Abstract:

" **OBJECTIVE:** Lung transplantation is associated with high rates of bleeding and frequent blood transfusion. The authors aimed to determine if point-of-care coagulation testing (POCCT) reduced transfusion requirements.

DESIGN, SETTINGS, AND PARTICIPANTS: A before-and-after cohort analysis conducted at a single tertiary referral center. Ninety-three sequential adult patients between January 2010 and January 2014 undergoing isolated lung transplant without preoperative extracorporeal support were analyzed.

INTERVENTION: ROTEM and multi-plate POCCT were introduced on July 1, 2012, with an associated algorithm based on the results.

MEASUREMENTS AND MAIN RESULTS: Statistically significant decreases in the proportion of patients receiving PRBCs (87% v 65%; p = 0.015), FFP (72% v 30%; p<0.0001) and platelets (70% v 37%; p = 0.002) were found after the intervention. There were small decreases in median chest tube blood loss at 2 hours (300 mLs v 215 mLs; p = 0.03) and 4 hours (440 mLs v 350 mLs; p = 0.050) but not at 12 hours postoperatively. There were no changes in reoperation for bleeding (9% v 4%; p = 0.158) or in-hospital mortality (6% v 2%; p = 0.617). The cost of blood products administered decreased from a median of \$3,935.00 to \$991.00 (p<0.001).

CONCLUSIONS: Use of POCCT in lung-transplant surgery is associated with significant reductions in blood product use and cost. There were no detectable changes in outcome aside from a small decrease in early postoperative bleeding."

Comments by Barbara Wilkey, MD

In this single center, retrospective cohort analysis, the authors found a decrease in RBC, FFP and PLT administration as well as overall transfusion cost after initiation of ROTEM and a ROTEM based transfusion algorithm. Transfusion cost included product cost, TXA cost and ROTEM cost. There was a trend toward increase fibrinogen supplementation, however this did not reach statistical significance (p= 0.114). The study was powered to detect a decrease in transfusion from 80% (pre-algorithm) to 50%. All transplants were sequential double lung and performed on cardiopulmonary bypass. Patients were excluded from analysis if they required any additional procedures during their transplant operation. There was no change in surgical or anesthetic staff during the study period. Abnormal ROTEM results were not treated if there was no clinical need. Interestingly, despite the published association between blood product transfusion and primary graft dysfunction (PGD) [1] there was no difference in PGD seen between the two treatment groups. The authors surmise that this is due to lack of study power for this variable.

Though a small study group, this is the first study published to date looking at the impact of point of care coagulation testing in lung transplantation. Optimal timing of testing, type of testing, and cut off values for intervention have yet to be assessed. As an example, the transfusion algorithm presented in this paper, even when platelet aggregometry is removed, varies slightly from the algorithm recently proposed by the Society of Cardiovascular Anesthesia (SCA). [2] Though the SCA algorithm is a guide for all cardiac surgery and not specific to lung transplantation, the lack of published literature does not guide a practitioner on which algorithm is optimal to follow. More studies, ideally multicenter and prospective, are necessary to fully understand how point of care testing should be utilized in lung transplantation.

References:

1. Diamond JM, Lee JC, Kawut SM, et al. Clinical risk fac- tors for primary graft dysfunction after lung transplantation. *J Heart Lung Transplant*. 2013;32(4 suppl):S43.
2. Jacob Raphael, MD C. David Mazer, MD Sudhakar Subramani, MD Andrew Schroeder, MD Mohamed Abdalla, et al. Society of Cardiovascular Anesthesiologists Clinical Practice Improvement Advisory for Management of Perioperative Bleeding and Hemostasis in Cardiac Surgery Patients. *Anesth Analg*. 2019;129:1209-21.