EVMS EM JC CRITICAL REVIEW FORM:

Resident: **Robert Luke** **Date: September 2022**

Citation: Douglas M, Obaid O, Castanon L, Reina R, Ditillo M, Nelson A, Bible L, Anand T, Gries L, Joseph B. After 9,000 laparotomies for blunt trauma, resuscitation is becoming more balanced and time to intervention shorter: Evidence in action. J Trauma Acute Care Surg. 2022 Sep 1;93(3):307-315. doi: 10.1097/TA.0000000000003574. Epub 2022 Mar 28. PMID: 35343923.

Background: Hemorrhage control is a pilar of ATLS and trauma management. Two major areas of focus in the past decade have been on balanced resuscitation and time to intervention. Hemorrhage remains the leading early cause of death in blunt trauma. In recent the past decades much focus has been centered on early damage control surgery and balanced resuscitation.

Study Objectives: Examine the effects and outcomes from advancements in balanced resuscitation and early surgical intervention in the blunt trauma population.

Study Methodology: 9773 blunt trauma patients that underwent laparotomy from the TQIP database were analyzed from the period of 2013-2017. 18yo and older that underwent a trauma laparotomy within 4 hours of presentation for blunt trauma whom also received at least 1u of blood product in the first 4 hours after presentation. Transfers, burns, DOAs and mortality in the bay were excluded. **Primary outcome** measures were time trends of 24 hour mortality, pRBC:FFP ratio and time to laparotomy. Secondary outcomes were the independent association of blood product ratio to 24 hour and overall in hospital mortality. Multivariate regressions performed to compare outcomes to study measures.

Randomization and Blinding: None given retrospective design

What were the results: Over the 5 year period an 11% decrease in the mean RBC:FFB ratio from 1.93 to 1.71. Time to laparotomy saw a 27% decrease from 1.87 to 1.37 hours. Mortality rates in first 24 hours in this time frame decreased from 23 to 19.3%. Multivariate analysis of outcomes showed the decrease in RBC to FFP ratio was independently associated with decreased in hospital mortality and 24 hour mortality with odds ratios of 0.89 and 0.88, respectively. With regards to time to laparotomy, every 6 minute decrease in time to laparotomy conferred an increased odds 24 hours and overall hospital mortality of 22% and 9% respectively. Thus, patients were getting taken to the OR sooner but this conferred an increased odds of mortality.

Applicability to my patient care: As Trauma Surgeons and Emergency Physicians we are responsible for initial evaluation, resuscitation and disposition of such patients and knowing that continued focus on balanced resuscitation and obviously early surgical control of hemorrhage are imperative to continuing to improve patient outcomes in blunt trauma.

Strengths: The sample size of the paper is a definite strength as well as it being multicenter.

Weaknesses/Bias: Obvious weakness of this paper being a retrospective study limits the paper but often hard to do prospective research in the trauma setting. There is also selection bias in the population going to the OR and time to the OR that may be confounding the results of the shorter time to OR resulting in increased mortality. As centers become more expeditious with getting patients to the OR we are seeing a lot more of the patients that would otherwise expire in the ED making it to the OR before expiring as trauma systems become more robust and polished.

My Clinical Bottom Line: We need to continue focusing on true 1:1 resuscitation in trauma and truly all hemorrhagic shock. We also should not be discouraged by the increased mortality associated with our quicker time to the OR as it is associated with an increased mortality, but this is very likely due to us getting sicker patients to the OR before they decompensate which ultimately gives them their best chance at survival. There has even been emerging research looking at direct to OR activations for traumas that are felt likely to need operative intervention as a means of improving outcomes.