Do No Harm Project
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Story from the Front Lines:
An elderly man with a past medical history significant for type II diabetes, coronary artery disease status post remote PCI to right coronary artery, hypertension, anemia of chronic disease (baseline hemoglobin of 9-10) and GERD presented to the ER with a 3 day history of mid-sternal chest pressure.

He described the chest pressure as dull, burning, mid-sternal, and without radiation to his jaw, back or left arm. The pressure was not associated with any shortness of breath, dyspnea on exertion or nausea and did not change with position. He avoids spicy foods and coffee and felt the pressure improved with tums, omeprazole as well as sublingual nitroglycerin.

His vital signs were notable for a pulse of 72, blood pressure of 132/68, normal oxygen saturation rate of 92% with respiratory rate of 18. Admission labs were unremarkable other than elevated glucose of 225 and hemoglobin (hbg) of 8.5. His first troponin was 0.08 with a second troponin of 0.12. Sequential electrocardiograms (EKGs) showed old q waves in the inferior leads and new nonspecific ST wave abnormalities in the anterior leads. Given the patient's history of CAD and co-morbidities, the patient was admitted to medicine to evaluate his chest pressure further.

The patient had morning labs that were notable for Hbg of 7.5 and glucose of 215. His third troponin was 0.16. Our team discussed whether the patient would benefit from receiving a red blood cell transfusion (RBC-T) in the setting of his NSTEMI and acute on chronic anemia.

Teachable Moment:
Several studies have shown that a liberal approach with RBC-Ts may be more harmful than beneficial in comparison to a more restrictive approach in the critical care setting and in patients with ACS.

For example, the TRICC trial evaluated 838 critically ill patients and randomly assigned them to either a restrictive (transfuse for Hbg <7.0) or a liberal (transfuse for a Hbg <10.0) transfusion strategy and found a significant lower mortality rate during hospitalization in the restrictive strategy group (22.2% vs. 28.1%, P=0.05). (1)

Another retrospective study evaluated data on ~79,000 patients greater than 65 years of age who were hospitalized with acute MI and assessed the association between the use of transfusion and 30-day mortality. The study found that RBC-Ts were associated with a reduction in 30-day mortality in patients whose Hct on admission was between 5.0-24.0% (adjusted OR, 0.22; 95% CI, 0.11 to 0.45) but no reduction in those whose Hct was >33%. (2,3)

Another retrospective study using the CRUSADE initiative database evaluated ~85000 patients with NSTEMIs and sought to describe RBC-T rates in patients overall and in those who did not undergo CABG as well as the in-hospital outcomes in patients receiving RBC-Ts. The study found that 10.3% of the non-CABG population underwent RBC-Ts and had a greater risk of death (11.5% vs. 3.8%) and re-infarction (13.4% vs. 5.8%) in comparison to patients who did not receive RBC-Ts. (4)

Some evidence has shown that anemia is a powerful and independent predictor of major adverse CV events in patients with ACS. For instance, a study in 2005 evaluated ~39,900 patients and examined the association between baseline Hbg values and major adverse CV events through 30 days. The study found that in patients with NSTEMIs, the likelihood of CV death, MI, or recurrent ischemia

increased as the Hbg fell below 11 g/dL (adjusted OR of 1.45 (95% CI 1.33 to 1.58, P<0.001) for each 1 g/dL decrement in Hbg). (5)

Despite the aforementioned information, the current literature does not demonstrate good evidence on RBC-T thresholds in patients with NSTEMIs. In addition, physicians must remember that transfusions carry a risk for minor AEs (ie. febrile non-hemolytic reactions, urticaria) and life-threatening AEs (ie. anaphylaxis, transfusion associated circulatory overload, transfusion related acute lung injury). (6) At this time, more evidence seems to be leaning towards a more restrictive approach for RBC-Ts in patients with ACS, including NSTEMIs.

References

1. Hebert PC, Wells G, Blajchman MA, et al. A Multicenter, Randomized, Controlled Clinical Trial of Transfusion Requirements in Critical Care. NEJM 1999; 340(6): 409-17.
2. Wu W, Rathore SS, Wang YW, et al. Blood Transfusion in Elderly Patient with Acute Myocardial Infarction. N Engl J Med 2001; 345(17):1230-36.
3. Rao SV, Jollis JG, Harrington RA, et al. Relationship of blood transfusion and clinical outcomes in patients with acute coronary syndromes. JAMA 2004;292:1555-62.
4. Yang X, Alexander KP, Chen AY, et al. The Implications of Blood Transfusions for Patients with Non-ST-Segment Elevation Acute Coronary Syndromes: Results from the CRUSADE National Quality Improvement Initiative. JACC 2005;46(8):1490-95.
5. Sabatine MS, Morrow DA, Giugliano RP, et al. Association of hemoglobin levels with clinical outcomes in acute coronary syndromes. Circulation 2005; 111(16):2042-9.
6. Hebert PC, Yetisir E, Martin C, et al. Is a low transfusion threshold safe in critically ill patients with cardiovascular diseases? Crit Care Med 2001;29:227-34.

https://www.radcliffecardiology.com/articles/variations-use-blood-transfusion-patients-coronary-artery-disease

Guidelines:

Authors: Less than 3

Format: Around 600-800 words, including a clinical vignette headed "Story from the Front Lines" and a summary of the clinical issues headed "Teachable Moment"

- An engaging story with enough clinical information for readers to understand the clinical issues
- A succinct summary of the clinical issues, stating the evidence for over-testing or over treatment and suggesting an alternative approach

References: Less than 5