Acute hypoxia from a potentially preventable cause

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Story from the front lines

An elderly woman with a history of CLL, COPD with a baseline 2-4L O2 requirement was admitted to the hospital for bacteremia due to MSSA. Her course had been complicated by septic emboli to the kidneys and brain as well as endopthalmitis, and delirium. Due to her CLL she was chronically anemic with baseline hemoglobin between 7 and 8. Her blood counts, renal function, and liver function had stabilized and she was recovering appropriately on continuous cefazolin and was awaiting placement, which was taking longer than usual since she was not from the area.

Over the course of a week, placement in a skilled nursing facility was arranged and the patient was set for discharge. In that time daily labs were checked despite her frustration with the discomfort of daily venipuncture. Her hemoglobin slowly down trended over the week and on the final day she had hemoglobin of 6.9. As her hemoglobin was less than 7 she was consented and transfused 1 unit of red blood cells in order to prevent immediate re-hospitalization upon discharge to the skilled nursing facility. Two hours later she was acutely hypoxemic and required an increased oxygen requirement to 8L. Her chest x-ray showed pulmonary edema however she had no evidence of volume overload and she was diagnosed with transfusion associated lung injury (TRALI). Over the next two to three days she returned to her baseline oxygen requirement and was ultimately able to discharge to a skilled nursing facility.

Teachable Moment

Three teachable moments exist in this scenario; including patient preference, avoidable phlebotomy and the most importantly the benefits and harms of blood transfusions for chronic anemia.

The first two problems coexist. Patients should have the autonomy to choose if and when they have procedures even as simple as blood draws performed. This patient was becoming frustrated with daily blood draws mostly due to discomfort. However they continued, perhaps unnecessarily, given the patient's labs had been stable for several days and was clinically improving. Different options exist to help reduce the pain associated with insertion of peripheral IVs however these are not commonly used with standard venipuncture for phlebotomy purposes.[1,2].

Additionally, these tests, especially when stable, are unlikely to impact clinical management and can lead to adverse downstream events such as further testing, tranfusions and patient discomfort.[3]

Finally, this patient was transfused for a chronic anemia and a one time hemoglobin of less than 7 to prevent readmission if testing at the SNF still showed a hemoglobin less than 7. The choice to transfuse was made based on the TRICC trial and subsequent trials which have since established more conservative transfusion thresholds. [4] However, this was better established for patients with critical illness, which was not the case in our patient and she likely would not have had a difference in her outcome had we held off on transfusion.

Additionally, while the risk of TRALI has been reported as high as 1% in many studies, it has been noted to be even higher in high risk populations similar to our patient. She had a history of COPD with a baseline oxygen requirement, CLL making her immunocompromised and a systemic infection due to her bacteremia.[5] These factors as well as her chronic anemia suggest here transfusion may have been avoidable and should be considered in similar cases in order to potentially prevent adverse outcomes associated with blood transfusions.

Sources:

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3) Iams, W et. al. A multidisciplinary housestaff-led iniative to safely reduce daily laboratory testing. *Acad Med* 016 Jun;91(6):813-20.
4) Hebert, P.C.; Wells, G. et. al. A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. *NEJM.* 340(6) Feb 11, 1999.
5) El Kenz H and Van der Linden, P. Transfusion-related acute lung injury. *Euro j Anesth.* Volume 31(7), July 2014, p 345–350.