Determining the Minimum Discard Volume for Central Venous Catheter Blood Draws

Sheri Wyant, MSN, RN-BC, OCN®, and Rachael Crickman, MN, RN, AOCNS®, OCN®

Objective

This study aimed to determine the minimum discard volume from central venous catheters (CVCs) to avoid dilution or contamination from flush or IV fluids. In 93 adult patients with CVCs, minimum discard volume findings were 9 ml for tunneled and 6 ml for nontunneled catheters. Nurses who obtain samples from CVCs are uniquely positioned to minimize blood loss from sampling.

Methodology

At an urban, tertiary teaching hospital in 2005, the laboratory staff observed a high rate of blood sample rejection because of contaminated samples drawn by RNs. In this article, contamination is defined as residual IV fluid or flush within the blood sample. The highest frequency reported in the hospital was from central venous catheters (CVCs). The common contributing factors were variable discard volumes (5–12 ml) and inconsistent nursing practice for blood sampling from CVCs. However, limited research was available on optimal blood sampling methods from CVCs in adults. The hospital at that time had a patient safety goal to reduce the rate of rejected blood samples with redraws to 0.3% or lower—the College of American Pathologists reported top performance among hospital laboratory blood sample rejection rates as 0.3% in 1997 and 0.28% in 2000 (Zarbo et al., 2002).

Literature and Guidelines

Relevant literature includes three methods of blood sampling: discard, push-pull (mixing), and reinfusion (Almandrones, Goldbold, Raf, & Ennis, 1987; Clemence, Walker, & Farr, 1995; Franson, Ritch, & Quebbeman, 1987; Frey, 2003; Holmes, 1998; MacGeorge, Steeves, & Steeves, 1988; Mayo, Dimond, Kramer, & Horne, 1996; Odum & Drenck, 2002; Wannimolruk & Murphy, 1991). Only one study tested discard volumes of 3–6 ml for complete blood counts and electrolytes, 3–5 ml for drug levels, and 10–25 ml for coagulation tests (Almandrones et al., 1987; Franson et al., 1987; Holmes, 1998; Mayo et al., 1996; Odum & Drenck, 2002; Wannimolruk & Murphy, 1991). Only one study tested discard method in all three types of CVCs (implanted ports, tunneled lines, and non-tunneled lines) (Holmes, 1998).

Most guidelines and standards for discard volume from CVC blood draws recommend a flush of CVCs prior to laboratory specimen collection. The discard volume recommendations vary by (a) the dwell volume multiplied by a...