**TEG FOR TRAUMA: IMPLEMENTATION OF RAPID THROMBOELASTOGRAPHY IN A LEVEL 1 PEDIATRIC TRAUMA CENTER**

Chris McKenna, MSN, CRNP*, Christine Leeper, MD, & Barbara Gaines, MD

*Children’s Hospital of Pittsburgh of UPMC, Pittsburgh PA*

---

## Introduction

TEG (thromboelastography) is a functional test of blood coagulation that helps direct resuscitation in bleeding trauma patients.

The American College of Surgeons Committee on Trauma in the *Resources for Optimal Care of the Injured Patient* states that “TEG should be available at all Level 1 and 2 Trauma Centers”.

In June, 2015 our hospital implemented rapid (r) TEG for all of our highest level trauma activations.

The specific aims of this poster are to:
1. Define thromboelastography
2. Demonstrate normal and abnormal rTEG tracings
3. Describe the implementation and utilization of rTEG in a Level 1 Pediatric Trauma Center

---

## Methods

**BACKGROUND & EDUCATION**

**What is TEG?**

A whole blood test of coagulation. Measures the functional properties of the hemostasis process. Demonstrates coagulation pathway function:
- Clotting factors
- Platelet function
- Fibrinolysis

**How does TEG work?**

Graphically and numerically depicts the clotting process from clot initiation and development to ultimate clot degradation.

Analysis of the TEG tracing directs which products would most benefit the patient (goal directed transfusion therapy)

1. Pin is placed in cup containing fresh whole blood sample
2. Cup is rotated around pin
3. Computer senses any deflection of the pin caused by clot formation (blood = thicker) or break-down (blood = thinner)
4. Computer software translates this information into a visual depiction or tracing

**PROCESS**

1. Lab technologist sets reagent to room temperature and readies machine with notification of incoming patient via trauma pager
2. ED nurse sends blood to lab via tube system
3. Trauma team follows results in real-time from anywhere in hospital via remote viewing software
4. Test-treat-test-treat management: transfuse product based on TEG Transfusion Triggers, recheck rTEG, transfuse based on updated results, recheck rTEG

**EXPERIENCE TO DATE**

**Patient Profile and Product Resuscitation**

<table>
<thead>
<tr>
<th>Product (mg)</th>
<th>Tx/Unit of Pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRYO</td>
<td>250</td>
</tr>
<tr>
<td>FRESH PLASMA</td>
<td>1000</td>
</tr>
<tr>
<td>RED BLOOD</td>
<td>600</td>
</tr>
<tr>
<td>TXA</td>
<td>10</td>
</tr>
</tbody>
</table>

**CHALLENGES**

1. Lack of FDA approval for non-hospital use
2. Security and access of remote viewing software
3. Agreement on ranges of normal coagulation and abnormal samples, especially across all age ranges
4. Education and Information Dissemination
   - Multidisciplinary peer review committee
   - Multidisciplinary educational trauma conference
   - Timely Trauma Topics (nursing education)
   - Unit-specific education
   - Included in resident orientation
   - Special edition of Trauma Matters (monthly newsletter)
   - Formal trauma program memo

---

## Implementation & Results

**IMPLEMENTATION**

**Team Members:** Trauma, Information Technology, Laboratory Medicine, Hematopathology, Hematology, Pharmacy, Informatics, Haemonetics

**Key Aspects in Development**

- Assistance from other trauma centers locally, regionally and nationally
- Integrated into existing workflow

**EXPERIENCE TO DATE**

**HPI:** 7yo female → hemorrhagic shock

**ED:** Arived 186, BP 90/64, GCS 3

**LABS:** Hgb 7.1, plt 97, INR 3.3

**TX:** 2 units uncrossmatched PRBC’s transfused in ED, the actively bleeding artery was sutured, admitted to PICU for ongoing resuscitation. Transfusion of blood products based on rTEGs (below) with serial testing to guide product selection.

---

## Conclusion

1. We have demonstrated successful implementation of rTEG in a Level 1 Pediatric Trauma Center
2. There is opportunity for improvement in:
   - Rapidity of test performance
   - Utilization of results
3. Future point of care testing will likely greatly improve the rapidity of testing and utilization of results
4. Research study underway to evaluate utility of admission rTEG in trauma and potential application in post-injury recovery period

**Acknowledgments**

Extended CHP Trauma Team members, especially Jayne Rasmussen and Jayne Zona from Laboratory Medicine

Molly Kosoglow, RN, BSN, MBA, Haemonetics