Pratyush Gupta¹, Achal Dhir¹

1. Anesthesia, London Health Science Center, UWO, London, ON, Canada

Purpose: Adapt a novel technique to prevent transfusion related hyperkalemia in anuric patients undergoing liver transplant surgery, thereby enhancing patient safety.

Clinical Features: “A written informed consent to use information for medical educational purpose was obtained preoperatively”.

Transfusion of massive quantities of blood intraoperatively may result in dangerously high levels of serum potassium. The stored RBC units may contain more than 20meq/L of potassium. Use of old banked blood, irradiated blood or rapid rate of administration via rapid transfusion devices contributes to hyperkalemia during blood transfusion. Conditions such as acidosis, hypothermia, hyperglycemia, hypocalcemia and low cardiac output may further increase the risk of potassium cardiotoxicity1. In addition, unclamping of portal vein at the start of reperfusion in a liver transplant surgery may be associated with marked acidemia and hyperkalemia. Interventions exist to facilitate redistribution of potassium in blood, but none of these primarily prevent the rise of potassium. Post-reperfusion syndrome (PRS) as evidenced by severe cardiovascular dysfunction, bradyarrhythmias and cardiac arrest, decreased mean arterial pressure and systemic vascular resistance, along with an increased mean pulmonary artery pressure and central venous pressure still remains a major complication in liver transplantation. The etiology of this syndrome has been attributed to acute acidosis, hyperkalemia, and hypothermia2. Its incidence in Orthotopic liver transplant varies from 8-30%, with a significant detrimental effect on patient and allograft outcome. We report a case of status 4 patient, with polycystic liver-kidney disease, posted for a combined liver and kidney transplant. Massive blood transfusion at unpredictable rate during dissection phase meant an extra load of potassium for already anuric kidneys. This could cause severe metabolic derangement, thus predisposing the patient to PRS and an unfavorable outcome. We used the Fresenius Kabi ‘Continuous Auto Transfusion System’ (CATS) to wash the RBC units obtained from blood bank. Two units of packed cells were passed together in High Quality wash cycle of ten minutes each time. This helped reduce prewash potassium from 11.3 meq/L to a post wash content of 0.6 meq/L. A total of 20 units of RBCs were transfused. Most importantly, the post perfusion potassium rise was only 0.7 meq/l (2.8 preclamp-3.5 post clamp release). Hence, use of washed RBCs helped reduce the potassium load in allogeneic blood and was not associated with life threatening metabolic derangement, hemodynamic instability or PRS.

Conclusion: We advocate the use of washed RBCs through CATS, when massive blood transfusion requirements may threaten metabolic derangement and pose a significant risk of PRS during liver transplantation