**EAST MULTICENTER STUDY**
**DATA COLLECTION TOOL**

**Multicenter Study:** The Efficacy of Platelet Transfusion on the Reversal of Platelet Dysfunction in Traumatic Brain Injury

Enrolling Center: __________________________
Enrolling Co-investigator: __________________________

**Demographics / Injury Variables:**
Age: _______ Gender: _______ Admission systolic blood pressure: _______ Admission hemoglobin: _______
INR: _______ Antiplatelet medications: __________________________________________________________

**Mechanism of initial injury:**
Blunt: YES / NO
Penetrating: YES / NO

ISS: _______ AIS Head: _______ GCS: _______ Intracranial hemorrhage type:
(epidural, subdural, SAH, intraparenchymal, intraventricular, combined)

**Admission TEG values:**
AA MA1: _______ ADP MA1: _______ AA% inhibition1: _______ ADP % inhibition1: _______

**Management Variables:**
Did the patient receive a platelet transfusion: YES / NO
Number of platelet transfusions: _______
Age of platelets transfused: _______ _______ _______ _______
Other blood products given: ________________________________ (i.e. pRBC, Cryo, FFP, VIIa, Desmopressin, Tranexamic acid)

**Outcomes:**

TEG values post-platelet transfusion or no transfusion:
AA MA2: _______ ADP MA2: _______ AA% inhibition2: _______ ADP % inhibition2: _______

Mortality: YES / NO
General Information

Study Title: The efficacy of platelet transfusion on reversal of platelet dysfunction in traumatic brain injury

Primary investigator/Senior researcher: Mathew Edavettal, MD, PhD

Email of Primary investigator/Senior researcher: medavettal2@lghealth.org

Co-primary investigator: Frederick B. Rogers, MD, FACS

Background & Significance: Traumatic brain injury is a devastating condition and represents a significant portion of the health care cost. The detrimental effects of preinjury anticoagulants have been shown repeatedly in this population. Reversal agents are shown to be effective in the classical or tissue factor pathway even though change in long term outcome TBI patients has not been fully established. What is more debated is the effects of platelet dysfunction in TBI. Although platelets are generally believed to be responsible for 80% of the clot strength, the impact of reversing platelet dysfunction by means of transfusion is not easily obtained nor has it been definitely shown to improve outcome. Part of the problem lies in the complexity of platelet function, the redundancy of the ability to activate platelets, our changing ability to measure platelet function and therefore using one that is readily available, is accurate, and gives results expeditiously.

Specific Aims of Multicenter Study:

Primary aim: The purpose of this investigation is to determine the efficacy of platelet transfusion for the reversal of platelet dysfunction in patients presenting with inherent and/or pharmaceutically-induced coagulopathy.

Experimental Design/Methods

Inclusion Criteria:

- Over 18 years of age
- Isolated blunt traumatic brain injury patients
- Shown to have platelet dysfunction on thromboelastography with platelet mapping
- Platelet inhibition shown within a certain period of time from the injury (two hours)

Exclusion Criteria:

- Penetrating trauma
- Patients under 18
- Non-traumatic brain injury patients
- Transfers possibly (depending on time)
- Patients on Vitamin K antagonists, direct thrombin inhibitors, anti-Xa agents, and heparinoids
-Patients that do not show any platelet dysfunction
-Multisystem traumatic patients
-Hemophiliacs or other known blood disorders Thrombocytopenia
-CHF or CKD

Therapeutic Intervention: This is a prospective observational study. The decision to administer platelets to TBI patients presenting with platelet dysfunction will be placed at the discretion of the attending trauma surgeon.

Outcomes Measures

Primary Outcome: The primary outcome of this investigation is the measured change in arachidonic acid (AA) and adenosine diphosphate pathway (ADP) maximum amplitude (MA) / percent inhibition following the decision to administer/not administer platelets to isolated TBI patients presenting with platelet dysfunction.

Variables

List specific variables to be collected & analyzed

Demographics: Age, sex, GCS, ISS, Head AIS, anticoagulant medications

Admission Statistics: Systolic blood pressure, hemoglobin, INR, type of intracranial hemorrhage (epidural, subdural, SAH, intraparenchymal, intraventricular, combined)

Intervention measures: Number of platelets transfused, age of platelets, other blood products transfused

Outcome Measures: ADP and AA MA and % inhibition pre and post transfusion, mortality

Data Collection and Statistical Analysis

- Statistical analysis will be performed by the Research Director of Penn Medicine Lancaster General Health. Standardized data will be collected from each center participating in this study. TBI patients presenting with platelet dysfunction will be separated into two groups: 1.) platelets administered (experimental) and 2.) no platelets administered (control) (based on physician discretion). Univariate analysis in the form of two-sample t tests and chi square analysis will be performed to determine baseline demographic differences between groups. Further, two-sample t tests will be employed to determine differences in TEG platelet mapping measures (AA MA/% inhibition and ADA MA/% inhibition) pre to post intervention for experimental and control groups to determine improvement of platelet dysfunction. A Multivariate logistic regression model for platelet correction (yes/no) will assess the adjusted impact of platelet administration in correcting platelet dysfunction while controlling for demographic and injury severity covariates.

Consent Procedures
Waiver of informed consent requested as this is a prospective observational study, with no randomization of treatments. Physician discretion determines which patients receive platelets and which do not.

**Risk/ Benefit Analysis**

Platelet transfusion is not benign. It involves giving a foreign agent to a host and incurs all the risks of such medical procedures, including increased infection, mortality, major and minor transfusion reaction, and immune suppression. The potential benefit is reversing platelet dysfunction and thereby limiting intracranial bleeding which may augment TBI recovery.

**References**

Include a brief listing of key references


9. Vishal Bansal, MD, Dale Fortlage, BA, Jeanne Lee, MD, Jay Doucet, MD, Bruce Potenza, MD, and Raul Coimbra, MD, PhD. A New Clopidogrel (Plavix) Point-of-Care Assay: Rapid Determination of Antiplatelet Activity in Trauma Patients. The Journal of TRAUMA® Injury, Infection, and Critical Care • Volume 70, Number 1, January 2011


31. Saunders C1, Rowe G, Wilkins K, Collins P. Impact of glucose and acetate on the characteristics of the platelet storage lesion in platelets

EAST MULTICENTER STUDY
DATA DICTIONARY

The Efficacy of Platelet Transfusion on Reversal of Platelet Dysfunction in Traumatic Brain Injury – Data Dictionary

Data Entry Points and appropriate definitions / clarifications:

<table>
<thead>
<tr>
<th>Entry space</th>
<th>Definition / Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographics / Injury Variables:</strong></td>
<td></td>
</tr>
<tr>
<td>Traumatic Brain Injury</td>
<td>Traumatic brain injury is defined as any intracranial hemorrhage present on computed tomography scan</td>
</tr>
<tr>
<td>Admission Date</td>
<td>Admission date of the TBI patient</td>
</tr>
<tr>
<td>Admission Time</td>
<td>Admission time of the TBI patient</td>
</tr>
<tr>
<td>Age</td>
<td>Age of TBI patient</td>
</tr>
<tr>
<td>Gender</td>
<td>Gender of TBI patient</td>
</tr>
<tr>
<td>Admission systolic blood pressure</td>
<td>Systolic blood pressure of TBI patient upon admission</td>
</tr>
<tr>
<td>Admission hemoglobin</td>
<td>Hemoglobin value of TBI patient upon admission</td>
</tr>
<tr>
<td>INR</td>
<td>INR upon admission&lt;br&gt;(INR= International Normalized Ratio)</td>
</tr>
<tr>
<td>Antiplatelet Medications</td>
<td>Admission anticoagulant medications of TBI patient – aspirin, Clopidogrel, Triflusal, Prasugrel, Ticagrelor, Cilostazol</td>
</tr>
<tr>
<td><strong>Mechanism of initial Injury</strong></td>
<td></td>
</tr>
<tr>
<td>Blunt</td>
<td>Single choice for best description of blunt mechanism (if penetrating mechanism proceed to next data point) Options include: MVC, Auto vs. Peds (Pedestrian), Fall, Assault, MCC (Motorcycle Collision / Crash), Machinery, Other</td>
</tr>
<tr>
<td>Penetrating</td>
<td>Single choice for best description of penetrating mechanism. Options include: GSW (Gunshot wound) Shotgun (Shotgun wound) Stab (Stab Wound) Other</td>
</tr>
</tbody>
</table>
ISS  
Numerical value for calculated ISS  
(ISS = Injury Severity Score)

AIS Head  
Numerical Value for AIS body region = Head  
(AIS = Abbreviated Injury Score)

GCS  
Numerical Value for GCS upon admission  
(GCS = Glasgow Coma Scale score)

Intracranial hemorrhage type  
Type of intracranial hemorrhage TBI patient presented with. Select from the following options: epidural, subdural, subarachnoid, intraparenchymal, intraventricular, combined (multiple of the above)

Admission Lab/TEG Values

Hemoglobin  
Admission Hemoglobin value (g/dL)

AA MA1  
AA MA from admission TEG  
(AA MA = arachidonic acid maximum amplitude)

ADP MA1  
ADP MA from admission TEG  
(ADP MA = adenosine diphosphate maximum amplitude)

AA % inhibition1  
AA % inhibition from admission TEG  
(AA % inhibition = arachidonic acid percent inhibition)

ADP % inhibition1  
ADP % inhibition from admission TEG  
(ADP % inhibition = adenosine diphosphate percent inhibition)

Management Variables

Platelet transfusion  
Did the TBI patient receive platelets following the results of the initial TEG tracing? Answer type: Yes / No

Number of platelet transfusions  
Free entry of number of platelet transfusions received by TBI patient if patient had platelets transfused?

Age of platelets transfused  
Free entry for numerical age of platelets given to the TBI patient. Data on platelet age should be available from the blood bank of each institution

Other blood products/ procoagulant agents given  
Free entry for whether the TBI patient was provided with any other blood products during management. Other blood products include: packed red blood cells, fresh frozen plasma, cryoprecipitate, VIIa, desmopressin, tranexamic acid

Outcomes

AA MA2  
AA MA from post intervention TEG  
(AA MA = arachidonic acid maximum amplitude)

ADP MA2  
ADP MA from post intervention TEG  
(ADP MA = adenosine diphosphate maximum amplitude)
**Outcomes Continued:**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA % inhibition</td>
<td>AA % inhibition from post intervention TEG</td>
</tr>
<tr>
<td>(AA % inhibition</td>
<td>arachidonic acid percent inhibition)</td>
</tr>
<tr>
<td>ADP % inhibition</td>
<td>ADP % inhibition from post intervention TEG</td>
</tr>
<tr>
<td>(ADP % inhibition</td>
<td>adenosine diphosphate percent inhibition)</td>
</tr>
<tr>
<td>Mortality</td>
<td>TBI patient discharge status: Dead or alive. If dead, answer yes. If alive,</td>
</tr>
<tr>
<td></td>
<td>answer no. Answer type: Yes / No</td>
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