One significant intraoperative outcome of concern to anesthesiologists and orthopedic surgeons is controlling the amount of blood loss both intraoperatively and postoperatively. The use of the antifibrinolytic, tranexamic acid (TXA) is an innovative strategy that has been shown to decrease postoperative bleeding as well as decrease the need for blood transfusions. Currently, there are multiple intravenous tranexamic acid regimens that are being employed for orthopedic surgeries. In this study, the aim was to evaluate the effectiveness of 2 dose regimens (1000 mg within 30 minutes pre-op and 1000 mg 4-6 hours post-op) compared to a single 1000 mg preoperative IV/VPD dose. This study was a retrospective cohort conducted on patients undergoing total hip arthroplasty (THA), total knee arthroplasty (TKA), and total shoulder arthroplasty (TSA). Both TSA groups resulted in similar transfusion rates and adverse events rates with no significant difference as determined by statistical analysis. Our results indicate that a single preoperative IV/VPD 1000 mg dose of TXA is cost effective way to prevent blood loss and postoperative complications without increasing adverse events.

**METHOD**

- 140 read by core hospital community
- All patients that underwent total hip arthroplasty, total knee arthroplasty, and total shoulder arthroplasty were included in the study regardless of post medical history and comorbidities.
- Patients undergoing partial knee arthroplasties and revisions were excluded.
- For a 10-month period, the hospital employed a 2-dose tranexamic acid protocol (1000 mg IV/VPD pre-op as defined above and 1000 mg 4-6 hours post-op) which included 366 patients (172 patients having THA, 238 having TSA, and 18 having TKA) and was labeled as Group I.
- Following this period, the hospital employed a single dose tranexamic acid protocol (1000 mg preoperative dose 10 minutes prior to incision) which included 252 patients (75 patients having THA, 136 having TSA, and 21 having TKA) and was labeled as Group II.
- Data from Groups I and II were both collected in a retrospective manner using chart review.
- Venous thromboembolism prophylaxis regimen consisted of either aspirin 325 mg BID for one month total, rivaroxaban 10 mg QD based on procedure TKA for 14 days and THA for 31 days, or warfarin which was dose determined on a case by case basis. Patients that received warfarin, 5 (2%) who received dabigatran, 3 (1%) who received rivaroxaban, 10 (4%) who received rivaroxaban, 5 (2%) who received dabigatran, and 2 (1%) which did not receive VTE prophylaxis (all TSA patients) as it was the clinical judgment of the orthopedic surgeon that VTE prophylaxis was not necessary.
- Statistical analysis was conducted using the chi squared test (a parametric analysis method) to compare transfusion rates and adverse events between Groups I and II.

**RESULTS**

1. **Transfusion rates:** Group II (7 out of 252 patients transfused, 2.3%) compared to Group I (11 out of 366 patients transfused, 3.02%).
   - No significant difference between Group I and II as determined using the chi squared test (P value=0.27).
2. **Adverse events:** Group II (5 out of 252 patients, 2.0%) compared to Group I (9 out of 366 patients, 2.46%).
   - No significant difference between Group I and II as determined using the chi squared test (P value=0.53).
3. **Group II (1 PE, 0.4%) had a reduction in the number of thromboembolic events as compared to Group I (2 PE, 0.54%) and 1 Stroke, 0.37%).

**DISCUSSION**

- The study was conducted in order to compare a flat fixed 2 dose regimen (1000 mg IV/VPD within 30 min pre-op and 1000 mg post-op 4-6 hrs) to a flat fixed single dose regimen (1 preoperative dose of 1000 mg). The aim was to analyze the effects of tranexamic acid with the administration of a flat fixed 1000 mg dose regardless of comorbidities.
- Previous studies analyzing the efficacy of tranexamic acid have used a weight based dosing regimen

**Flat Fixed Dose vs. Weight Based Dose**

<table>
<thead>
<tr>
<th>Percentage of Blood Transfusions</th>
<th>Church et al.</th>
<th>Rayley et al.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Church: flat fixed dose</td>
<td>4.0%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Rayley: weight based dose</td>
<td>5.0%</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

**LIMITATIONS OF STUDY**

- 4 different regimens of various thromboembolic prophylaxis being employed by the orthopedic surgeons.
- Gillette et al., a retrospective study consisting of 2496 patients which analyzed the use of aspirin, low molecular weight heparin, and warfarin for VTE prophylaxis in patients that had received tranexamic acid and underwent THA and TKA.
- Results: There was no difference in the rates of deep vein thrombosis and pulmonary embolism between the different regimens of VTE prophylaxis.
- TSA groups were compared from different times of the year resulting in a different sample size for each group.

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