

Purpose
Central venous access devices (CVAD) are a vital medical device but develop complications necessitating removal.

We examined risk factors for CVAD failure in hospitalised patients ≥16 years.

Methods
In this secondary analysis of data from a 10-site RCT assessing IV administration set change frequency, central line-associated bloodstream infection (CLABSI), occlusion and dislodgement were examined. Cox proportional hazards regression models were informed by Bayesian information criteria.

Results
1893 CVADs were included: 814 non-tunnelled CVADs, 757 peripherally-inserted central catheters (PICCs) and 322 tunnelled CVADs.

Factors associated with increased CLABSI:
• Mechanical ventilation (HR 1.70, p=0.047)
• Administration of blood products (HR 1.70, p=0.045)

Factors protective of CLABSI:
• PICC insertion compared to jugular or subclavian CVAD (HR 0.46, p=0.01)

Factors associated with higher risk of occlusion:
• Administration of propofol (HR 2.49, p=0.01) and insulin (HR 2.82, p<0.01)

Factors associated with increased dislodgement:
• Insertion in other hospital (HR 10.59, p=0.003)

Conclusions
Modifiable risk factors for CVAD complications have been identified.

• Enhanced infection prevention vigilance is required during CVAD care in mechanically ventilated patients and those receiving blood products.

• Increased CVAD securement is needed in patients requiring inter-hospital transfer.

These findings inform practice change to reduce preventable CVAD complications and improve patient outcomes.