EVIDENCE-BASED PRACTICE (EBP) GUIDELINE

Drawing Labs from Peripheral IV Sites

CLINICAL PRACTICE

Occasionally, nurses perform phlebotomy through new or established intravenous lines. Because the laboratory reported a higher incidence of hemolysis in samples obtained in the Emergency Department for chemistry and coagulation studies, the Nursing Research Council began investigating this practice. This higher rate of hemolysis was attributed to the ED practice of obtaining blood samples through IV catheters. This problem may be wider spread as in a review of a random month of housewide lab data in 2003 revealed that 80% of rejected lab samples were due to hemolysis.

In a survey of this practice at United Hospital in 12/03, 51% of the nurses who responded (N=215) stated they drew labs from either a new or an established IV line. While this practice may be employed to reduce the number of sticks for a patient, it is also associated with a higher incidence of hemolysis. Higher rates of hemolysis can then lead to delays in patient diagnosis and treatment, potentially affecting length of stay, while labs are redrawn and analyzed. In addition, this practice may potentially dislodge the IV in the process, leading to the need to restart the IV and again further delaying treatment.

REVIEW OF EVIDENCE

1. United Hospital Policy
   The United Hospital Infection Control Core Policy and Procedure states "blood specimens shall not be withdrawn through intravascular lines, except from vascular access devices and tunneled lines" (p. 10).

2. IV Nurses Society Standards
   The Intravenous Nurses Society's standards do not support the practice of drawing blood specimens from peripheral IV lines.

3. Manufacturer's Guidelines (Becton-Dickinson and Co.)
   IV catheter material consists of soft plastic. This material stays open under positive pressure of IV fluids or medication delivery. However, the soft plastic can collapse under the negative pressure of drawing blood, causing turbulence and hemolysis. In addition, a fibrin sheath also begins to develop as the IV catheter is exposed to blood. This sheath allows infusion into the vein but closes over the catheter tip under negative pressure associated with aspiration which can disrupt the integrity of the IV access.

4. Research Studies
   Eight studies have investigated the effect of blood drawing techniques and equipment on hemolysis rates.[1-2] In these studies, multiple factors were significantly associated with increased rates of hemolysis and test cancellation compared to venipuncture using a straight needle. These factors included:

EQUIPMENT FACTORS	*TECHNICAL FACTORS*
• Plastic IV catheter hub (p=.01)	• Right antecubital, hand or forearm sites (p<.05)
• Smaller IV catheter gauges (20-22G)	• Drawing during IV start (p=.001)

(p=.05)	
• Use of Vacutainers (p=.02)	• > 2 tries for IV placement (p<.05)
• Larger lab tubes (6-10 ml) (p=.05)	• Difficulty drawing blood (p<.05)
• Blue lab tubes (p=.05)	• Filling tube < ½ full (p=.01)
	• Too vigorous drawing with syringe
	• Too forcibly putting blood into tube via syringe

The combination use of an IV catheter and Vacutainer caused increased hemolysis compared to the use of an IV catheter and syringe in one study.[4]

The evidence from the literature, nursing standards and manufacturer's guidelines provides **Class IIa** evidence. More investigation is indicated.

EBP RECOMMENDATION

A. Blood samples should NOT be drawn during IV starts or from established IV catheters except for patients on thrombolytics (to reduce number of sticks), or in an emergency.

B. Peripheral lab samples should be obtained using a straight needle and either the Vacutainer or syringe method. Straight needles are preferred over butterfly needles because the needle provides a smooth solid inner lumen surface that is unaffected by drawing pressure.

REFERENCES

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Levels of Evidence

Class of EBP Recommendation	Criteria	Clinical Definition
Class I Definitely recommended	Supported by **excellent** evidence, with **at least 1 prospective randomized, controlled trial.**	**Class I** interventions are always acceptable, safe & effective. Considered definitive standard of care
Class IIa Acceptable & useful	Supported by **good to very good** evidence. Weight of evidence and expert opinion strongly in favor.	**Class IIa** interventions are acceptable, safe & useful. Considered intervention of choice by majority of experts.
Class IIb Acceptable & useful	Supported by **fair to good** evidence. Weight of evidence and expert opinion not strongly in favor.	**Class IIb** interventions are also acceptable, safe and useful. Considered optional or alternative interventions by majority of experts.
Indeterminate Promising, evidence lacking, immature	Preliminary research stage. Evidence: **No harm but no benefi**t. Evidence insufficient to support a final class decision.	**Indeterminate**: Describes treatments of promise but limited evidence.
Class III May be harmful; no benefit documented	Not acceptable, not useful, **may be harmful**.	**Class III** refers to interventions with no evidence of any benefit; often some evidence of harm