Pragmatic, Randomized Optimal Platelet and Plasma Ratios (PROPPR)

LAC+USC Medical Center Community consultation

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Background

- Nearly 50% of trauma deaths occur before the patient reaches the hospital and few of these deaths are preventable.

- For those that reach the hospital, about 40% experience bleeding complications and require a MT (massive transfusion of at least 10 units of blood)

- Bleeding complications are the leading cause of early death in trauma patients.

Background

- Current military transfusion guidelines for massively transfused casualties are based on the U.S. Army Surgeons General recommendation of a 1:1:1 ratio.

- Studies in both the public and military populations have shown that seriously injured patients who received a massive transfusion (MT) with higher plasma ratios had lower mortality than those who received more traditional ratios of plasma.

- **<u>Question remains</u>: What is the best ratio group to use for trauma patients who require a large amount of blood?**
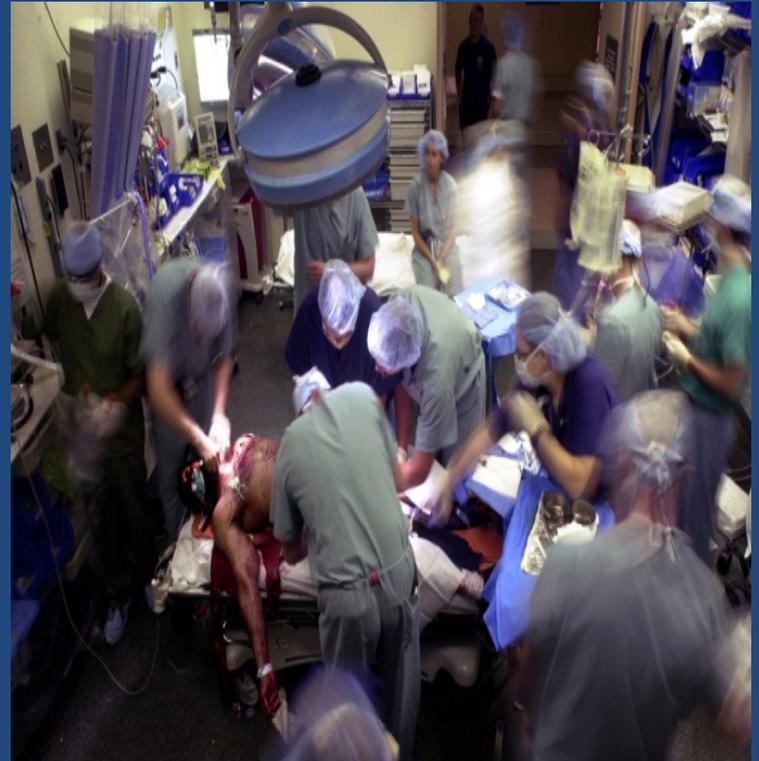
What Are Red Blood Cells, Platelets, Plasma
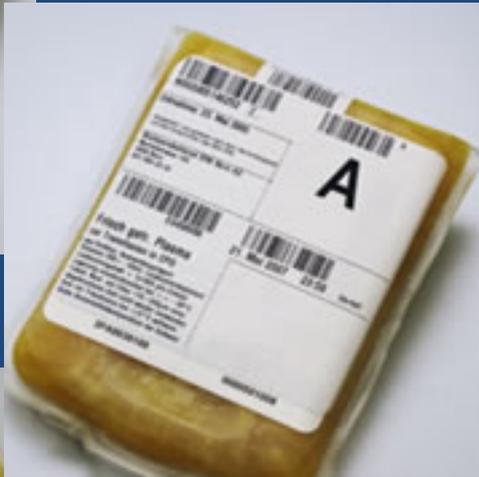
- Red Blood Cells are cells that carry oxygen

- Platelets are the smallest structures in the blood and are important for blood clotting and plugging damaged blood vessels.

- Plasma is the liquid portion of the blood; represents approximately 50% of the total volume of blood and contains coagulation proteins

What was the PROPPR study?

- 12 North American Level 1 trauma center sites participated

- Purpose: Determine what the best ratio of products is to provide the best outcomes for the patients.

- Enrolled patients who were PREDICTED to receive significant amounts of blood products into 1 of 2 groups: 1:1:1 ratios of plasma to platelets to red blood cells (RBCs), compared to 1:1:2
  (338 patients in 1:1:1, 342 in 1:1:2)

Enrollment

- 15 month enrollment period   (8/3/12 – 12/3/13)
- 11,185 patients screened
- 680 enrolled (338 in 1:1:1, 342 in 1:1:2)
- 10,505 excluded - main reasons for exclusions are:
    didn't get blood in 1st hour,
    transfer from another hospital,
    not predicted to need a massive transfusion,
    age <15,
    patient improved,
    expected to die within 1 hour of ED admission

Outcomes

No difference between groups for:

Death at 24 hours and 30 days

Complications associated with trauma

Age, race, type of injury

Differences seen:

Death related to uncontrolled bleeding was decreased in the 1:1:1 group

Outcomes (continued)

Blood Products within 1st 24 hours plus pre-hospital		Group 1:1:1 (N = 338)	Group 1:1:2 (N = 342)
Plasma (units)	Median (range)	7 (3,13)	5 (2,10)
	# who got ≥ 1 unit (%)	325 (96.2)	320 (93.6)
Platelets (units)	Median (range)	12 (6,18)	6 (0,12)
	# who got ≥ 1 unit (%)	333 (98.5)	205 (59.9)
RBC (units)	Median (range)	9 (5,15)	9 (6,16)
	# who got ≥ 1 unit (%)	338 (100)	341 (99.7)

Conclusion

- More people who received 1:1:1 lived long enough for the physicians to stop the bleeding

  (291 in 1:1:1 vs. 267 in 1:1:2)

- Future studies will look at outcomes earlier in the resuscitation process

  (i.e. survival at 3 hours or time to bleeding stopped instead of 24 hours & 30 days)