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Antibiotic Concentrations after MassivE Transfusion (ACME) study: Study methods and preliminary data

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Introduction

- Current clinical guidelines recommend prophylactic antibiotics for high-risk wounds.
- Adequate antibiotic plasma concentrations are necessary for tissue penetration, particularly into injured tissue.
- Blood loss from traumatic hemorrhage may impact plasma antibiotic concentrations.
- The association between blood loss, subsequent blood product transfusion, and antibiotic concentrations remains unclear.

Objectives

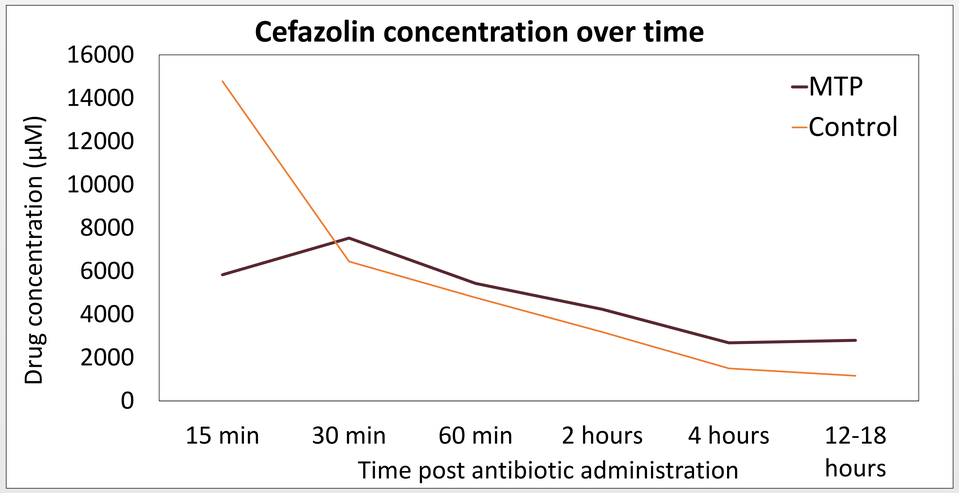
- Determine the plasma drug concentration at regular intervals and the total volume of blood products during the first 24 hours after antibiotic administration.
- Explore the correlation between blood transfusions and plasma drug concentrations to inform data-driven dosing models.

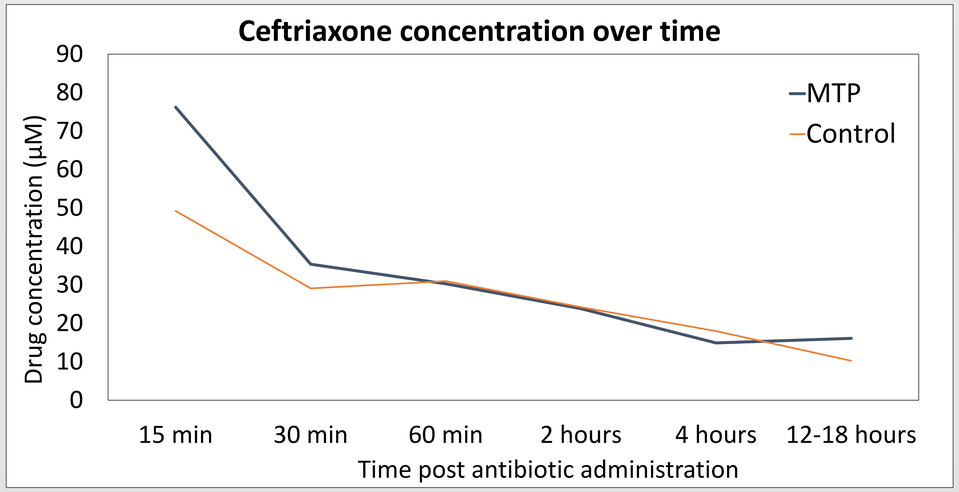
Methods

- Our study was conducted at two American College of Surgeons-verified Level 1 trauma centers (University of Colorado Hospital and Brooke Army Medical Center).
- Admitted trauma patients that met inclusion criteria and received study approved antibiotics were enrolled.
- Research staff collected blood samples post antibiotic injection, at 15 min, 30 min, 60 min, 2hr, 4hr and between 12-18 hours.

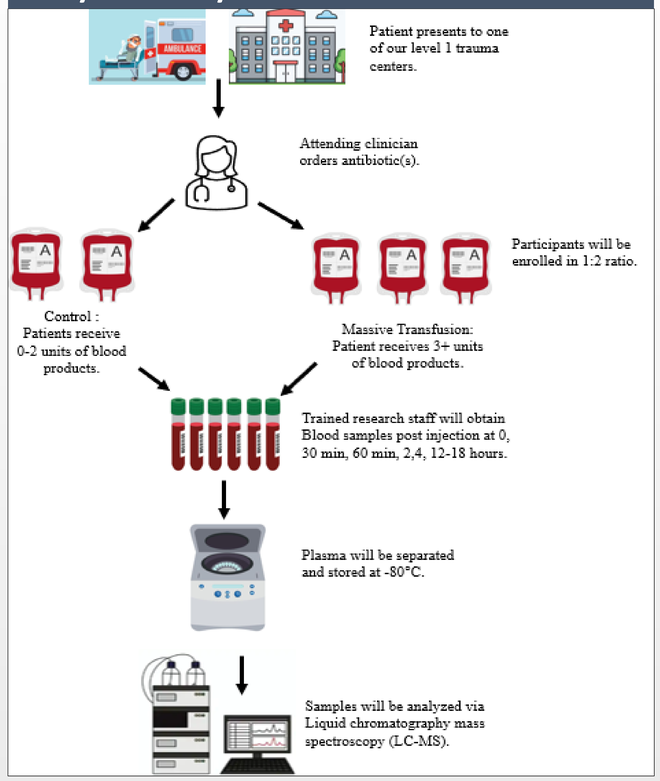
Results

- Currently, 178 patients have been enrolled. This analysis uses data from the 118 patients with available antibiotic concentration data.
- The median age was 37 [IQR 28-67], 66% were male, and the median body mass index was 25 [IQR 22-30].
- The most common causes of injury were motor vehicle collisions (41%), falls (22%), and gunshot wounds (15%).
- We enrolled 91 control patients:
  - 59 received Cefazolin and 32 received Ceftriaxone.
- 27 patients received a massive transfusion:
  - 22 received Cefazolin and 5 received Ceftriaxone.





Study Summary Flow



Conclusions

- No major differences in antibiotic concentrations noted with ≥3 units of blood products transfused.
- Sample is limited and preliminary, additional enrollment needed.

Statements

- This study was conducted under a protocol reviewed and approved by the US Army Medical Research and Development Command Institutional Review Board and in accordance with the approved protocol.

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