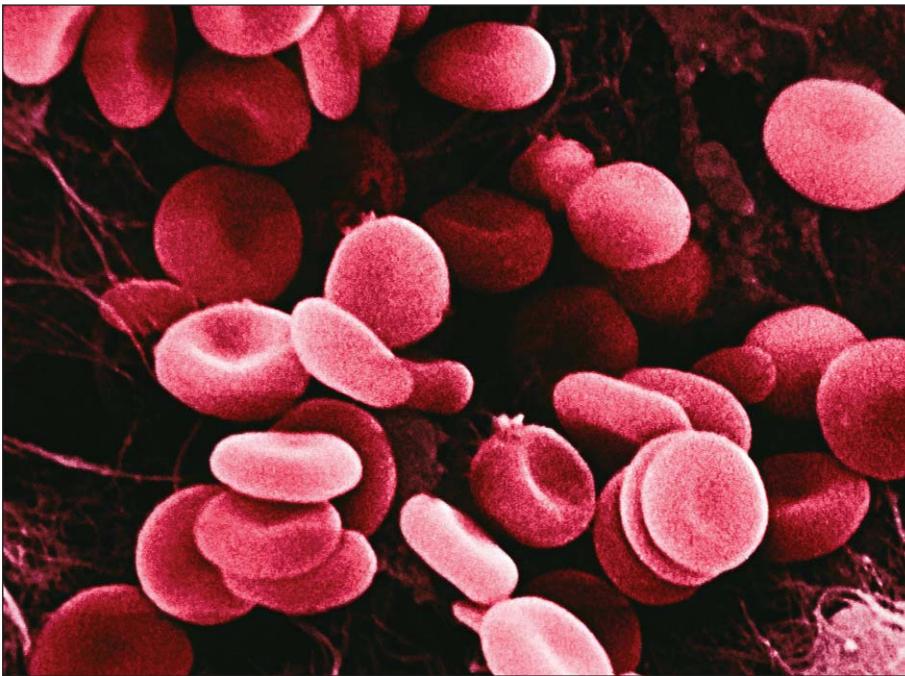


# Preventing “Never Events”

## Complications Following Total Knee or Hip Replacement Surgeries



Total knee replacement and hip replacement surgeries have been commonplace for decades. Although surgical techniques have improved and recovery times have shortened, these procedures still come with a high risk of deep vein thrombosis (DVT). DVT originates in the calf or thigh due to a combination of venous stasis, vessel wall damage, and hypercoagulability<sup>1</sup>. Blood clots can then form and travel to the lungs, causing fatal pulmonary embolism (PE).

PE is a common fatal complication associated with total joint arthroplasty. However, preventive measures exist that health care providers can use to protect patients<sup>1</sup>. One such measure is thromboprophylaxis, which involves giving a patient a low dose of an anticoagulant medication. Evidence shows that the correct use of thromboprophylaxis could prevent an estimated 20,000 to 30,000 deaths in the United States alone.<sup>2</sup>

The problem of DVT is not a new one, according to Kenneth A. Bauer, M.D., professor of medicine, Harvard Medical School, and director, Thrombosis Clinical Research, Beth Israel Deaconess Medical Center in Boston. Bauer says health care providers knew and were concerned about DVT as far back as the nineteenth century. “It goes back to the pathogenesis of thrombosis. The issue of the stasis of blood in the veins is common in postoperative patients because they are sedentary,” Bauer says, adding that vessel damage and hypercoagulability were also identified at that time.

Because these complications are serious and preventable, the National Quality Forum has designated DVT and PE after total knee replacement or hip replacement surgery to be serious reportable events, commonly called “never events.” The Centers for Medicare & Medicaid Services no

*“The blood clot can travel to the lung, causing pulmonary embolism, before patients or clinicians realize a problem exists.”<sup>4</sup>*

longer reimburses health care organizations for costs associated with never events.

### Scope and Extent of Total Hip and Knee Replacements

Currently, nearly a half-million total knee replacements and nearly a quarter-million primary total hip replacements are performed each year.<sup>3</sup> As the baby boom generation grows older, the demand for such surgeries is likely to grow, according to Bauer.

Meanwhile, surgical techniques for hip and knee replacements have evolved, including the use of less invasive methods. These techniques involve reduced recovery times, but the dangers of DVT and PE persist. “Minimally invasive hip replacements are starting to be performed, and patient stays have gone down, but it’s still a major surgery; patients are immobile, and there is still a recuperative phase. The risk remains in this population,” Bauer explains.

Certain factors exacerbate the risk. For example, DVT can be clinically silent, presenting no symptoms until in some cases long after the surgery. The blood clot can travel to the lung, causing pulmonary embolism, before patients or clinicians realize a problem exists.<sup>4</sup>

Other factors have to do with the patient’s demographics, such as his or her age. Older patients can be at a higher risk of DVT or PE than

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younger patients. Unfortunately, older patients are also more likely to need knee or hip replacement surgeries. The average age for knee replacements is 67.1 years, and the average age for hip replacement is 65.4 years.<sup>3</sup> Gender can be a factor as well. Research indicates that women are more likely than men to undergo total hip and knee surgeries.

Along with the age and gender of the patient, the likelihood of DVT is higher among those who have other health problems, including obesity, history of smoking, family history of thrombosis, or the presence of another condition such as cancer.<sup>5</sup>

## Effective Preventive Measures

Fortunately, DVT and PE are preventable if the proper precautions are taken.

Some of these precautions should be in place during surgery. For example, regional anesthesia, such as spinal or epidural anesthesia, has been shown to prevent thrombosis by allowing more blood flow to the lower extremities than general anesthesia.<sup>5</sup>

What happens after surgery is also important. For example, clinicians should do what they can to help the patient become ambulatory as soon as possible after surgery. Patients who are sedentary are more likely to develop DVT than those who are mobilized earlier and more often.

## Thromboprophylaxis: A Valuable Tool

Chief among preventive measures that have proven effective is thromboprophylaxis—administration of anticoagulation medication prior to or during surgery. An estimated 40% to 60% of patients undergoing total hip and knee replacements without pharmacological prophylaxis experience DVT.<sup>6</sup> For patients who receive throm-



*Proper use of anticoagulants prior to some surgeries can potentially prevent thousands of deaths.*

boprophylaxis, the incidences drops to 2.4% for hip replacement patients and 1.7% for total knee replacement patients.<sup>7</sup>

The type of anticoagulant used in thromboprophylaxis varies, from warfarin to low-molecular weight heparin to fondaparinux (synthetic pentasaccharide). Some physicians have even provided low doses of aspirin.

Warfarin is one of the most frequently used prophylactic agents in the prevention of DVT. Warfarin has been shown to lower incidence of DVT by 70%. Warfarin is also associated with a reduced risk of bleeding complications.<sup>1</sup>

Low-molecular-weight heparin has been effective in preventing venous

thromboembolism. Low-molecular-weight heparin tends to work better than standard heparin in patients who have undergone hip and knee replacement because of its bioavailability and prolonged half-life, among other attributes.<sup>1</sup>

Clinical trials have shown that fondaparinux offers key preventive qualities for DVT, although it has been linked to some bleeding complications.<sup>1</sup>

In recent years, newer drugs have been introduced that show promise in preventing DVT and PE. “Newer agents are showing very low rates,” reports Bauer. Among those newer agents are tissue factor pathway inhibitors (TFPIs) and nematode anticoagulant

protein (NAPc2). Direct thrombin inhibitors are also in various stages of testing.<sup>8</sup>

Despite extensive research, no individual agent has been determined to be the ideal medication in DVT prevention.<sup>1</sup> The type of medication to be used depends on a number of factors, from the use of regional anesthesia to a patient's propensity to bleed to his or her age, among other factors. Ultimately, the physician and/or medical team determines which prophylactic regimen to use after weighing the risk of potential bleeding and the effectiveness for DVT and PE prevention.

### Timing Is Everything

The duration of postoperative anticoagulant therapy can be just as important as the type of medication used. For knee surgeries, for example, the anticoagulant must be taken for at least 10 to 14 days. Patients who have undergone hip replacements should receive anticoagulant therapy for at least 30 days and perhaps more.<sup>4</sup>

### Diagnosing and Treating DVT

When DVT occurs, diagnosis and treatment are critical to stopping it from progressing to PE, which can, if left undetected, cause a fatality within as little as one hour.<sup>2</sup>

During a hospital stay, knee and hip replacement patients are regularly checked for any unusual swelling, redness, or pain. Rapid screening measures may be used if swelling is found; venography, magnetic resonance imaging, and ultrasonography may also be used to diagnose DVT.<sup>9</sup>

Because DVT can develop after discharge, patients are also monitored by home health professionals and can check in for additional testing and follow-ups with their physicians following discharge. Although many cases of DVT present within a few days after surgery, the risk can extend for three

months or longer, especially for those who have undergone hip surgery.<sup>8</sup>

Patient education, which begins at the hospital, can also lead to the identification of complications and to a medical diagnosis of DVT. Patients who are instructed on what symptoms to look for and when and how often to return for monitoring can play a role in their own care.

If a patient is diagnosed with DVT and a clot is discovered, he or she is generally ordered to bed rest and to follow a course of heparin, followed by warfarin. If clots are found in the calf, warfarin may be administered for 6 to 12 weeks.<sup>8</sup> **PS**

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