



Calcium and Blood Transfusion in Trauma: A Retrospective Analysis of the Impact Pre-Hospital Blood Transfusions Have on Calcium Levels and Outcomes of Trauma Patients

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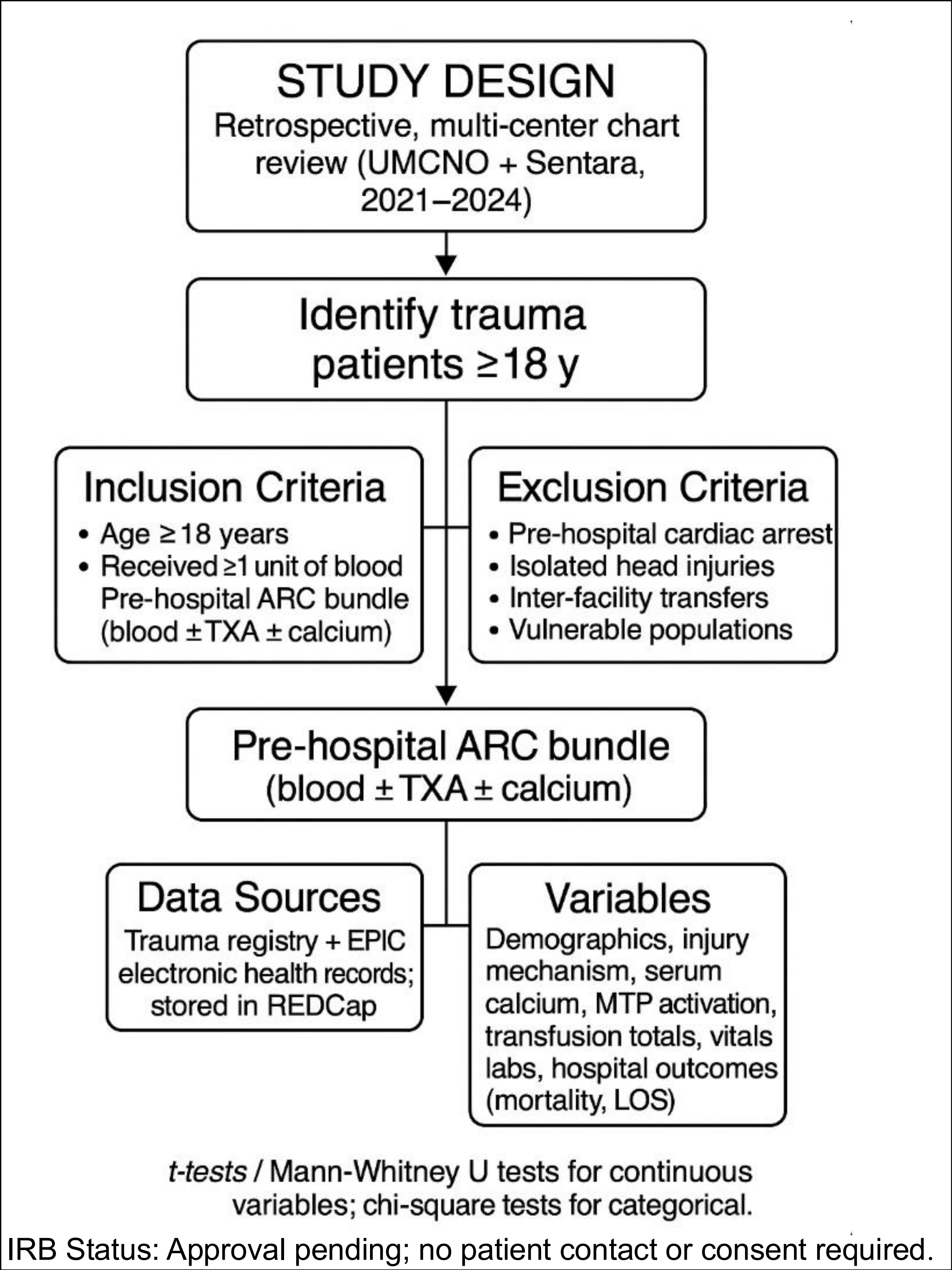
Introduction

- Severe trauma causes rapid blood loss → early transfusion needed.
- Stored blood has citrate → binds ionized Ca^{2+} → hypocalcemia.
- Hypocalcemia worsens coagulopathy, decreases contractility, and contributes to shock/mortality.
- **ARC bundle** (blood + TXA + calcium) was developed in military trauma for prehospital use.
- In civilian systems, prehospital calcium use is inconsistent and understudied.
- **Objective:** Evaluate whether adding calcium to prehospital blood maintains Ca^{2+} and improves outcomes.

Objective and Significance

- Primary Objective:**
- Compare outcomes between trauma patients who received a pre-hospital ARC bundle and those who did not.
- Secondary Objectives:**
- Compare calcium levels, transfusion needs, and outcomes between ARC and non-ARC cohorts
- Significance:**
- Findings may guide future EMS resuscitation protocols, optimizing outcomes in civilian trauma care.

Methods



Hypothesis

- Patients receiving the ARC bundle will show:
- Higher calcium levels on ED arrival.
 - Fewer MTP activations and transfusions.
 - Lower mortality and shorter LOS.
 - Benefits are expected to persist after controlling for injury severity.

Results

- Anticipated Results** (data collection pending)
- Analysis will compare ARC bundle and non-bundle cohorts.
- Expected outcomes include:
- Higher ionized calcium and fewer cases of hypocalcemia
 - Reduced transfusion volume and fewer MTP activations
 - Improved hemodynamic stability and lower mortality with calcium administration

Conclusion

- Prehospital calcium administration with blood ± TXA may represent a low-cost, scalable addition to civilian trauma resuscitation bundles.

References

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