There are over 50,000 cardiac surgical procedures conducted in Canada yearly and red cell transfusion rates for cardiac surgery patients are the highest amongst all surgical specialties accounting for 16% of all red cell transfusions. In a retrospective study of seven Canadian centres, which included 11,812 cardiac surgical patients 44% of patients received one or more red cell units, and the range of patients transfused was 28% to 60%. In Ontario, for the year 2006/2007, red cell transfusion rates also ranged from 20% to 68%.

This widely variable transfusion rate for patients undergoing cardiac surgery is also seen internationally and ranges from 9% to 100%. Although the variability may be due to patient factors, previous reports have shown that this variation in transfusion is largely attributable to individual physician practice, highlighting the clinical equipoise in selecting hemoglobin concentrations for transfusion and the difficulty in conducting studies in these patients as conviction regarding optimum transfusion thresholds will affect compliance with transfusion strategies. It is not known at what degree of anemia transfusion of red cells will improve oxygenation and it is not known when the risks of anemia outweigh the risks of transfusion.

It is critically important to determine at what hemoglobin concentration physicians should be transfusing these patients since 1) anemia and transfusions are independent predictors of morbidity and mortality in this patient population, 2) existing evidence and expert opinion suggest that as many as 15% to 60% of such patients receive unnecessary transfusions, and 3) optimizing red cell utilization is necessary at times when periodic shortages of blood occur and may result in surgeries that are delayed.

We thus conducted a large multicentre centre trial of two transfusion strategies in 208 patients (9 Canadian sites, 1 American site and 1 site in Malaysia) (NCT01484639) (TRICS II), which was funded by the Canadian Institutes for Health Research. The primary objectives were to determine enrolment rates and adherence rates to the specified transfusion triggers, and the secondary objectives included clinical outcomes such as mortality renal, cardiac, neurological and infectious adverse events; and to determine the proportion of blood products utilized (red cells, platelets and plasma). Patients were included if they had cardiac surgery with cardiopulmonary bypass and a EuroSCORE ≥ 6, and excluded if they refused participation, were unable/ or refused blood transfusion, had undergone autologous predonation or had a predicted HCT on CPB >33% or < 18%. Patients were randomized to either a Restrictive transfusion strategy (≤ 7.5 g/dL from start of surgery until the earliest of hospital discharge or 28 days postop) or a Liberal strategy (≤9.5 g/dL intraoperatively and in ICU; <8.5 g/dL after transfer to ward until discharge or day 28). Enrolment began in January 2012 and was completed in November 2012 (9 months ahead of schedule). Protocol adherence was consistent with the target of 80% overall. Patients in the Restrictive group received significantly less transfusion than the Liberal group. Blinded outcome analysis did not demonstrate significant differences between groups although some numerical differences appeared to be present. This trial has formed the basis for a global multicenter trial of Transfusion Triggers in Cardiac Surgery (TRICS III) which hopefully will begin in late 2013. Interested sites are encouraged to contact the authors above for more information.

References: