



Blood sampling in critical care – every drop counts!

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Arterial Catheters (ACs) are vital medical devices used in anaesthesia and critical care areas for invasive monitoring of the cardiovascular system and frequent blood sampling (ANZICS 2014, Gowardman et al 2010).

To facilitate this, pressurised administration sets are applied to maintain patency with a low rate infusion and facilitate continuous monitoring.

However, blood sampling via these systems can result in contamination and blood wastage, which can lead to systemic infection and iatrogenic anaemia.

As part of a program of research investigating this issue (Ullman et al 2015), researchers from NCREN's vascular access group (AVATAR) conducted a National Survey of nurses' blood sampling practice and use of blood conservation strategies.

Members of leading Australian critical care associations were invited to participate in a short online survey.

The final respondent sample was 646. The population was predominantly adult critical care nurses working full time in a metropolitan public hospital, delivering direct patient care.

However, overall we managed to achieve proportional representation from paediatric and neonatal settings.

The most salient results were the data on line clearance method and volume.

Nurses in the adult setting discarded the line clearance with reinfusion of the line clearance being primarily employed by nurses in the paediatric and neonatal settings.

Also of note was the variation in the volume of line clearance.

In the adult sector alone volumes ranged from 1-10mls.

This variation may impact on the accuracy and reliability of the related



test and/or accumulatively contribute to iatrogenic anemia.

The use of a closed loop system was reported but minimally.

Correspondingly the variation in the haemoglobin threshold for transfusion also varied.

Less so in the adult setting where the majority reported tolerating a low threshold of 7g/l before a transfusion was ordered.

While blood testing to inform clinical decision making is vital, strategies have been developed to minimise unnecessary sampling and associated infection risk and iatrogenic blood loss.

However, research suggests they are not widely practiced in all adult, paediatric and neonatal ICUs (Shaffer 2007, Harber et al 2006, Barie 2004, Fowler & Berenson 2003).

Moving forward, quality trial research is planned to evaluate impact of blood conservation strategies, including use of a closed loop system on (a) infection outcomes, (b) blood sample losses, and (c) health care costs.

For more information about NCREN's vascular access research visit www.avatargroup.org.au ■

References

- Australian and New Zealand Intensive Care Society (2014) *Centre for Outcome and Resource Evaluation Annual Report 2012-2013*.
- Barie PS (2004) "Phlebotomy in the intensive care unit: strategies for blood conservation", *Critical Care* 8(Suppl 2), S34-6.
- Fowler RA, Berenson M (2003) "Blood conservation in the intensive care unit", *Critical Care Medicine* 31(12 (Suppl.)), S715-20.
- Gowardman JR, Lipman J, Rickard CM (2010), "Assessment of peripheral arterial catheters as a source of sepsis in the critically ill: a narrative review", *The Journal of hospital infection* 75(1), 12-18.
- Harber CR, Sosnowski KJ, Hegde RM (2006) "Highly conservative phlebotomy in adult intensive care - a prospective randomized controlled trial", *Anaesthesia and Intensive Care* 34(4), 434-7.
- Shaffer C (2007) "Diagnostic blood loss in mechanically ventilated patients", *Heart and Lung* 36(3), 217-22.
- Ullman A, Keogh S, Coyer F et al (2015) "'True Blood' The Critical Care Story: An audit of blood sampling practice across adult, paediatric and neonatal intensive care settings", *Australian Critical Care* (early access online June 2015).