Blood loss from lab testing associated with hospital-acquired anemia for patients with heart attacks

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In patients with acute myocardial infarction (heart attack), blood loss from greater use of phlebotomy (blood drawn for diagnostic testing) appears to be independently associated with the development of hospital-acquired anemia (HAA), according to a report published Online First by *Archives of Internal Medicine,* one of the JAMA/Archives journals. The article is part of the journal's Less Is More series.

Anemia (low red blood cell count or low hemoglobin level) is associated with greater mortality and worse health status in patients with AMI, whether the condition is chronic (present at hospital admission) or hospital-acquired, according to background information in the article. However, HAA may be preventable if strategies to reduce blood loss in high-risk patients are implemented. Among the factors that may be associated with HAA is blood loss from diagnostic phlebotomy, which has been associated in other patient populations with in-hospital declines in hemoglobin level and need for blood transfusion. "Blood loss from phlebotomy could be an actionable target for intervention," write the authors.

Adam C. Salisbury, M.D., M.Sc., from Saint Luke's Mid America Heart and Vascular Institute, Kansas City, Mo., and colleagues analyzed data from the Cerner Corp.'s Health Facts database. Records selected from January 2000 through December 2008 included 17,676 patients who were admitted with AMI and no anemia from 57 hospitals. To measure blood loss, the researchers identified all phlebotomy events in patient records. They determined, by the laboratory tests ordered, which type of hematology tubes were used and the blood volume each held. Then, for every patient, the researchers multiplied these blood volumes by the number of tubes of each type that were collected during hospitalization. They also calculated the mean (average) blood drawn for every 24 hours of hospitalization and the mean phlebotomy volumes for each of the first 10 days of hospitalization.

About 20 percent of patients (n = 3,551) developed moderate to severe HAA. Estimates of the mean blood loss from phlebotomy for these patients (173.8 milliliters [mL]) were almost 100 mL higher than estimated blood loss in patients who did not develop moderate to severe HAA (83.5 mL) over the course of the hospitalization. The volume of diagnostic blood drawn was associated with developing moderate to severe HAA. The relative risk for developing HAA increased by 18 percent for each 50 mL of blood drawn; the relationship persisted when researchers adjusted the data for site and potential confounders. The average volume of blood drawn varied significantly across hospitals.

"In conclusion, blood loss from phlebotomy is substantial in patients with AMI, varies across hospitals, and is independently associated with the development of HAA," write the authors. "Studies are needed to test whether strategies that limit both the number of blood draws and the volume of blood removed for diagnostic testing can prevent HAA and improve clinical outcomes in patients with AMI."

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