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HIGHLIGHTS FROM MEDICAL GRAND ROUNDS

DEEP VENOUS THROMBOSIS: LOW-MOLECULAR-WEIGHT HEPARINS IN PERIOPERATIVE PROPHYLAXIS

APPROXIMATELY 11 000 surgical patients die of pulmonary embolism each year, and most of these deaths could be prevented by prophylaxis against deep venous thrombosis (DVT). Theoretically, the low-molecular-weight heparins (LMWHs) have unique advantages over standard heparin. The LMWHs have been only slightly better than standard therapy in preventing DVT in general surgery but are proving to be more effective in orthopedic procedures. The important issue is to *give* prophylactic therapy: many physicians still do not, in spite of recommendations.

WHO IS AT RISK?

DVT develops in 20% to 25% of untreated general surgical patients because of Virchow's triad of stasis, intimal injury, and hypercoagulability. The risk is higher in certain situations: age over 40, surgery lasting longer than 30 minutes (especially orthopedic or extensive pelvic or abdominal surgery), obesity, varicose veins, immobilization, cancer, estrogen use, or previous DVT or pulmonary embolism. Without prophylaxis, the risk of DVT in total-hip replacement is as high as 50% and an amazing 72% in total-knee replacement. Prophylactic therapy approximately halves the risk.

LOW-MOLECULAR-WEIGHT HEPARINS

LMWHs were developed to provide better bioavailability and more specific action than regular heparin does in inhibiting factor Xa (and less against factor IIa, which should result in less bleeding). Further, LMWHs, unlike regular heparin, do not bind to proteins such as histidine-rich glycoprotein, platelet factor 4, fibronectin, and von Willebrand's factor. As a result, the dosage of LMWHs is easier to titrate. Regular heparin also binds to macrophages and endothelial cells, inhibits its collagen-induced platelet aggregation and von Willebrand's factor-dependent platelet aggregation, and increases vascular permeability; LMWHs do not.

These features should make LMWHs ideal in orthopedic surgery. However, in controlled clinical trials in patients undergoing total-hip replacement, the incidence of DVT was only slightly lower with LMWHs than with warfarin or heparin. The advantage may be somewhat greater in repair of fractured hips, and LMWH therapy recently has been shown to reduce the incidence of DVT in total-knee replacement surgery.

Current recommendations in total-hip replacement are to give warfarin to maintain the International Normalized Ratio (INR) between 2 and 3, or enoxaparin (an LMWH) 30 mg subcutaneously every 12 hours, or regular heparin in adjusted doses, or to use pneumatic compression sleeves. For hip-fracture repair, patients should receive regular heparin in an adjusted low-dose regimen, warfarin, or compression sleeves. For total-knee replacement, the options are warfarin, enoxaparin 30 mg subcutaneously every 12 hours, or compression sleeves.

■ Highlights from Medical Grand Rounds present take-home points from selected Cleveland Clinic Division of Medicine Grand Rounds lectures.

SHOULD THERAPY CONTINUE AFTER DISCHARGE?

Even with prophylaxis, 20% to 25% of patients develop DVT after orthopedic surgery—even more after total-knee replacement. Performing venography in all orthopedic patients to detect these DVTs would be prohibitively expensive. Evidence from one study suggests it might be worthwhile to treat all high-risk patients *as if* they had DVT, ie, with warfarin for 12 weeks after discharge. Most orthopedic surgeons are already doing this. Another study is underway.

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SUGGESTED READING

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