

# Liquid Plasma for Trauma

Forget what you learned



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# Objectives

- Rationale for use of plasma in trauma care
- Reasons to move to thawed plasma
- Clinical evidence for liquid plasma
- Operational aspects
- What next?



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# Surgeon's point of view

- *Textbooks say that]“plasma should not be used as a volume expander,” yet exsanguinating patients are hypovolemic and coagulopathic. Why shouldn't we infuse the only fluid that simultaneously addresses both conditions?*

# Use of plasma in trauma care

- Use of plasma (rather than crystalloid) in the initial resuscitation leads to better outcomes, decreased inflammatory complications (ARDS, MOF) and coagulation disturbances
- Trauma centers have moved to a “balanced” transfusion ratio of 1plasma:platelet:RBC
- Dried plasma, quickly reconstituted, is used in countries where it is available

# Thawed Plasma

Plasma available in a liquid state for rapid infusion

- Thawing of frozen products may take too long in the trauma or similar setting
- Desire to have plasma *immediately* available (MTP)
- FFP, FP24, or PF24-RT24 is thawed at 30-37°, stored at 1-6° for up to 24 hours
- **“Thawed plasma”** may be relabeled and kept for 4 additional days (5 days total)

# Success of thawed plasma

- Adopted extensively for MTPs, obstetric hemorrhage and CV surgery
- Survey results from 61 trauma centers in US—almost all level 1, mostly urban
  - 88% kept thawed plasma immediately available



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# Changing demand for plasma

- “Universal” plasma desired for trauma
- Introduction of TRALI mitigation
- Even 5 days is a short shelf life
- Is liquid plasma the answer?





# Liquid Plasma

Plasma available in a liquid state for rapid infusion

- Made from whole blood\*
- Separated and infused no later than 5 days after the expiration date of the WB, stored at 1-6 °
  - ACD, CPD, CP2D- 21 + 5
  - CPDA-1- 35 + 5
  - If you wait that long to separate, it will look really **junky**
- Generally made soon after collection
- Does contain some WBC, platelets

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# What good is liquid plasma?

- Comparison with thawed plasma
  - Better capacity to form clot/ generate thrombin
  - Retains at least 88% of clotting factor activity
  - **Both show loss of labile factors**
  - Increased platelets and microparticles
  - Better stabilization of endothelium
- Better function if separated early from cells

# What good is liquid plasma?

- Who cares??
  - Availability trumps specific measurement
  - Potential to reduce expiration/wastage
  - Initial transfusion(s) followed by goal-directed transfusion therapy
- Suitability for indications other than trauma?

# Operational Considerations

- In Production
  - Number of Whole Blood units available
  - Decision to make product on day of collection
  - Filter or not?
  - TRALI risk reduced: Males, females never pregnant, tested negative

# Operational Considerations

- Blood type-To B or not to B?
  - We will not know group, type of most trauma patients
  - AB is “universal plasma” but only 4% of donors
  - A is compatible with A and O patients- 80+%
  - Strong anti-B might be risk for B patient
  - Should we titer for anti-B to reduce risk?

# Problems with antibody titration

- Surveys have shown considerable interlaboratory titer variance
- Many methods used
- No agreement on clinically appropriate levels



# Group A plasma in trauma

- Survey results from 61 trauma centers in US- almost all level 1, mostly urban
  - 69% use A for recipients of unknown group
  - 79% do not titer for anti-B
  - 62% did not impose a limit on volume

# Group A plasma in trauma

- Infrequent reports of platelet incompatibility
- Many donors low-titer anti-B
- Often getting O RBC concurrently
- B and AB recipients less common
- Few reports of problems, but not directly studied in most cases

- Further studies ongoing





# Next Up

- If we can transfuse red cells with liquid plasma, why not just keep the platelets in and use

## WHOLE BLOOD

- Now used at a number of trauma centers, use seems to be growing
- Technically less work for blood center, but questions remain

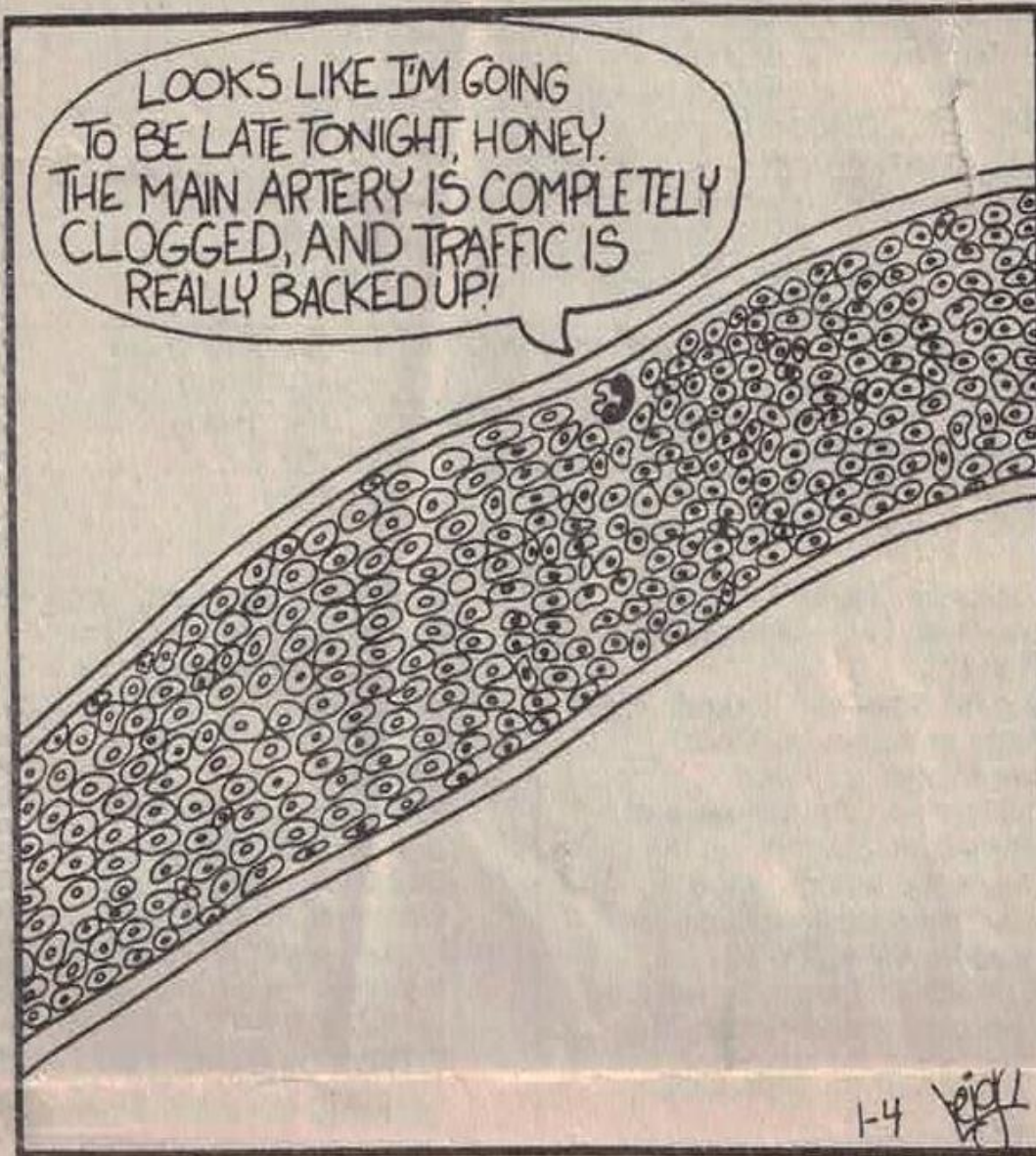
# In summary



## Questioning what we learned

- Saline resuscitation is not ideal
- FFP isn't only RX for coagulopathy
- Giving incompatible plasma isn't forbidden

**RUBES** By Leigh Rubin



Cellular phones.

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# Key references

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