# Clinical Guideline

**Title:** PRIMARY TOTAL KNEE & HIP Venous ThromboEmbolic (VTE) Guideline

## Target Audience:
Orthopaedic Surgeons, Midlevel extenders and surgical teams on staff at any MHS facility who perform primary total knee and hip joint replacement procedures; Anesthesiologists on staff at any MHS facility; MHS Pre-admission Clinic Nurses; MHS Perioperative Nurses and MHS Pharmacists.

## Scope/Patient Population:
All patients who are scheduled for and undergo an elective primary total hip or knee replacement surgery.

## Rational:
Prevention of Venous ThromboEmbolic (VTE) events including Deep Venous Thrombosis (DVT) and Pulmonary Embolus (PE) reduces morbidity and mortality in patients following surgery for knee and hip joint replacement procedures. Some reports that in-hospital VTE can be reduced by 50-60% and PE particularly by 66% (17). This can represent 13 VTE prevented per every 1,000 patients undergoing major orthopedic surgery. Within MultiCare Health System we perform approximately 800-1000 of these procedures every 12 months suggesting we could prevent one VTE approximately every month.

Additional History:
Historically, the recommendations to prevent VTEs have varied widely depending on underlying assumptions, goals, and methodology of the various groups. This effort has previously been exemplified by the American College of Chest Physicians (ACCP) and the American Academy of Orthopaedic Surgeons (AAOS). The former group of medical specialists targeted minimizing venographically proven deep vein thrombosis (DVT) (the vast majority of which are asymptomatic) as their primary goal prior to 2012. The latter group of surgeons targeted minimizing symptomatic VTE. As a result prior to 2012, the recommendations of the two groups were widely divergent. In the past year, both groups have reassessed the current literature with the principal goals of minimising symptomatic VTE events and bleeding complications. As a result, for the first time the CPGs of these two major subspecialty organisations are in close agreement.
**Objective:**
Reduce the likelihood of a post-operative VTE in total joint replacement patients while decreasing the likelihood of minor and major bleeding complications.

**Recommendations:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>All 1B*</td>
<td>Use of one of the following rather than no antithrombotic prophylaxis: LMWH; fondaparinux; dabigatran†, apixaban†, rivaroxaban (THA or TKA but not hip fracture surgery); low-dose unfractionated heparin; adjusted-dose vitamin K antagonist; aspirin</td>
</tr>
<tr>
<td>1C*,†</td>
<td>Intermittent pneumatic compression device (IPCD)</td>
</tr>
<tr>
<td>2C/2B</td>
<td>Use of LMWH in preference to the other agents recommended as alternatives</td>
</tr>
<tr>
<td>2C</td>
<td>In patients receiving pharmacologic prophylaxis: adding an IPCD during the hospital stay</td>
</tr>
<tr>
<td>2B</td>
<td>Extending thromboprophylaxis for up to 35 days</td>
</tr>
<tr>
<td>2C</td>
<td>In patients at increased bleeding risk: an IPCD or no prophylaxis</td>
</tr>
<tr>
<td>All 1B</td>
<td>In patients who decline injections: using apixaban† or dabigatran†</td>
</tr>
<tr>
<td>2C</td>
<td>Suggest against using IVC filter placement for primary prevention in patients with contraindications to both pharmacologic and mechanical thromboprophylaxis</td>
</tr>
<tr>
<td>1B</td>
<td>Against Doppler (or duplex) ultrasonography screening before hospital discharge</td>
</tr>
<tr>
<td>2B</td>
<td>For patients with isolated lower extremity injuries requiring leg immobilization: no thromboprophylaxis</td>
</tr>
<tr>
<td>2B</td>
<td>For patients undergoing knee arthroscopy without a history of VTE: no thromboprophylaxis</td>
</tr>
</tbody>
</table>

- **Length of treatment minimum 10 to 14 days** † Not FDA approved for DVT prophylaxis prior to total joint replacement † Recommend the use of only portable, battery-powered IPCDs capable of recording and reporting proper wear time on a daily basis for inpatients and outpatients. Efforts should be made to achieve 18 hours of daily compliance
**Algorithm:** The treatment options are expressed in graphic form in Figure 1.

**Evidence:**


List of Implementation Items and Patient Education:
- Orthopedic Pre-Admission Order Set (in development)
- Total Knee Replacement Post-Op Order Set 418
- Total Hip Replacement Post-Op Order Set 591
- Primary Total Joint QlikView Quality Improvement Dashboard
- Supporting MHS Policy: Geriatric Hip Fracture Program VTE protocol

**Patient Education Materials Regarding VTE:** [Partnership for Patients](#) and on [MultiCare Sites](#)

### Metrics Plan:

- Measure VTE outcomes as part of Qlikview Quality improvement Dashboard. Goal set for VGTE rate less than 1% and Bleeding complications <1%
- Review all VTE cases
- Goal is to eliminate all VTE in Total joint replacement patients.

### PDCA Plan:

The MMA Total Joint Program Medical Director will monitor VTE data and results on a quarterly basis and determine appropriate Quality Improvement countermeasures as indicated. Literature reviews will be conducted in partnership with the Vascular surgery department.

### Point of Contact: Dr. Rob Tamurian

<table>
<thead>
<tr>
<th>Approval By:</th>
<th>Date of Approval:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Staff Committee Quality Steering Council</td>
<td>12/31/2014</td>
</tr>
<tr>
<td><strong>Original Date:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Revision Dates:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Reviewed by Surgery Collaborative:</strong></td>
<td>05/12/2015</td>
</tr>
<tr>
<td>Distribution: Surgery Collaborative, Clinical Collaborative Program</td>
<td>X/XX; X/XX</td>
</tr>
</tbody>
</table>
VTE and Bleeding Risk Assessment (AHRQ, National Guideline Clearinghouse, 19)

Table 1. Grade Practice Recommendations *

<table>
<thead>
<tr>
<th>Grade</th>
<th>Descriptor</th>
<th>Qualifying Evidence</th>
<th>Implications for Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Strong recommendation</td>
<td>Level I evidence or consistent findings from multiple studies of levels II, III, or IV</td>
<td>Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present</td>
</tr>
<tr>
<td>B</td>
<td>Recommendation</td>
<td>Levels II, III, or IV evidence and findings are generally consistent</td>
<td>Generally, clinicians should follow a recommendation but should remain alert to new information and sensitive to patient preferences</td>
</tr>
<tr>
<td>C</td>
<td>Option</td>
<td>Levels II, III, or IV evidence, but findings are inconsistent</td>
<td>Clinicians should be flexible in their decision-making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role</td>
</tr>
<tr>
<td>D</td>
<td>Option</td>
<td>Level V evidence: Little or no systematic empirical evidence</td>
<td>Clinicians should consider all options in their decision making and be alert to new published evidence that clarifies the balance of benefit versus harm; patient preference should have a substantial influencing role</td>
</tr>
</tbody>
</table>


Table 2. VTE and Bleeding Risk Assessment (AHRQ, National Guideline Clearinghouse, 19)

<table>
<thead>
<tr>
<th>VTE Risk Assessment</th>
<th>General Risk Factors for Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual risk factor assessment for VTE focuses on patient-specific characteristics, incorporating surgery-specific risk in addition to medical factors. Alternatively, group-specific recommendations for thromboprophylaxis, such as major orthopedic surgery, exist. Although individualized risk factor assessment carries considerable appeal, it is limited by lack of validation in orthopedic surgery. In addition, although we can find ORs for individual risk</td>
<td>- Previous major bleeding (and previous bleeding risk similar to current risk)</td>
</tr>
<tr>
<td></td>
<td>- Severe renal failure</td>
</tr>
<tr>
<td></td>
<td>- Concomitant antiplatelet agent</td>
</tr>
<tr>
<td></td>
<td>- Surgical factors: history of or difficult-to-control surgical bleeding during the current operative procedure, extensive surgical dissection, and revision surgery</td>
</tr>
</tbody>
</table>
factors for VTE, the interaction of these factors in a given patient is not well understood. Such risk factors include (multivariate ORs): previous VTE (OR, 3.4-26.9), cardiovascular disease (OR, 1.4-5.1), Charlson comorbidity index ≥3 (OR, 1.45-2.6), BMI >25 kg/m² (OR, 1.8), age (OR, 1.1 for each 5-year increment vs. age <40 years), advanced age ≥85 years (OR, 2.1), varicose veins (OR, 3.6), and ambulation before day 2 after surgery (OR, 0.7).

However, for major orthopedic surgery, the surgery-specific risk far outweighs the contribution of the patient-specific factors. In our view, individual risk estimation is not sufficiently secure to mandate different recommendations for different risk strata.

Similarly, we did not find any bleeding risk assessments that have been sufficiently validated in the orthopedic surgery population. Below is a list of general risk factors for bleeding in the setting of orthopedic surgery, but specific thresholds for using mechanical compression devices or no prophylaxis instead of anticoagulant thromboprophylaxis have not been established.
Figure 1. Algorithm For Selecting Prophylactic Therapy for VTE with TKA and THA

Consider antithrombotic prophylaxis before surgery.

For Total Knee Arthroplasty (TKA) or Total Hip Arthroplasty (THA). If other orthopedic procedures including hip fracture see specific recommendations.

Consider Relative Contraindications to Pharmacological Options for VTE prophylaxis (Table).

Options for VTE Prophylaxis

Strong Recommendation and Moderate Evidence (1B)

Use Low Molecular Weight Heparin (LMWH) or fondaparinux, dabigatran, apixaban or rivaroxaban for TKA, THA. Other options Low Dose unfractionated heparin, adjusted-dose vitamin K antagonist (VKA) or aspirin (ASA).

Taking the above treatments are recommended for a minimum of 10-14 days as a (1B) Strong recommendation and Moderate Evidence

For major orthopedic surgery there is a weak recommendation and moderate evidence (2B) for extending the outpatient period for up to 35 days.

Moderate or High Risk (see Risk Factors (Table).

Review Specific Recommendations

Weak Recommendation with Moderate or Low Evidence (2B/2C)

Use for TKA and THA LMWH in preference to other alternatives listed to left. Including ASA or VKA.

Intermittent Pneumatic Compression Device (IPCD)

Weak Recommendation with Moderate Evidence (2B)

For Knee Arthroscopy alone without history of VTE- no thrombophylaxis.

Weak Recommendation with Moderate or Low Evidence (2B)

Strong Recommendation and low or very low Evidence (1C)

Efforts should be made to achieve 18 hr of daily compliance.

Strong Recommendation and low or very low Evidence (1C)