ANEMIA TOLERANCE IN HIGH-RISK CARDIAC PATIENTS

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In the past, anemia in the perioperative period has been treated by red blood cell (RBC) transfusions relatively uncritically. RBC transfusions were believed to increase oxygen delivery by increasing hemoglobin concentration. Arbitrary transfusion triggers such as the "10/30 rule" (i.e., RBC transfusion indicated below a hemoglobin (Hb) concentration of 10 g/dL or a hematocrit of 30%) were applied. However, there is now increasing evidence that RBC transfusions are associated with adverse outcomes and that moderate isovolemic haemodilution (up to Hb levels of 9g/dl) is well-tolerated in elderly patients as well in those with coronary artery diseases and aortic diseases during anaesthesia. In the perioperative period and the intensive care settings, blood transfusion products are often unnecessarily administered and are considered as independent risk factor for infection and mortality.

The physiology of oxygen delivery and clinical data indicate little need to transfuse patients with a haemoglobin of 10 g/dL or higher. Experimental data suggest that hematocrit level in the range of 30-33% represents the best combination of cardiac output and haematocrit in healthy animals and humans. Patients with a haemoglobin level below 6 g/dL are usually at substantial risk, particularly if postoperative or gastrointestinal bleeding is a possibility. Between 8 g/dL and 10 g/dL, the risk of hypoxic organ damage is low for most patients, except for those with end-organ dysfunction (e.g., heart failure, CAD, renal insufficiency, stroke). In critically-ill patients, a restrictive blood transfusion strategy (threshold at 7g/dl) has been shown to reduce markedly the utilization of blood components while decreasing the incidence of cardiac complications, compared with a liberal transfusion approach (transfusion threshold at 10g/dl).

The decision to transfuse red cells should be made in conjunction with analysis of the circulatory blood volume, assessment of pulmonary, cardiovascular, and cerebrovascular status as well as appraising the duration of anaemia and likelihood of unexpected acute
blood loss. Although no convincing evidence exists to indicate that mild-to-moderate anaemia contributes to morbidity, neither has any transfusion algorithm proved better than the judgment of a skilled physician at the bedside. Better understanding of microcirculatory control and sensitive measures of tissue hypoxia promises to provide a more objective basis for initiating, continuing, or discontinuing RBC transfusion. Moreover, knowing the compensatory mechanisms during acute anemia is crucial. This review focuses on acute anemia tolerance, its limits, and physiologic transfusion triggers in the perioperative period.