Hemolysis of Blood Specimens: Increasing Throughput Time In The Emergency Department?

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Purpose

Due to overcrowding in the Emergency Department, (ED) patient throughput flow is a hot topic. To enhance efficiency of patient flow, nurses often perform phlebotomy via a newly established intravenous (IV) site, to reduce the number of patient venipunctures when blood specimen and IV therapy is ordered. (Burns & Yoshikawa, 2002).

SOMC’s ED nurses noted an increased incidence of hemolysis of blood specimens after adopting the practice of nurses obtaining blood specimens via a newly established IV site.
Purpose

Hemolysis: the breakdown of red blood cells resulting in the release of hemoglobin; can be due to mechanical trauma (Mosby, 2002)

“Average Throughput Time” is an ED service indicator and Magnet indicator

Benchmark: 2.6 hours

SOMC ED: Average for Fiscal Year 2011 as of September was 2.9 hours
Purpose

The purpose of this study was to determine if there was a significant difference in the proportion of hemolysis of blood specimens obtained from a newly inserted IV using a 20 g Advant IV safety catheter and blood specimens obtained from a 21g-23g straight needle venipuncture.
Setting

Study conducted in Level 2 ED of a 220-bed community teaching Appalachian hospital, located in Southern Ohio.

ED has approximately 53,000 annual visits.
Design

Non-experimental Quantitative Descriptive Design

- No manipulation of variables
- Review of hemolysis log
- Describe method of specimen collection/hemolysis
Subjects

Convenience sample of 100 hemolyzed blood samples drawn in the ED January, 2009- November 2009. \((N = 101 \text{ were recorded})\)

Exclusions

- Any ED patient under the age of 18
- Dialysis patients
- Mastectomy patients

Obtained approval from institutional IRB
Methods

Specimen Collection

Randomly selected **ED nurses** with 2 or more years of ED experience: **IV site draw**

Randomly selected **ED techs II** with 2 or more years of ED experience: **Venipuncture**

**ED lab techs** maintained record of all hemolyzed blood specimens drawn until N=100 (total of 101 were recorded).
Methods

Blood specimens were analyzed for hemolysis using a Hitachi automated spectrophotometer and visual inspection by the lab technologist.

Hemolyzed specimens were stratified according to method of specimen retrieval:

- Group A = Veinipuncture
- Group B = IV Site

Chi-Square, SPSS
Results

Of the 101 hemolyzed specimens, 65 (64.4%) were drawn by newly placed 20 g IV catheter, while 36 (35.6%) were drawn by 21 – 23 g venipuncture needle. There was a significant difference in the proportion of hemolysis in the two specimen collection methods

$\chi^2 (1, \, N = 101) = 8.327; \, p < .01$
Implications

A decreased hemolysis rate would result in improved ED throughput, reduced length of stay for the patient, fewer recollections (saving in both time and materials), and better patient satisfaction. (Running a hospital: Fixing bad blood tests website November, 2008).

Hemolysis can affect the patient’s length of stay in the ED setting due to delay in diagnosis and treatment while blood specimens are collected and analyzed again (Halm & Gleaves, 2009).
Implications

- IV Nurses Society Standards do not support the practice of drawing blood specimens from peripheral IV lines (Nursing Research Council of United Hospital, 2004)

- Policy developed for SOMC named Obtaining Blood for Lab Specimens
  - Lack of consistency in method of IV blood draw (site selection, discard/no discard spec, sequence of tube selection)
Implications

As this study was in process, systematic review of literature was published supporting venipuncture as best practice for collecting blood samples, (Halm & Gleaves, 2009) supporting findings of this study and strengthening researchers’ recommendations.

Recommend: SOMC ED develop an evidence based practice protocol regarding blood draws only to be obtained via venipuncture or arterial stick, not from newly started or established peripheral IV.
Obtaining Blood for Lab Specimens Policy in the Emergency Department

- Policy effective date was June 1, 2010
- Staff members received education in shift briefings from Assistant Nurse Managers
- All blood draws are to be done by venipuncture
Collaborative Effort

- Southern Ohio Medical Center
- Shawnee State University
- Ohio University Centers For Osteopathic Research And Education (CORE)
References


Cox, S., Dages, J., & Hazelett, S. (2004). Blood samples drawn from iv catheters have less hemolysis when 5-ml (vs. 10-ml) collection tubes are used. Journal of Emergency Nursing. 30(6), 529-33.


Questions?