

PRE/POSTOPERATIVE ANTICOAGULATION

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The most common indications for anticoagulation with coumadin are atrial fibrillation, the presence of a mechanical heart valve, and venous thromboembolism. The two approaches most commonly used in clinical practice are the aggressive approach, in which IV heparin is given two days before and two days after surgery, and the minimalist approach, in which patients receive no heparin before or after surgery. We have based our recommendation for management of anticoagulation pre and post surgery on a recent review article,¹ based on quantification of the risks of thrombosis and bleeding associated with the various approaches.

Minimalist Strategy:

IV heparin is not indicated in most patients who are being given long term anticoagulation therapy. The absolute risk of a thromboembolism associated with a few days of peri-operative sub-therapeutic anticoagulation is generally very low, and the risk of bleeding associated with post operative IV heparin therapy is often relatively high.

If a patient's International Normalized Ratio (INR) is between 2.0 and 3.0, four scheduled doses of coumadin should be withheld to allow the INR to spontaneously fall to 1.5 or less before surgery. The coumadin should be withheld longer if the INR is maintained above 3.0 or if it is necessary to keep it lower (i.e. 1.3). Coumadin should be restarted as soon as possible after surgery.

Alternative preoperative and postoperative prophylaxis, or both, against thromboembolism should be considered in hospitalized patients

[subcutaneous (SC) heparin and/or mechanical techniques like graduated-compression stockings or intermittent pneumatic compression] for the period during which the INR is less than 2.0. Neither hospitalization to administer SC heparin nor administration of SC heparin to outpatients appears to be justified.

With this program patients can be expected to have a sub-therapeutic INR for approximately two days before and two days after surgery. However, because the INR is elevated to some extent during this period, the patients can still be expected to have partial protection against thromboembolism. Regardless of what approach is used, patients need to have a near normal state of coagulation during surgery, so some increase in the risk of thromboembolism is unavoidable.

Aggressive Strategy:

Elective surgery should be avoided in the first month after an acute episode of pulmonary embolism, deep venous thrombosis (DVT) or arterial embolism, but if surgery is essential, IV heparin should be given before and after the procedure while the INR is below 2.0, because the risk of thrombosis or recurrent emboli is much higher.

If the patient is in therapeutic range, stopping continuous IV heparin six hours before surgery should be sufficient. Heparin should not be restarted until 12 hours after major surgery and should be delayed even longer if there is any evidence of bleeding from the surgical site. Heparin should be restarted without a bolus at the expected maintenance infusion rate (probably pre-op dose) and patient should be checked in 12

hours. Heparin therapy should be continued until the INR is above 2.0 with coumadin therapy.

If the patient has been receiving anticoagulant therapy for less than 2 weeks after

PE or DVT, or if the risk of bleeding with IV heparin is unacceptable, a vena caval filter should be inserted.

Recommendations For Preoperative and Postoperative Anticoagulation in Patients Who Are Taking Oral Anticoagulants*

Indication	Before Surgery	After Surgery
Acute venous thromboembolism		
Month 1	IV heparin **	IV heparin **
Months 2 and 3	No change ◊	IV heparin
Recurrent venous thromboembolism ϕ	No change ◊	SC heparin
Acute arterial embolism		
Month 1	IV heparin	IV heparin ^^
Mechanical heart valve	No change ◊	SC heparin
Nonvalvular atrial fibrillation	No change ◊	SC heparin

*IV heparin denotes intravenous heparin at therapeutic doses (PTT 50-70), and SC heparin subcutaneous unfractionated or low-molecular-weight heparin in doses recommended for prophylaxis against venous thromboembolism in high-risk patients.

**A vena caval filter should be considered if acute venous thromboembolism has occurred within two weeks or if the risk of bleeding during intravenous heparin therapy is high.

◊If patients are hospitalized, subcutaneous heparin may be administered, but hospitalization is not recommended solely for this purpose.

ϕ The term refers to patients whose last episode of venous thromboembolism occurred more than three months before evaluation but who require long-term anticoagulation because of a high risk of recurrence.

^^Intravenous heparin should be used after surgery only if the risk of bleeding is low.

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