



Q: What is the optimal venous thromboembolism prophylaxis for patients undergoing bariatric surgery?

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A: The optimal drug, dose, and duration of pharmacologic therapy to prevent venous thromboembolism (VTE) is not known. However, mechanical prophylaxis combined with some form of heparin, in most cases low-molecular-weight heparin (LMWH), is strongly recommended.

VTE risk is elevated in bariatric surgery patients

Patients undergoing bariatric surgery are at increased risk for VTE. The reported frequency of thromboembolic complications from bariatric surgery, including deep venous thrombosis (DVT) and pulmonary embolism (PE), is as high as 2.4%.¹ PE was the most frequently reported cause of death within 30 days of a bariatric procedure in reports from the International Bariatric Surgery Registry.² All patients undergoing bariatric surgery have at least two risk factors for VTE (obesity and surgery), and most have one or more additional risk factors.

Combine multiple strategies whenever possible

Mechanical prophylaxis alone is never adequate. Early ambulation should always be encouraged in addition to mechanical prophylaxis measures. The Seventh American College of Chest Physicians Conference on Antithrombotic and Thrombolytic Therapy recommends that pharmacologic prophylaxis be combined with the use of graded compression stockings and/or intermittent pneumatic compression devices in high-risk patients undergoing general surgery.³

Consider weight-adjusted LMWH dosing

The optimal form and duration of pharmacologic prophylaxis against VTE in morbidly obese patients is

TABLE
Comparative outcomes with two enoxaparin dosages in bariatric surgery*

	30 mg q12h (n = 92)	40 mg q12h (n = 389)	Significance of difference
No. of postoperative DVTs/PEs (combined incidence)	1/4 (5.4%)	2/0 (0.6%)	<i>P</i> < .01
No. of bleeding complications	1	1	NS
Length of stay (days)	5.67	3.81	<i>P</i> < .05
Operating room time (min)	213	175	<i>P</i> < .05

* In a retrospective study of 481 patients undergoing Roux-en-Y gastric bypass procedures.⁵ See text for details.
DVT = deep venous thrombosis; PE = pulmonary embolism; NS = not significant

not known. Prophylaxis with LMWH is generally recommended, but there is a general lack of consensus on the timing, dose, and duration of treatment. No randomized controlled trials have evaluated the optimal LMWH dosage in severely obese patients.

When the LMWH enoxaparin is used in fixed doses, there is a strong negative correlation between total body weight and enoxaparin's anticoagulant effect based on anti-Xa assay levels.⁴ Weight-adjusted doses may be better than fixed doses for obese patients.

One retrospective study compared two dosages of enoxaparin—30 mg or 40 mg subcutaneously every 12 hours—for patients undergoing Roux-en-Y gastric bypass surgery (97.5% of the surgeries were open procedures).⁵ Enoxaparin was administered 2 hours before surgery and continued until the patient was fully ambulatory or discharged from the hospital. As detailed in the **Table**, patients in the 40-mg group had a statistically significantly lower risk of postoperative DVT or PE compared with those in the 30-mg group. Operating room time and length of stay were greater

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in the 30-mg group, however, which makes the results of this study less compelling. Nevertheless, the decreased effectiveness of LMWH in obese patients suggests that weight-based dose adjustments should be indicated.

Consider extended pharmacologic prophylaxis

Extended pharmacologic prophylaxis may be needed in patients undergoing bariatric surgery, particularly those with multiple risk factors for VTE. The PROBE study (Prophylaxis against VTE Outcomes in Bariatric Surgery Patients Receiving Enoxaparin) was a multicenter retrospective survey that assessed the frequency of symptomatic DVT or PE in morbidly obese bariatric surgery patients who received six different prophylactic regimens of enoxaparin.¹ Among the 668 patients in this analysis, 7 VTE events occurred—6 PEs (0.9% incidence) and 1 DVT (0.1% incidence). All but one episode of VTE occurred after the cessation of prophylaxis; therefore, extended prophylaxis may have some benefit. However, no trials have evaluated the optimal dose or duration of treatment.

Summary: What the current evidence suggests

Patients undergoing bariatric surgery are at increased risk for VTE and frequently have multiple significant risk factors. Mechanical prophylaxis measures should always be used, and early ambulation should always be

encouraged. A lack of randomized controlled trial data precludes specific guidelines for pharmacologic VTE prophylaxis. Increased, weight-based doses of LMWH should be considered, starting preoperatively or as soon as possible after the operation. Extended prophylaxis, particularly for patients at the highest risk for VTE, should also be considered. Further study is needed to define the optimal regimen for pharmacologic VTE prophylaxis for bariatric surgery patients.

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