An orthopedic surgeon announces she is revising her orders to call for aspirin as the sole prophylaxis for venous thromboembolism (VTE) for her patients having total joint replacement who are at a standard risk for both pulmonary embolism (PE) and bleeding. She refers to guidelines from the American Academy of Orthopaedic Surgeons (AAOS).

Alarm bells go off for the OR management team. Under the Surgical Care Improvement Project (SCIP), aspirin alone does not meet the SCIP VTE 1 measure for patients with no documented risk of bleeding.

Issues like these have arisen as physicians and OR leaders weigh the evidence on VTE prevention for orthopedic surgery.

The role of aspirin

The SCIP VTE measures do not allow aspirin alone for patients at standard risk of PE and bleeding. That is because there is a Grade 1A recommendation against aspirin alone for all surgical patients from the American College of Chest Physicians (ACCP) guidelines, on which the SCIP measures are based. (Grade 1A is a strong recommendation supported by high quality evidence.)

One solution: If the surgeon is concerned about bleeding, and risk factors for bleeding are documented in the chart, the surgeon can use mechanical prophylaxis for the patient, and that will pass the SCIP measure, notes Dale Bratzler, DO, MPH, of the Oklahoma Foundation for Medical Quality, which supports SCIP for CMS. Mechanical prophylaxis is recommended by both ACCP and AAOS. If the surgeon wants to give the patient aspirin or warfarin in addition, the case will still pass the SCIP measure, Dr Bratzler says. Aspirin used alone, however, will not pass the measure.

(A summary of the recommendations is in the sidebar.)

Role of mechanical prophylaxis

Updated ACCP guidelines released in 2008 give a more prominent role to mechanical prophylaxis than the 2004 guidelines on which the SCIP measures were based. ACCP now recommends mechanical prophylaxis with a venous foot pump or intermittent pneumatic compression device for patients having total joint replacement and hip fracture procedures who have a high risk of bleeding.

The AAOS guidelines advocate mechanical compression devices and early mobilization in all patients. AAOS also says aspirin would not be the lone thromboprophylaxis measure, Norman Johanson, MD, chairman of the group that developed the AAOS guidelines, told OR Manager.

“Aspirin alone is not really acceptable to anybody,” he says, noting that the issue really is not use of aspirin alone but its use with mechanical prophylaxis.
## Comparison of AAOS and SCIP on VTE prophylaxis

**Summary:** American Academy of Orthopaedic Surgeons (AAOS) Clinical Guideline on Prevention of Symptomatic Pulmonary Embolism in Patients Undergoing Total Hip or Knee Arthroplasty

<table>
<thead>
<tr>
<th>Standard risk PE, standard risk bleeding*</th>
<th>Standard risk PE, elevated risk bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>Aspirin</td>
</tr>
<tr>
<td>LMWH</td>
<td>Warfarin</td>
</tr>
<tr>
<td>Synthetic pentasaccharides</td>
<td>None</td>
</tr>
<tr>
<td>Warfarin</td>
<td>Level III, Grade B recommendation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elevated risk PE, standard risk bleeding</th>
<th>Elevated risk PE, elevated risk bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMWH</td>
<td>Aspirin</td>
</tr>
<tr>
<td>Synthetic pentasaccharides</td>
<td>Warfarin</td>
</tr>
<tr>
<td>Warfarin</td>
<td>None</td>
</tr>
<tr>
<td>Level III, Grade B recommendation</td>
<td>Level III, Grade C recommendation</td>
</tr>
</tbody>
</table>

Additional notes about AAOS recommendations:
1. “The risk of PE differs among different patients; however, there is currently no satisfactory evidence-based risk stratification system.” (p 12).
2. Recommendation 1.2: All patients should be assessed preoperatively for elevated risk (greater than standard risk) of major bleeding (Level III, Grade C). Note: Grade of recommendation reduced because of lack of consistent evidence on risk stratification of patient populations.
3. Recommendation 2.1: Patients should be considered for intraoperative and/or immediate postoperative mechanical prophylaxis (Level III, Grade B).
4. Recommendation 3.1: Postoperatively, patients should be considered for continued mechanical prophylaxis until discharge to home (Level IV, Grade C).

### SCIP VTE 1 Performance Measure: Hip or knee arthroplasty

<table>
<thead>
<tr>
<th>No bleeding risk documented</th>
<th>Documented bleeding risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMWH</td>
<td>Mechanical prophylaxis</td>
</tr>
<tr>
<td>Synthetic pentasaccharides</td>
<td>[Any other modality (including aspirin or warfarin) can be added at the discretion of the surgeon.]</td>
</tr>
<tr>
<td>Warfarin</td>
<td></td>
</tr>
<tr>
<td>Knee arthroplasty only:</td>
<td></td>
</tr>
<tr>
<td>Intermittent pneumatic</td>
<td></td>
</tr>
<tr>
<td>compression devices</td>
<td></td>
</tr>
<tr>
<td>Venous foot pump</td>
<td></td>
</tr>
</tbody>
</table>

*This is the ONLY category where there is a significant difference between the recommendations of the AAOS and the national SCIP performance measure. The AAOS guideline recommends aspirin alone for those patients who are at “standard risk of both PE and major bleeding.”

**Source:** Surgical Care Improvement Project, Dale Bratzler, DO, MPH, 2009.
**Weighing the risks**

In deciding on VTE prophylaxis, physicians must weigh the risks of DVT and PE with the risk of bleeding, both serious complications for surgical patients.

Orthopedic surgeons say the AAOS guidelines, which focus on prevention of symptomatic PE, are more applicable to orthopedic surgical patients. The ACCP guidelines focus on both asymptomatic and symptomatic DVT as an outcome.

Orthopedic surgeons contend that the aggressive prophylaxis recommended by ACCP raises the risk of major bleeding.

“The ACCP guidelines lump all orthopedic surgery into a high-risk group [for VTE] and give incidence of DVT in the 50% to 60% range. Orthopedic surgeons know the incidence is nowhere near that high,” Dr Johanson says. “The incidence of symptomatic PE for hip replacement is less than 1%, and it is far less than 1% for knee replacement, whereas the incidence of bleeding with aggressive prophylaxis is up to 4%,” says Dr Johanson, who is chairman of the Department of Orthopedic Surgery at Drexel University College of Medicine in Philadelphia.

**Risk of bleeding**

Bleeding is a major concern in orthopedic patients, and he says more research on postoperative bleeding is needed. “This is a patient safety issue—a patient can be harmed by a drug that causes postoperative bleeding,” says Dr Johanson.

The reason there hasn’t been more research is that it is difficult to define major bleeding, he notes. Some surgeons take patients back to the operating room, while others wait to see if the bleeding stops. With every major hematoma, particularly in and around the knee, he says, there is a higher risk of drainage, which raises the risk of infection and further problems.

**Risk of DVT, PE**

Surgery is also one of the biggest risk factors for DVT and PE, Dr Bratzler points out. The risk is almost 25-fold greater for surgical patients than for patients who are not in the hospital, according to published research.

He says most experts who participated in developing the SCIP measures think patients having total joint procedures are all at significant risk of VTE, and risk stratification is not needed. The fact that the AAOS guidelines do not discuss the risk of DVT or asymptomatic PE is a problem, he says.

“Based on studies of patients who survived DVT or PE, 30% have recurrence within 10 years, and 28% will develop deep venous stasis syndrome within 20 years. So we think asymptomatic DVTs and PEs do present a risk for long-term complications.”

Dr Johanson responds, “Post-thrombotic syndrome among total joint patients who did not previously have some form of venous stasis disease has never been proven to be a problem and, in my opinion, needs more careful research to identify it as a significant clinical issue.”

**Stratifying risk**

Another issue is that, though the AAOS guidelines advocate risk stratification for each patient, there are currently no good evidence-based guidelines for risk stratification, Dr Johanson notes.
Dr Bratzler says stratifying patients when there is no evidence-based risk stratification system essentially means no one really knows how to divide patients into standard or elevated risk.

**Strength of the evidence**

The strength of the evidence backing the guidelines is another issue. All of the AAOS recommendations for pharmacoprophylaxis are supported by Level 3 evidence, which is not as strong as AACP’s Grade 1 recommendations, Dr Bratzler notes. Level 3 evidence is based on case-control studies.

Dr Johanson says the AAOS recommendations rely on Level 3 evidence because the literature on pulmonary embolism is not strong owing to the large sample size that would be required. The literature is the same as that examining DVT as an end point. Because the incidence of DVT is higher than the incidence of PE, the studies are more appropriately powered to answer questions about DVT incidence, he notes.

“If you have DVT incidence of 9% or 10%, and you want to prove a 50% risk reduction, your sample size needs to be 200 to 300 patients; whereas, if you want to achieve a 50% risk reduction of a PE incidence of 0.8%, you need 35,000 patients,” Dr Johanson explains.

Returning to the aspirin issue, Dr Bratzler summarizes: “Any surgeon who is concerned about bleeding can put mechanical prophylaxis on the patient, and the case will pass the performance measure. Then if they want to use aspirin, that isn’t counted against them [for SCIP].”

He and Dr Johanson agree that despite the controversy, the orthopedic surgeons are some of the best physicians at following the SCIP performance measures.

—Judith M. Mathias, RN, MA

**References**


Bratzler D. Patient Safety and the Surgical Care Improvement Project. Feb 2, 2009; Presentation at the Colorado Foundation for Medical Care, Englewood. Webinar available at: www.cfmc.org/files/hospital/Great8_SCIP%200209%201%20slide%20per%20page.pdf


Preventing VTE: Stockings or pumps. What’s the best method?

Guidelines recommend using mechanical methods to prevent venous thromboembolism (VTE).

But what type is best to use? Options include compression stockings like TED hose and sequential compression devices (SCDs). Both come in knee-high and thigh-high lengths, and SCDs also come as foot pumps.

Unfortunately, there aren’t clear answers about what’s best. But whatever the method, they must be fitted and used correctly.

The Surgical Care Improvement Project (SCIP) says either knee-high or thigh-high SCDs or compression stockings are acceptable.

The American Academy of Orthopaedic Surgeons guideline recommends mechanical compression for total hip and total knee replacement unless it is contraindicated. But the guideline notes no prospective randomized studies have compared the efficacy of these devices.

The American College of Chest Physicians (ACCP) 2008 VTE prevention guideline says mechanical methods have advantages in patients with high bleeding risk but have not been studied as much as anticoagulants. Many of these devices have not been studied in clinical trials, and companies do not have to demonstrate they are effective in preventing VTE to market them, ACCP notes.

ACCP urges clinicians to select the correct size, properly apply them, and remove them only for a short time each day when the patient is walking or bathing.