



#IVTEAM #Intravenous literature: Wollowitz, A., Bijur, P.E., Esses, D., John Gallagher, E. (2013) Use of Butterfly Needles to Draw Blood Is Independently Associated With Marked Reduction in Hemolysis Compared to Intravenous Catheter. *Academic Emergency Medicine*. 20(11), p.1151-1155.

Abstract:

**OBJECTIVES:** Hemolysis of blood samples drawn in the emergency department (ED) is a common problem that can interfere with timely diagnosis and appropriate treatment. The objective of this study was to identify the smallest number of remediable factors that independently increases the risk of hemolysis to design an effective strategy to address this issue.

**METHODS:** This was a prospective, observational, cross-sectional study of blood specimens obtained by ED staff in an urban, academic, adult ED in a tertiary care center. The staff member who drew the specimen recorded data on a standardized data collection instrument about device (intravenous [IV] catheter or butterfly needle), needle size, anatomic site, fullness of collection tube, tourniquet time, and difficulty of venipuncture. Specimens were sent to the laboratory by a vacuum-powered tube system. A standard automated process that measures free hemoglobin was used to identify hemolysis. A multivariable logistic regression and a tabular analysis stratified by device were performed. Ninety-five percent confidence intervals (CIs) were calculated around the odds ratios (ORs) and around the difference between hemolysis rates.

**RESULTS:** Data were collected on 5,118 blood specimens. There were 4,513 specimens with complete data on all characteristics of the blood draw included in the analyses. The overall hemolysis rate was 12.5% (95% CI = 11.6% to 13.5%), 14.6% in blood drawn from IV catheters and 2.7% from butterfly needles (difference = 11.9%; 95% CI = 10.2% to 13.4%). Device was the strongest independent predictor of hemolysis (OR = 7.7; 95% CI = 4.9 to 12.0). In specimens drawn by IV catheter, hemolysis was significantly higher when blood was drawn from locations other than the antecubital fossa, with small-gauge catheters, collection tubes  $\leq$  half full, tourniquet time  $\geq$  1 minute, and difficult venipuncture. In contrast, none of these factors was associated with hemolysis when blood was drawn by butterfly needle.

**CONCLUSIONS:** The device used to collect blood was the strongest independent predictor of hemolysis in blood samples drawn in the ED in this study. This finding suggests that the most effective strategy to reduce the rate of hemolysis in the ED is to use butterfly needles for phlebotomy rather than IV catheters.

