ICU
MANAGEMENT & PRACTICE

Restrictive vs Liberal Transfusion Strategy in Acute Brain Injury

The indications for red blood cell transfusions in critically ill patients without life-threatening bleeding are debated, particularly due to the balance between risks and benefits. While anaemia is linked to increased morbidity and mortality, blood transfusions can also lead to complications such as infection or lung injury. Several randomised clinical trials in critically ill patients have suggested that a restrictive transfusion strategy (using a lower haemoglobin threshold) is as safe and effective as a more liberal approach (using a higher threshold). However, these studies did not specifically address patients with acute brain injuries.

Observational studies in patients with traumatic brain injury (TBI) or subarachnoid haemorrhage indicated that haemoglobin levels below 9 g/dL were associated with poorer outcomes, leading some to suggest that a more liberal transfusion strategy could improve oxygen delivery to the brain. However, transfusions also increased the risk of complications and mortality, and these studies did not establish an optimal haemoglobin threshold for transfusions.

Studies comparing transfusion strategies in brain-injured patients have had mixed results. Some found no significant differences in neurological outcomes between restrictive and liberal strategies, while others noted increased thromboembolic events with higher thresholds. One trial showed a higher mortality rate with a restrictive strategy, though a larger trial showed a slight, non-significant improvement in outcomes with a liberal approach.

Given the uncertainty surrounding optimal haemoglobin levels for transfusion in brain-injured patients, the Transfusion Strategies in Acute Brain Injured Patients (TRAIN) trial was initiated to assess the impact of different haemoglobin thresholds on neurological outcomes in ICU patients with acute brain injuries.

This clinical trial conducted across 72 intensive care units in 22 countries. It involved patients with traumatic brain injury, aneurysmal subarachnoid haemorrhage, or intracerebral haemorrhage. To be eligible, patients had to have haemoglobin levels below 9 g/dL within the first 10 days after injury and an expected ICU stay of at least 72 hours.

A total of 850 patients were randomly assigned to either a liberal transfusion strategy, where transfusions were triggered when haemoglobin levels dropped below 9 g/dL (n = 408), or a restrictive transfusion strategy, with transfusions triggered at haemoglobin levels below 7 g/dL (n = 442), over a 28-day period.

The primary outcome of the study was the occurrence of an unfavourable neurological outcome, defined as a Glasgow Outcome Scale Extended score between 1 and 5 at 180 days post-randomisation. Fourteen prespecified serious adverse events were monitored, including cerebral ischaemia occurring after randomisation.

In the liberal transfusion strategy group (n=393), patients received a median of 2 units of blood, while the restrictive strategy group (n=413) received a median of 0 units. At 180 days post-randomisation, 62.6% of the liberal strategy group had an unfavourable neurological outcome, compared to 72.6% in the restrictive strategy group. The effect on neurological outcomes was consistent across subgroups. The liberal strategy group had fewer cerebral ischaemic events (8.8%) than the restrictive strategy group (13.5%).

Overall, these findings show that patients with acute brain injury and anaemia who were randomised to a liberal transfusion strategy had a lower

likelihood of experiencing an unfavourable neurological outcome compared to those randomised to a restrictive transfusion strategy.

Source: JAMA
Image Credit: iStock

Published on : Mon, 14 Oct 2024