STROKE PREVENTION: MANAGING ANTICLOTTING DRUGS BEFORE HAVING A MEDICAL PROCEDURE

This information sheet is provided to help you understand the risks of using anticlotting drugs before an invasive medical procedure.

Neurologists from the AAN are doctors who identify and treat diseases of the brain and nervous system. The following evidence-based information* is provided by experts who carefully reviewed all available scientific studies on risks of using anticlotting drugs before certain medical procedures. More information is available at www.aan.com/guidelines.

People with a history of stroke often take anticlotting drugs (blood thinners) to prevent another stroke. These drugs also are used to prevent a first stroke in people with atrial fibrillation, an irregular or fast heartbeat. By preventing clots, these drugs also can cause bleeding. The bleeding can be a problem during invasive medical procedures. Before such a procedure, it is important to discuss management of anticlotting drugs with your doctor or medical care team. The decision to continue or stop an anticlotting drug temporarily should be made carefully. Bleeding risk during the procedure should be weighed against stroke risk from stopping the drug.

MY DOCTOR SAYS I AM AT RISK FOR A STROKE. WHAT ARE THE DIFFERENT TYPES OF STROKE?

There are two main types of stroke: ischemic and hemorrhagic. Most strokes are ischemic strokes. They account for about 80 percent of all strokes. Ischemic strokes happen when clots form in the arteries that feed the brain. Clots can lead to stroke in several ways:

• A clot develops, often where there is hardening of an artery in the neck or head. The clot blocks the artery or travels up and blocks a smaller artery.
• A clot forms in the heart, often because of an irregular heartbeat. The clot then travels to the brain.

The studies examined here looked at people who have a history of stroke and take anticlotting drugs to prevent another stroke. The studies also looked at people with atrial fibrillation who take anticlotting drugs to prevent a stroke. For more information about stroke, visit www.aan.com/view/stroke.

Some people take anticlotting drugs for heart problems. The studies here did not focus on people with heart problems other than atrial fibrillation.

ARE THERE DIFFERENT TYPES OF ANTICLOTTING DRUGS FOR PREVENTING A STROKE?

Several anticlotting drugs may be given to prevent a stroke. These can be used to prevent a first stroke or prevent another stroke after one has happened. The anticlotting drugs studied here are taken by mouth (except for heparin or low-molecular-weight heparin). There are two types: antiplatelets and anticoagulants. Both can help stop clots from forming or slow growth of existing clots. Examples of antiplatelets are:

• Aspirin
• Aspirin plus dipyridamole
• Clopidogrel

Anticoagulants typically are given to people with a high risk of stroke. People with atrial fibrillation also typically are given these drugs. For these people, the heart's uneven rhythm can cause blood to stay still long enough for a clot to form. The clot can then travel to the brain and cause a stroke. Examples of anticoagulants are:

• Warfarin
• Acenocoumarol
• Apixaban
• Dabigatran
• Rivaroxaban
• Heparin (low-molecular-weight heparin)

Anticoagulants and antiplatelets may cause increased bleeding. This is a serious side effect and can be life-threatening. It is especially risky during invasive medical procedures. These involve cutting or inserting objects into the body. Examples are surgeries and procedures involving needles, probes, or scopes.

I TAKE AN ANTICLOTTING DRUG AND NEED TO HAVE SURGERY. HOW CAN I KNOW IF I SHOULD STOP TAKING THIS DRUG BEFORE SURGERY?

It is important to work closely with your doctor or care team to decide whether to stop an anticlotting drug before an invasive procedure. When preparing for such a procedure, be sure to weigh bleeding risk against clotting risk. These risks vary by drug, procedure, and individual situation.

The studies examined here looked at risk of important bleeding with various invasive procedures. Important bleeding is bleeding that:

• May require a blood transfusion
• May require special drugs to increase the blood pressure
• May require another procedure to stop the bleeding
• May lead to a permanent problem related to bleeding during the procedure (for example, loss of vision during eye procedures or paralysis from bleeding during spine procedures)
In the guideline, bleeding is not considered important if:

- It is mild (occurs in small amounts)
- It requires a doctor to hold pressure for longer
- It is not linked to surgical problems

Studies have been done to find out the degree of stroke risk when an anticlotting drug is temporarily stopped. However, for many drugs and procedures, there is not enough evidence to show the level of risk. Most of the available studies examine the effects of stopping aspirin or warfarin. For people who have had a stroke before, moderate evidence shows that stopping aspirin can increase risk of another stroke.

The results from these studies cannot readily be applied to other drugs. Thus, more studies are needed to help show the stroke risks of stopping other anticlotting drugs temporarily. Be sure to discuss these risks with your doctor or care team before deciding to continue or stop a drug.

Bleeding risks from continuing anticlotting drugs can vary across procedures. The table below shows the available evidence for bleeding risks of different procedures when anticlotting drugs are continued. For many minor procedures, the bleeding risk from continuing an anticlotting drug is fairly small.

For some other procedures, bleeding risk may be higher when an anticlotting drug is continued. Examples are certain hip and colon procedures. For these, the doctor may decide an anticlotting drug should be stopped. For yet other procedures, there is not enough evidence to show the level of bleeding risk.

When deciding to stop or continue an anticlotting drug before a procedure, it is important to work with your doctor or care team to decide the right approach for you. For some people at high risk of having a clot, continuing the drug may be the right approach even if there is a risk of important bleeding. For others whose risk of clotting is lower, briefly stopping the anticlotting drug may be best. This may be the case for procedures where bleeding is riskier (for example, orthopedic hip procedures). For procedures with low risk of important bleeding (for example, dental procedures), the person may choose to continue the drug.

If you choose to stop an anticlotting drug before a procedure, be sure to restart the drug as soon as possible afterward. Work with your doctor or care team to decide when to restart the drug safely.

I AM SCHEDULED FOR SURGERY AND NEED TO MAKE A DECISION ABOUT MY ANTICLOTTING TREATMENT. MY DOCTOR WANTS TO STOP MY ANTICLOTTING PILLS AND USE A FORM OF HEPARIN INSTEAD. HOW CAN I KNOW IF THIS IS RIGHT FOR ME?

For certain anticlotting drugs, it is common to use “bridging” therapy before an invasive procedure. This often is done if a person has a high risk of developing clots. With bridging therapy, the anticlotting pills are stopped, and another anticlotting drug is used temporarily instead. Often, heparin is the replacement drug. This is given by injection or IV needle. The effects of heparin wear off more quickly than those of anticlotting pills. Thus, heparin can be safely used closer to the time of the procedure than anticlotting pills. Anticlotting pills must be stopped many days before the procedure.

There is not enough evidence to show if temporary anticlotting drugs such as heparin help prevent strokes. However, many experts think these drugs are helpful. Some studies looked at bleeding risk for people stopping temporary anticlotting drugs right before a procedure. There is moderate evidence that bleeding risk is higher for these people when compared with people who do not use these drugs. There is not enough evidence to show if people who use temporary anticlotting drugs bleed less than people who continue anticlotting pills.

THE TABLE MENTIONS ASPIRIN AND WARFARIN. HOWEVER, I AM TAKING A DIFFERENT ANTICLOTTING DRUG. ARE THE BLEEDING RISKS THE SAME?

Most studies on bleeding risks from anticlotting drugs used during procedures focus on aspirin and warfarin. More studies are needed to understand bleeding risks of other anticlotting drugs used before or during procedures. Other anticlotting drugs may have different bleeding risks. These drugs include:

- The anticoagulants apixaban, dabigatran, and rivaroxaban
- The antiplatelets aspirin plus dipyridamole and clopidogrel

More studies are needed to show the bleeding risks of these drugs during procedures. Regardless of the anticlotting drug used, it is important to work closely with your doctor or care team to determine a treatment approach before a procedure.
This statement is provided as an educational service of the American Academy of Neurology. It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods of care for a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodologies. The AAN recognizes that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, and are based on all of the circumstances involved.

*After the experts review all of the published research studies, they describe the strength of the evidence supporting each recommendation:

- Strong evidence = more than one high-quality scientific study
- Moderate evidence = at least one high-quality scientific study or two or more studies of a lesser quality
- Weak evidence = the studies, while supportive, are weak in design or strength of the findings
- Not enough evidence = either different studies have come to conflicting results or there are no studies of reasonable quality

Table. Important Bleeding Risk Linked to Continuing Anticlotting Drugs Before Procedures

<table>
<thead>
<tr>
<th>EVIDENCE LEVEL</th>
<th>ASPIRIN</th>
<th>WARFARIN</th>
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</thead>
<tbody>
<tr>
<td>Strong evidence: Likely not to increase risk of important bleeding</td>
<td>Dental procedures</td>
<td>Dental procedures</td>
</tr>
<tr>
<td>Moderate evidence: Likely not to increase risk of important bleeding</td>
<td>Carpal tunnel syndrome surgery</td>
<td>Dermatologic procedures</td>
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<td></td>
<td>Cataract surgery</td>
<td>Invasive ocular anesthesia</td>
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<tr>
<td></td>
<td>Dermatologic procedures</td>
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<td></td>
<td>Invasive ocular anesthesia</td>
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<td></td>
<td>Prostate biopsy (transrectal ultrasound guided)</td>
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<tr>
<td></td>
<td>Spinal/epidural needle</td>
<td>—</td>
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<tr>
<td>Weak evidence: Might increase risk of important bleeding</td>
<td>Colonoscopic polypectomy</td>
<td>Certain prostate procedures</td>
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<td>EMG</td>
<td>EMG</td>
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<tr>
<td></td>
<td>Sphincterotomy</td>
<td>Endothermal ablation of the saphenous vein</td>
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<td></td>
<td>Transbronchial biopsy</td>
<td>Inguinal herniorrhaphy</td>
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<td>Ultrasound-guided biopsies</td>
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<td>Upper-gastrointestinal endoscopic biopsy</td>
<td>—</td>
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<td></td>
<td>Vitreoretinal surgery</td>
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<tr>
<td>Not enough evidence: Do not know if risk of important bleeding is increased or not increased</td>
<td>Transurethral resection of the prostate</td>
<td>Ophthalmologic procedures (other than anesthesia)</td>
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<tr>
<td>Weak evidence: Might increase risk of important bleeding</td>
<td>—</td>
<td>Colonoscopic polypectomy</td>
</tr>
<tr>
<td>Moderate evidence: Likely to increase risk of important bleeding</td>
<td>Orthopedic hip procedures</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: Dashes mean no studies available.

EMG = Electromyography

This AAN guideline is endorsed by the American Osteopathic Association, European Federation of Neurological Societies, and European Neurological Society.

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Copies of this summary and additional companion tools are available at www.aan.com or through AAN Member Services at (800) 879-1960.