Unnecessary blood transfusion in acute coronary syndrome: Sometimes less is more

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We all do it, and we all know it. This is a case of an eighty-year-old gentleman with past medical history of hypertension, diabetes mellitus, hypercholesterolemia and rheumatoid arthritis, who presented to our emergency department (ED) with complaint of chest pressure beginning in the morning on the day of presentation. “I was working in the garden, and suddenly felt pressure across my chest” said the patient, describing radiation of the pain to his right shoulder and back. He mentioned sweating profusely and having some difficulty breathing. I realized that this elderly male needed further workup emergently, and an EKG was obtained in the ED – It showed ST segment elevations in the inferior leads.

At the time of admission hemoglobin level was 8.2g/dL with hematocrit of 24.6%. He was admitted to our hospital a month ago for community acquired pneumonia and his hemoglobin level during time was in range of 8-9g/dl. A year ago his primary medical doctor for this low hemoglobin worked him up and he was found to have anemia of chronic disease (high ferritin and normal transferrin with normal MCV and MCHC) secondary to his past medical history of rheumatoid arthritis. During this admission serum studies confirmed an ST elevation myocardial infarction, and the patient was subsequently taken for emergent cardiac catheterization and underwent aspiration thrombectomy and right coronary artery stenting for acute right coronary artery occlusion. The following day, routine bloodwork showed hemoglobin level of 8.1g/dL with hematocrit of 24.4%; however, although he was asymptomatic and hemodynamically stable, he still received transfusion of one unit of packed red blood cells (pRBC).

Following the pRBC transfusion, the patient unexpectedly complained of shortness of breath. He was found tachypneic with worsening blood oxygen saturation levels, requiring supplemental oxygen administration via facemask. Pulmonary auscultation revealed presence of bilateral crackles and rales, more prominent at the lung bases. The intern obtained an arterial stick, and the blood gas confirmed the suspicion – hypoxemia with metabolic acidosis. The repeat cardiac enzymes were obtained, to rule out a subsequent MI, but results were negative. A bedside echocardiogram was also done to rule out cardiogenic shock (thought to be secondary to wall rupture or papillary muscle dysfunction), but the echocardiogram revealed no abnormalities. A chest X-ray was obtained which showed bilateral interstitial infiltrates with diffuse and confluent alveolar opacities on the lower two thirds of the lung fields.

The diagnosis of transfusion related acute lung injury (TRALI) was made and the patient required emergent intubation with administration of stress dose intravenous hydrocortisone. The patient responded to treatment and subsequently tolerated extubation within 48 hours, with chest X-ray showing clearing of bilateral lung fields. He was able to tolerate room air post-extubation.

Recent studies have shown that blood transfusion is associated with a higher risk of mortality, independent of baseline hemoglobin level, nadir hemoglobin level, and change in hemoglobin level during the hospital stay. American Association of Blood Banks does not support use of liberal blood transfusion for hemodynamically stable patients with acute coronary syndrome (ACS). While liberal blood transfusion strategy or use transfusion threshold > 11.0 g/dL for ACS might be associated with adverse outcomes, the transfusion strategies for ACS patients with low baseline hemoglobin remain unclear. In patients with acute blood loss anemia with PRBC transfusion undertaken at thresholds < 8.0 g/dl might be reasonable especially if there is reasonable clinical suspicion that acute anemia might have precipitated the acute coronary syndrome. However, due to lack of strong evidence American Heart Association/American College of Cardiology guidelines do not make firm recommendations regarding correction of anemia with packed red blood cell (PRBC) transfusion in patients with ACS.

Although this patient was hemodynamically stable (and notably recovering appropriately post procedure for his STEMI), he was exposed to an increased risk of blood transfusion without warranted indications. Health care practitioners often react to low hemoglobin levels with immediate desire to transfuse blood when this act is perhaps not medically necessary.

Transfusion-related acute lung injury (TRALI) is the most common transfusion-related cause of morbidity and mortality in the United States. It presents with symptoms of respiratory distress beginning, during, or up to six hours after transfusion. This patient started experiencing dyspnea almost immediately after the initiation of the blood transfusion and deteriorated rapidly due to the sudden development of pulmonary edema consistent with a diagnosis of TRALI. In the case presented here, despite the early development and rapid progression of symptoms, the patient had an expeditious and complete recovery of pulmonary function, with successful extubation achieved within 48 hours.

The present case emphasizes the importance of exercising judicious care when transfusing blood, as the inherent risks include more than just concern of transmission of blood-borne pathogens. Physicians should be very cautious when transfusing patients with acute myocardial infarction, especially for patients with chronic anemia in absence of active bleeding. However due limited clinical evidence, the benefits and risks of blood transfusion in ACS still need to be evaluated in a well-designed larger randomized control trial.
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