THE EFFECTIVE PHYSICIAN

# Perioperative Anticoagulation Management

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**Background**
The perioperative management of patients on warfarin and/or antiplatelet medications is a difficult clinical issue that affects approximately 250,000 patients in North America annually. The recent American College of Chest Physicians guidelines update aims to balance the risk of thromboembolic events associated with interruption of therapy against the risk of bleeding associated with continued anticoagulation in the perioperative period.

**Conclusions**
Surgical procedures associated with the highest bleeding risk include coronary artery bypass and valve procedures, intracranial and spinal surgery, major vascular surgery, major orthopedic surgery, major cancer surgery, and prostate and bladder surgery. Perioperative anticoagulation might require particular diligence following endoscopic removal of large sessile polyps, prostate or kidney biopsy, or implantation of pacemaker (or defibrillator) generators.

Although no validated tools are available to stratify the risk of perioperative thromboembolism in patients on warfarin, the guidelines suggest separating patients into high-, moderate-, and low-risk groups based on the indication for anticoagulation. (See box.) The CHADS2 is a tool to aid clinicians in stratifying stroke risk in patients with chronic nonvalvular atrial fibrillation; it also has utility in predicting perioperative stroke risk. CHADS2 is scored from 0 to 6, with 1 point each for the presence of heart failure, hypertension, age over 75 years, and diabetes, and 2 points for prior cerebrovascular accident or transient ischemic attack.

It takes 2-3 days for warfarin's anticoagulant effect to begin, and the drug should be discontinued 5 days prior to a procedure.

With aspirin, antiplatelet effects begin within minutes after a dose is taken. In contrast, with maintenance dosing (75 mg) of clopidogrel, peak inhibition of platelet aggregation takes 3-7 days. Aspirin, clopidogrel, and ticlopidine irreversibly inhibit platelet aggregation and must be stopped 7-10 days prior to a procedure. With a low-molecular-weight heparin (LMWH), peak anticoagulation is achieved 3-5 hours after injection.

The anticipated bleeding risk during a procedure and the adequacy of hemostasis following its completion should be considered for each individual patient, in order to determine the timing of anticoagulation following surgery. To reduce the risk of postoperative bleeding, postpone therapeutic-dose unfractionated heparin (UFH) or LMWH until 48-72 hours after surgery, use lower doses, or avoid their use entirely.

Prophylactic-dose UFH or LMWH effectively prevents venous thromboembolism, but there is no evidence that these regimens are effective in preventing arterial thromboembolism.

**Implementation**
In patients on warfarin at high risk of thromboembolism, bridging anticoagulation with treatment-dose subcutaneous LMWH or intravenous UFH is recommended during warfarin interruption to reduce the risk of perioperative thromboembolism.

Bridging anticoagulation with treatment-dose LMWH or UFH or with low-dose LMWH is recommended for patients on warfarin who are at moderate risk of perioperative thromboembolism.

In patients on warfarin at low risk, bridging with low-dose subcutaneous LMWH or no bridging is recommended.

For patients who receive bridging anticoagulation with therapeutic-dose LMWH, the last preoperative dose of LMWH should be half the usual dose and should be administered 24 hours before surgery. When intravenous UFH is used for bridging, the heparin infusion should be stopped 4 hours before surgery.

In patients undergoing minor surgery or procedures who receive bridging with treatment-dose LMWH, the heparinoid may be resumed 24 hours after surgery if there is adequate hemostasis. For patients undergoing major surgery and/or at high risk of bleeding, postoperative therapeutic-dose LMWH/UFH should be delayed 48-72 hours, reduced to low-dose treatment, or avoided altogether.

In patients who require surgery within 6 weeks of bare-metal coronary stent placement and those who require surgery within 12 months of the insertion of a drug-eluting coronary stent, aspirin and clopidogrel should be continued throughout the perioperative period. These recommendations are based on the high risk of morbidity and mortality associated with in-stent thrombosis.

In patients on warfarin or aspirin who are to undergo minor dental procedures, minor dermatologic procedures, or cataract removal, the warfarin or aspirin should be continued through the perioperative period. Coadministration of an oral prohemostatic agent at the time of the dental procedure is recommended for patients taking warfarin.

For urgent reversal of warfarin anticoagulation for an urgent procedure, low-dose (2.5-5 mg) oral or intravenous vitamin K is recommended. If immediate reversal is required, fresh frozen plasma or another prothrombin concentrate should be given in addition to low-dose vitamin K.

Review the full guidelines for perioperative anticoagulation issues not covered here.

**Reference**
Douketis JD, et al. The perioperative management of antithrombotic therapy: American College of Chest Physicians evidence-based clinical practice guidelines (8th ed.). Chest 2008;133(suppl.):299S-339. ■

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**Suggested Risk Stratification for Perioperative Thromboembolism in Patients on Warfarin**

| Risk for Arterial Thromboembolism | Mechanical Valve | Atrial Fibrillation | Venous Thromboembolism |
|---|---|---|---|
| High (>10% per year) | ▸ Mitral valve prosthesis<br>▸ Caged-ball or tilting disk<br>▸ Aortic prosthesis<br>▸ Stroke or transient ischemic attack (TIA) in past 6 months | ▸ Stroke or TIA in past 3 months<br>▸ Rheumatic valve disease<br>▸ CHADS2 score 5+ | ▸ VTE in past 3 months<br>▸ Severe thrombophilia (protein C or S or antithrombin deficiency, antiphospholipid antibodies, multiple abnormalities) |
| Medium (4%-10% per year) | ▸ Bileaflet aortic prosthesis plus atrial fibrillation, prior cerebrovascular accident or TIA, hypertension, diabetes, heart failure, age >75 years | ▸ CHADS2 score 3-4 | ▸ VTE in past 3-12 months<br>▸ Heterozygous inherited thrombophilia (factor 2 or factor V Leiden)<br>▸ Recurrent VTE<br>▸ Active cancer (diagnosis/treatment in past 6 months) |
| Low (<4% per year) | ▸ Bileaflet aortic prosthesis without atrial fibrillation or other stroke risk | ▸ CHADS2 score <3 and no prior TIA or stroke | ▸ Single VTE >12 months ago and no other risk factors |

Source: Chest

ELSEVIER GLOBAL MEDICAL NEWS

# Endovascular Stenting May Benefit Women on OCs With DVT

BY MIRIAM E. TUCKER
*Senior Writer*

WASHINGTON — When women develop deep vein thrombosis while on oral contraceptives, the lower left side of the body is more likely to be affected than are the upper extremities or the lower right side, according to the results of a single-center, retrospective chart review.

The findings also suggest that a narrow left common iliac vein may predispose women to thromboses in this location, and that this risk facor could be addressed with endovascular stenting, said Dr. Grace A. Tye, who reported the results at the annual meeting of the Society of Interventional Radiology.

Oral contraceptives are a known risk factor for lower extremity venous thromboembolic events, but there are few published studies on the anatomical distribution of these events in women on OCs.

Among 52 women who were younger than age 45 and were diagnosed with DVT at Stanford (Calif.) University Hospital in 2002-2006, 19 were on OCs at the time of their diagnosis, reported Dr. Tye, a radiology resident at Stanford. All 19 women on OCs had lower extremity DVTs; of these, 16 were in the left lower extremity and 3 were in the right lower extremity, a statistically significant difference.

Cross-sectional imaging was available for 11 of the 19 patients, and the findings indicated a left common iliac diameter (at the point of maximal narrowing) of 3.7 mm, compared with a right common iliac diameter of 13.1 mm, a highly significant difference.

Dr. Tye proposed that the lower left side predominance of the DVTs might be related to May-Thurner Syndrome, also called iliac vein compression syndrome. Named after the two physicians who first described it more than 50 years ago (Angiology 1957;8:419-27), the syndrome describes the small diameter of the left common iliac vein as typically resulting from compression by the right common iliac artery.

Conventional anticoagulation therapy may not address the risk for recurrent DVTs and postthrombotic syndrome in these women, Dr. Tye said. However, they may benefit from endovascular stenting of the left common iliac vein to relieve compression at this location, which may subsequently result in a lower risk for recurrent DVTs and postthrombotic syndrome, she concluded. ■