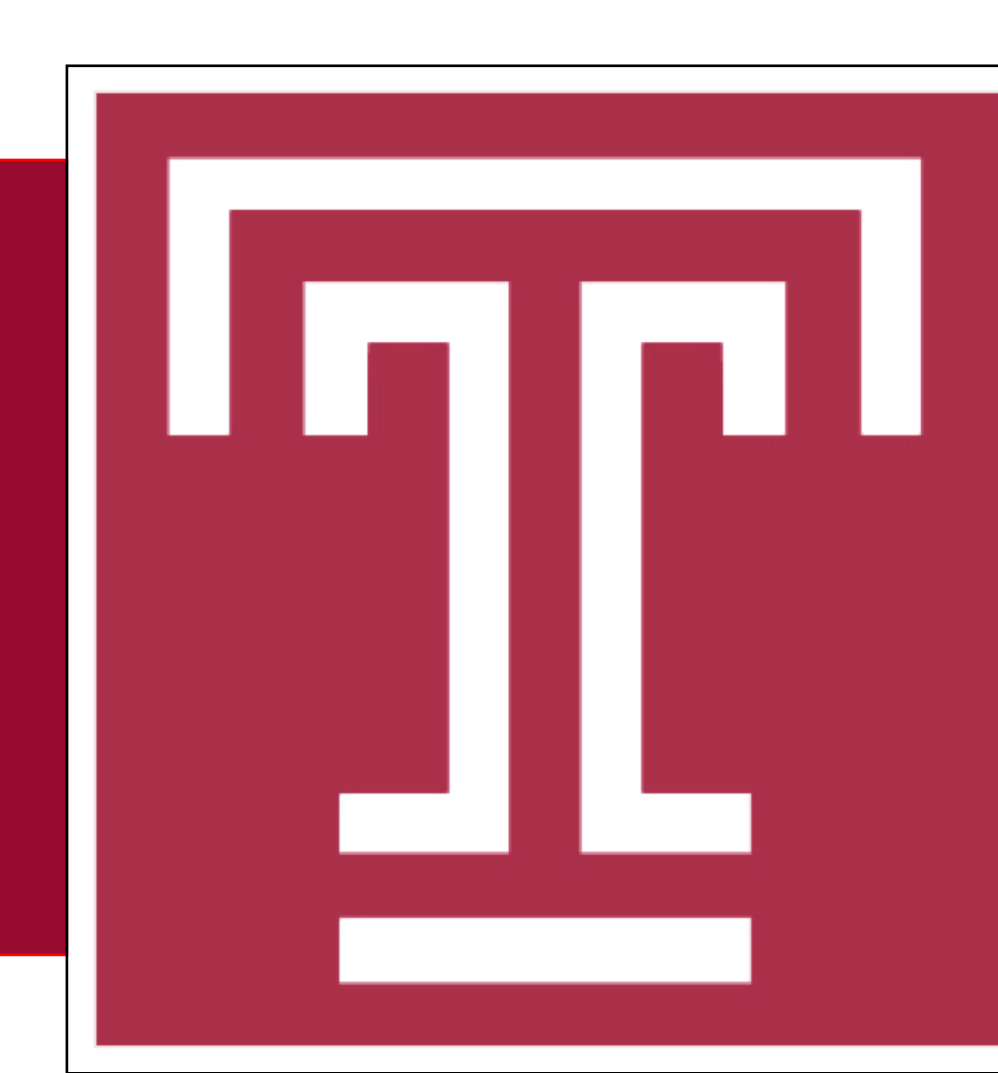




Estimated Blood Loss in Burns: a neglected quality measure



Blood loss is underestimated and inappropriately treated intraoperatively

$$EBL = Total\ Blood\ Volume * \frac{Hgb\ Pre\ Op - (Hgb\ at\ time\ 24\ or\ 48\ hours - Interim\ Transfusions)}{Hgb\ Pre\ Op}$$

Significance:

It is extremely difficult to estimate the blood loss during excision and grafting (E/G) for burn injury. There are only a handful of publications in the past 3 decades evaluating single institution blood loss during E/G procedures with wide variation in results. Additionally, these studies did not trend the blood loss due to donor sites and wound beds in the post operative period. In the trauma literature it is well established that hemoglobin concentration is not immediately responsive to active bleeding but rather has a delayed drop as fluid is mobilized from the third space. Transfusion based upon intra-operative hemoglobin concentrations may inaccurately reflect actual blood loss. We believe this blood loss (intra- and post-operatively) should be evaluated for use as a quality metric, and studied for improvements in care.

Data and Results:

This retrospective study was approved by our institution's IRB. Data was collected from 88 burn surgeries from August 2016 to December 2019. Data including: Height and weight, total burn size, hemoglobin preoperatively, at 24 and 48 hours postoperatively, blood transfusions, the area of excision and skin graft in cm² and tourniquet usage were collected. Any case without a complete data set was excluded from analysis. Some patients had multiple surgeries and each was considered individually.

Using the weight of and sex of the patient, an estimated total blood volume was calculated. The estimated blood loss (EBL), in milliliters (ml), in the first 24 and 48 hours postoperatively was calculated using the equation to the left. EBL was then divided by the excised area in cm² to generate the blood loss per centimeters squared E/G. This data was then sorted by both use of tourniquet as well as total burn surface area greater or less than 20%. Our standard deviations are large and noted in the table. We did not attempt to adjust our calculations for the dilutional effects of crystalloid infusions during this time period. The number of cases who received transfusions intraoperatively was 31/88. And 41/88 received transfusions in the burn unit postoperatively in the first 24 and 48 hour time periods.

Lessons Learned:

- The chart review revealed that the majority of blood transfused occurred in the burn unit post operatively, and crystalloid alone was primarily given intraoperatively.
- Moving forward we will change our transfusion practice intraoperatively and will re-evaluate our EBL, Crystalloid use and intraoperative hypotensive events
- Post operative Hgb loss at 48 hours can still be significant, even requiring transfusion.
- Limitations of the study include; no adjustments in EBL for the dilutional effect of crystalloids, retrospective data and the need for many estimates in calculations.

EBL in ml /cm² Excised and Grafted

