Identifying factors to minimize phlebotomy-induced blood loss in the pediatric intensive care unit

Valentine, Stacey L. MD; Bateman, Scot T. MD

Abstract

Objective: Phlebotomy-induced blood loss in critically ill children is common, contributes to anemia, and may be avoidable. We aimed to identify factors associated with phlebotomy-induced blood loss.

Design: Prospective observational study, single-center tertiary children's hospital.

Setting: Pediatric intensive care unit.

Patients: A total of 63 patients admitted to the pediatric intensive care unit for >48 hrs from 2004 to 2005.

Interventions: None.

Measurements and Main Results: Phlebotomy resulted in a mean blood volume loss of 2.5 ± 1.4 mL per draw, 7.1 ± 5.3 mL per day, and 34 ± 37 mL per pediatric intensive care unit stay, of which 1.4 ± 1.1 mL per draw, 3.8 ± 3.6 mL per day, and 23 ± 31 mL per pediatric intensive care unit stay were discarded as excess. This excess represents 210% ± 174% of the volume requested by the laboratory and a 110% overdraw. Blood drawn from central venous catheters had significantly greater overdraw volumes, 254% ± 112%, compared to those of arterial, 168% ± 44%, and peripheral intravenous catheters, 143% ± 39%, $p < .001$. Blood draws sent for one test had an associated overdraw of 278% ± 81%, compared to draws sent for two, 168% ± 48%, three 173% ± 4%, and four or greater tests 55% ± 5%, $p < .001$. Patients <10 kg had significantly greater mean volumes of blood loss/kg/day compared to patients ≥10 kg, $p < .001$.

Conclusion: Blood drawn in excess of phlebotomy requirements exceeds the blood volume loss drawn for phlebotomy by two fold. Using indwelling catheters for phlebotomy often requires a discard volume to be drawn before obtaining the laboratory sample. Consolidating phlebotomy tests and using a closed system may decrease the amount of blood overdrawn and minimize overall phlebotomy-induced blood loss.