Value of Thromboelastography-Platelet Mapping In The Timing of Urgent Inpatient CABG

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Unified Quality Improvement Symposium

February 5, 2020

Background / Introduction

- Current STS Guidelines recommend delaying urgent inpatient CABG 5-7 days in patients who have received P2Y12 inhibitors (Clopidogrel, Ticagrelor) to minimize the risk of intra-operative bleeding and transfusion

- Our institution performs nearly 300 urgent inpatient CABGs/year and approximately 70% receive a P2Y12 inhibitor upon hospital admission

- TEG-PM may allow us to identify P2Y12 non-responders, operate sooner, and decrease pre-op LOS while not increasing bleeding risk

Collaborative Team Members

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- Linda Kindell, RN STS Database Manager
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Aim Statement

To investigate if identification of P2Y12 inhibitor non-responders by TEG-Platelet Mapping could result in decreased pre-CABG hospital LOS vs. current guidelines without adversely increasing intra- and post-operative bleeding risk and need for blood product transfusion

How Will We Know This Change Is An Improvement?

- If pre-CABG LOS is similar between the P2Y12 non-responder group and the control group that did not receive a P2Y12 inhibitor
- If there is no increase in blood product transfusion requirement between the P2Y12 non-responder group and the control group
- If we can demonstrate a significant reduction in pre-CABG hospital LOS compared to current Society of Thoracic Surgeons guidelines

Methods of Study

- The number of days from initial Cardiac Surgery consultation to CABG was determined for P2Y12 non-responders vs. a control group that did not receive a P2Y12 inhibitor
- ADP inhibition less than 50% was used as a threshold to identify P2Y12 non-responders
- The number of blood products transfused intra-op, post-op, and in total was calculated and compared between these 2 groups

Baseline Data for Study Group

- The STS database was used to collect information on patients undergoing urgent isolated CABG between 2014-2019 who had received a P2Y12 inhibitor before or during admission to the hospital

- 417 patients met this criteria
  - Chart review was performed and patients were excluded who needed additional evaluation, treatment, or waited for CABG over weekends/holidays

- 333 patients remained after exclusion
  - 221 patients met criteria for TEG-PM ADP inhibition $\leq$ 50%
  - This identified a 66% (221/333) incidence of P2Y12 inhibitor non-responsiveness vs. reported 30% in the general population

Baseline Data for Control Group

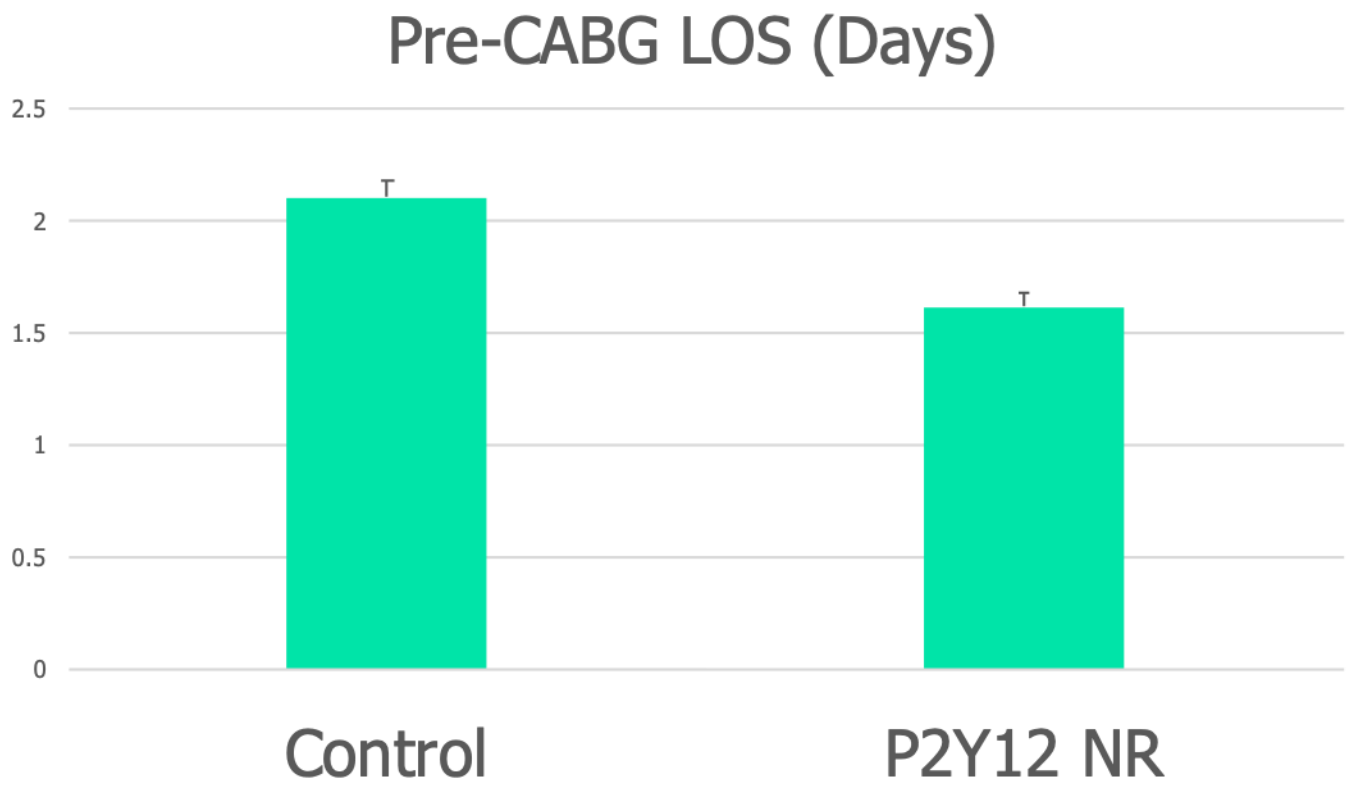
- The STS database was used to collect information on the last 350 consecutive patients undergoing urgent isolated CABG who did **not** receive a P2Y12 inhibitor before or during hospitalization
- Chart review was performed and patients were excluded who required additional evaluation, treatment, or delayed for weekends/holidays
- 232 patients remained after exclusion

Results

	Control (n=232)	TEG-PM NR (n=221)	p-value
Total Products	1.58 ± 0.41	1.63 ± 0.20	0.91
Intra-Op Platelets	0.13 ± 0.03	0.18 ± 0.03	0.22
Post-Op Platelets	0.15 ± 0.06	0.09 ± 0.03	0.42

Data expressed as Mean ± SEM

Results



p-value <0.001

Cost Analysis

- CIU inpatient day: Approximately $2,500 per day
- Pre-op LOS according to STS Guidelines (5-7 days): $12,500 - $17,500
- Pre-op LOS for P2Y12 NR (2 days): $5,000
- Cost savings per patient: Approximately $7,500
- Annual cost savings (300 cases/year): **$2,250,000**
- TEG-PM test: $75 x 300 cases/year = $22,500 (1% of total annual cost savings)

Improvement Strategies Employed

- **Plan-** Planned to perform TEG-PM at the time of consultation in patients who had received a P2Y12 inhibitor to determine responsiveness
- **Do-** Patients with an ADP inhibition ≤ 50% were identified as non-responders and underwent CABG as soon as schedule permitted, rather than waiting 5-7 days per STS Guidelines
- **Study-** Reviewed the time from consultation to CABG in P2Y12 non-responders (study group) and patients who did not receive a P2Y12 inhibitor (control group). Reviewed the transfusion requirements during hospitalization and found shorter LOS in study group and no difference in need for blood product transfusions between the study and control group.
- **Act-** For patients requiring urgent inpatient CABG, use TEG-PM to identify P2Y12 non-responders to decrease LOS by approximately 3 days without increasing risk of bleeding requiring blood transfusion

Lessons Learned Through QI Efforts

- TEG-PM can be used to identify P2Y12 non-responders and shorten pre-CABG LOS by approximately 3 days vs. current STS guidelines without adverse effects on blood product transfusion requirements

- There is a high incidence of P2Y12 non-responders (67%) in our inpatient CABG population vs. only approximately 30% in the general population

- This strategy provides a significant improvement in cost, hospital bed utilization, and patient satisfaction

Next Steps

- Determine the evidence-based %ADP inhibition for which transfusion requirements do not increase (50% inhibition was arbitrarily/anecdotally chosen)

- Should TEG-PM be checked on an outpatient basis in Cardiology or PCP offices to determine if P2Y12 inhibitor is having the desired effect? If not-should the drug be changed?

Questions?

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