

# JOURNAL CLUB: TRICS III – 6 MONTH OUTCOMES

## Restrictive or Liberal Red-Cell Transfusion for Cardiac Surgery and Six-Month Outcomes

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### STUDY QUESTION:

In patients undergoing cardiac surgery, who have a moderate-to-high risk of death, is a restrictive transfusion strategy (trigger = 75 g/L) non-inferior to a liberal strategy (Trigger = 95 g/L intraoperatively/ICU or 85 g/L on the ward) with respect to a composite outcome of death, myocardial infarction, stroke and acute kidney injury requiring dialysis at 6 months after surgery?

### HOW DOES THIS RELATE TO OUR PRACTICE ON NCCU?

The most common situation leading to massive transfusion is cardiac surgery, but trauma, where physical injury and blood loss combine, remains the best-studied example and trauma patients are the other large group of patients consuming large amounts of red cells.

We currently follow the NICE guidelines for red blood cells transfusion which sets a threshold of 70 g/L and a hemoglobin concentration target of 70–90 g/L after transfusion (for patients with acute coronary syndrome, the trigger is 80 g/L and the hemoglobin concentration target is 80–100 g/L after transfusion). Our local TBI protocol sets a threshold of 90 g/L. This does not apply to major haemorrhage, history of acute coronary syndrome or chronic anaemia.

Trauma patients in need of the major haemorrhage protocol are transfused in the Emergency Department, aiming for a haemoglobin concentration target above 80 g/L. However the suspicion of major haemorrhage is not based on haemoglobin concentration, but instead on the mechanism of injury and the vital signs.

### WHAT DO WE CURRENTLY KNOW ABOUT THIS AREA?

At present most centres are using the 2017 EACTS/EACTA Guidelines on patient blood management for adult cardiac surgery (or something very close to that). In addition, we need to find a balance between optimal patient care and the appropriate use of a limited resource.

The two approaches to blood transfusion currently are:

- The **restrictive** approach, which is based on limiting the infectious and non infectious (TRALI, pulmonary oedema, multiorgan system dysfunction etc.) risks of transfusion
- The **liberal** approach, which is based on the fact that patients who are at high perioperative risk may be more susceptible to anaemia-induced tissue hypoxia

### **When it comes to the brain.....the evidence is conflicting!**

There is clear clinical and guideline agreement that Hb less than 70 g/L in critically ill patients with TBI requires red blood cell transfusion (RBCT). However, the exact threshold between 70 and 100 g/L remains a contentious issue. Recent data from a randomized controlled trial (RCT) and meta-analysis found no difference in neurological outcome between the restrictive and liberal transfusion strategies, but the overall quality of the evidence was low. Several observational studies have shown an association between anemia and poor outcomes in patients with TBI. However, other studies evaluating anemia and TBI outcomes have not demonstrated a consistent risk of harm (see further reading section).

Additionally, several studies have shown that RBCT administration in TBI is associated with increased mortality, decreased functional outcomes, increased ICU length of stay, and impaired cerebral autoregulation. A liberal transfusion strategy applying a threshold trigger of 100 g/l was associated with an increased risk of progressive cerebral hemorrhagic injury and thromboembolic events. However, evidence from other observational studies in patients with TBI is conflicting, with data to support a lack of association between RBCT administration and worse outcome in TBI.

### **WHY WAS THIS STUDY NEEDED?**

Patients undergoing cardiac surgery often have significant transfusion requirements and there is wide variation in transfusion practices among clinicians and institutions. Robust evidence has emerged in other patient populations (general critical illness, septic shock, etc) that a restrictive transfusion strategy is at least as good as (and possibly better than) a liberal one. If a restrictive strategy is shown to be noninferior to a liberal one, and this can influence practice, there is the potential for significant cost savings and decreased use of a scarce and limited resource.

### **AT JOURNAL CLUB WE SHOULD DISCUSS THE FOLLOWING:**

- Should we compare transfusion practices in cardiac surgery with those in trauma and TBI?
- Transfusion thresholds for trauma and TBI. We aim for higher than other critically ill groups. Why? Do latest studies agree with that?
- This study is unusual in that it is about patients at a higher risk of death and other complications than some of the other studies.
- It also shows that a RCT overturned TITRe2

- It focuses on transfusion of red blood cells only
- No data exists for transfusion and TBI. How would data like CENTER-TBI answer this question in TBI?
- How often do we ignore guidelines and stick to personal experience or instincts?

## **SHOULD WE CHANGE PRACTICE ON NCCU**

We are already following a rather restrictive strategy when it comes to transfusing red blood cells, so we are probably going to the right direction according to this study. Furthermore, we base our practice on a multivariable approach that includes fluid resuscitation and coagulopathy.

Maybe we should wait for the next big “transfusion in trauma” or “transfusion in TBI” study focusing on non-inferiority of restrictive transfusion strategy and then check how cost/effective is our practice. In any case, excessive concern about cost-effectiveness shouldn't change our approach to cases where we highly suspect major haemorrhage: We should have a low threshold for transfusion.

## **FURTHER READING**

The Bottom Line

Hematology Times

EuroSCORE I

Transfusion practices in traumatic brain injury

Variation in blood transfusion and coagulation management in TBI at the ICU

RBCT in Patients With TBI: A Systematic Review and Meta-Analysis