Rivaroxaban (Figure 1) is a new oral prescription medication used to help prevent clots from forming. Rivaroxaban is marketed under the brand name Xarelto, and it is approved in the United States, Canada, and Europe to prevent blood clots in patients undergoing an elective hip or knee replacement and to prevent stroke from atrial fibrillation. This Cardiology Patient Page will discuss the use of rivaroxaban to prevent pulmonary embolism and deep vein thrombosis after hip or knee replacement.

Although there are many risk factors for developing a blood clot after surgery, one of the biggest is being immobile after surgery. Patients are at risk for developing a blood clot up to 3 months after surgery. Anticoagulants or “blood thinners” prevent blood clots from forming after surgery. Although these medications do not actually “thin” your blood, they make it more difficult for blood to clot.

How Does Rivaroxaban Work?
Proteins, called clotting factors, and platelets, a type of blood cell, are normally found flowing through your blood vessels. When you have a cut or when you are not moving and your blood becomes sluggish, clotting factors and platelets work together to form a clot or thrombus. Although this natural process helps you stop bleeding when you have a cut, it can be harmful when blood clots develop in the arms, legs, or lungs. This process is called the coagulation cascade (Figure 2). One step in this cascade involves clotting factor Xa. Rivaroxaban blocks clotting factor Xa from working, and this prevents the clot from forming.

Tips on Taking Rivaroxaban
Rivaroxaban is available as a 10-mg tablet. The usual dose is 10 mg once daily beginning at least 6 to 10 hours after surgery. Rivaroxaban should be taken exactly as prescribed by your doctor and is usually continued for up to 35 days after hip replacement and 12 days after knee replacement. The tablet can be taken with or without food. The tablet can be crushed if needed. If you forget to take a dose, take it as soon as you remember. However, if it is close to the time of your next dose, then skip that dose. You should not take 2 doses at the same time. Do not stop this medication without permission from your doctor, because stopping it can cause you to have an increased risk of forming a blood clot.

Therapies Other Than Rivaroxaban to Prevent Clots After Hip or Knee Replacement
Many different medications are used to prevent blood clots from forming. You will be taking an anticoagulant until your physician feels that you are no longer at risk for developing a clot after surgery. Warfarin (Coumadin) is an oral medication that is commonly used. It needs to be monitored by a laboratory test, the international normalized ratio. You will have to have your blood drawn at least once a month while taking this medication to monitor your international normalized ratio. Unlike warfarin, rivaroxaban does not require laboratory monitoring. Another class of medications called low-molecular-weight heparins such as enoxaparin (Lovenox) and
Dalteparin (Fragmin) are injections that are given under the skin once or twice a day. Fondaparinux (Arixtra) is similar to dalteparin and enoxaparin and is dosed once a day. These agents do not require laboratory monitoring but can be painful to inject.

**Side Effects**

Bleeding is the most common side effect with rivaroxaban. You may bleed or bruise, and it may take longer than usual to stop bleeding. Bleeding may occur from obvious areas like your nose or gums, but also in hidden areas like your bladder and intestines. There is a greater risk of bleeding in patients who are older in age or have kidney or liver problems. The risk of bleeding also increases if you have stomach ulcers or are on other medications that increase your risk of bleeding such as aspirin. Check with your doctor if you start taking any new medications or before you discontinue any existing medications while taking rivaroxaban. If you experience a fall, unusual or excessive bleeding, persistent headache or dizziness, you should contact your healthcare provider immediately. If you have a severe headache that does not go away, you should contact your doctor. This might be a sign of bleeding within your head. Other common side effects of rivaroxaban are itching, fainting, blisters, muscle spasms, and increased fluid draining from your surgery site.

**When to Call Your Healthcare Provider**

You should call your healthcare provider or 911 if you experience any of the following:

- Bleeding that does not stop or bruising that is not the result of injury
- Bright red or black blood in the stool
- Coughing up or vomiting blood
- Numbness, tingling, or unusual muscle weakness in your legs
- Pain or redness in your calf and leg that is not related to your surgery site
- Swelling of your thigh, calf, ankle, or foot
- Shortness of breath or chest pain related to breathing
- Fall or hit your head

**Rivaroxaban and Lifestyle**

Rivaroxaban can increase your risk of bleeding. Therefore, caution must be taken when participating in physical activities, especially those that can cause serious injury. A medical identification bracelet should be worn to make emergency medical personnel and healthcare providers aware that you are taking an anticoagulant. It is important to know the common do’s and don’ts of rivaroxaban therapy (Table).

**Pregnancy**

You should talk with your doctor if you are pregnant or plan on becoming pregnant to weigh the risks versus the benefits of taking rivaroxaban while pregnant. Rivaroxaban has not been studied in pregnancy. In animal research studies, there was an increased risk of pregnancy loss but no fetal malformations. It is unknown whether rivaroxaban crosses into the breast milk. Therefore, you should discuss with your doctor breastfeeding if you plan on nursing while taking rivaroxaban.

**Surgery/Dental and Other Medical Procedures**

It is important to tell all your healthcare providers that you are taking rivaroxaban. If you are having surgery or any procedure that increases your risk of bleeding, you may need to briefly stop taking rivaroxaban.

**Medication Interactions**

Rivaroxaban has several different drug interactions. You should contact your health provider before changing or taking any new medications, including over-the-counter, vitamins, or other herbal products, because they might interact with rivaroxaban. You should try to avoid taking medications that also increase the risk of bleeding such as
as pain relievers (e.g., aspirin, ibuprofen, or naproxen). If you are currently taking a pain reliever, consult your doctor.

Where to Get More Information
Your healthcare provider and pharmacist are good sources for questions and concerns regarding rivaroxaban after your orthopedic surgery. You will be given a rivaroxaban medication sheet with your prescription. More information can be found on the worldwide web at the following addresses:

- Venous Disease Coalition. Available at: http://www.venousdiseasecoalition.org/
- ClotCare. ClotCare Online Resource. Available at: http://clotcare.org/

Table. Rivaroxaban Common Do's and Don'ts

<table>
<thead>
<tr>
<th>What to Do</th>
<th>What Not to Do</th>
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<tbody>
<tr>
<td>Do watch for signs and symptoms of bleeding.</td>
<td>Do not take 2 doses at once if you miss a dose.</td>
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<tr>
<td>Do pay attention to leg cramps, chest pressure</td>
<td>Do not wait for pain, discomfort, shortness of breath, or headache to</td>
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<tr>
<td>or discomfort, shortness of breath, or</td>
<td>subside before seeking medical assistance.</td>
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<tr>
<td>headache.</td>
<td>Do not start taking any new medications without talking to your healthcare</td>
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<td>Do contact your healthcare provider if you</td>
<td>provider.</td>
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<tr>
<td>experience an injury and experience bruising</td>
<td>Do not stop taking rivaroxaban unless told to do so by your healthcare</td>
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<tr>
<td>or unusual bleeding.</td>
<td>provider.</td>
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<tr>
<td>Do take rivaroxaban exactly as prescribed by</td>
<td>Do not leave your bracelet or medication list at home.</td>
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<td>your provider.</td>
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<tr>
<td>Do wear a medical identification bracelet or</td>
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<td>carry a card that alerts medical personnel that</td>
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<td>you are on an anticoagulant.</td>
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<tr>
<td>Do tell all your healthcare providers that you</td>
<td>Do not rely on a friend or family member to know what medication you are</td>
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<tr>
<td>are taking rivaroxaban.</td>
<td>taking.</td>
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Rivaroxaban to Prevent Pulmonary Embolism After Hip or Knee Replacement
Deborah Cios and John Fanikos

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