Incidence of Deep Venous Thrombosis in Patients Undergoing Obesity Surgery

Agneta Westling, M.D., David Bergqvist, M.D., Ph.D., Annika Boström, M.D., Sadettin Karacagil, M.D., Ph.D., Sven Gustavsson, M.D., Ph.D.

Department of Surgery, University Hospital, 751 85 Uppsala, Sweden

Published Online: February 6, 2002

Abstract. The aim of this study was to investigate prospectively the incidence of deep venous thrombosis (DVT) after surgery for morbid obesity. The series comprised 116 consecutive patients undergoing Roux-en-Y gastric bypass. The median age and body mass index were 35 years (range 19–59 years) and 42 kg/m² (range 32–68 kg/m²), respectively. The patients were examined with duplex ultrasonography pre- and postoperatively. No patient had any symptoms or signs of DVT postoperatively, and ultrasonography showed no signs of thrombosis in iliac, femoral, and popliteal veins in any of the patients. Two patients (1.7%) had a thrombus in the peroneal vein of one leg. Repeated ultrasonographic investigation after 1 week showed complete resolution of both. One patient with a previously unknown activated protein C resistance had an angiographically confirmed minor pulmonary embolus. The incidence of venous thromboembolism after obesity surgery seems to be low, and obesity as a risk factor for thromboembolic disease might have been overestimated in the past.

There are several known risk factors for postoperative thromboembolic complications, such as advanced age, major orthopedic surgery, malignancies, reoperations, long-duration DVT postoperatively, and varicose veins, immobilization, and estrogen medication [1, 2]. Moreover, obese people have been thought to be at higher risk than nonobese individuals to develop deep venous thrombosis (DVT) in connection with abdominal surgical procedures [3, 4].

Death after obesity surgery is fortunately rare, but pulmonary embolism (PE) is one of the most common causes of postoperative mortality [5–8]. Several postmortem studies of PE indicate obesity to be a predisposing risk factor [9–11]. Because of this postulated increased risk of thromboembolic complications, special precautions are generally recommended when obese patients are to undergo abdominal surgery. Thus apart from pharmacologic prophylaxis, many surgeons also use compression stockings or intermittent pneumatic compression devices.

The increased risk for venous thromboembolism in obese individuals has also been questioned. In prospective studies neither Hill et al. [12] nor Sue-Ling et al. [13], using the 125I-fibrinogen uptake test as a diagnostic tool, could demonstrate a correlation between obesity and the incidence of postoperative DVT. In a postmortem study of 152 surgical patients by Cullen and Nes- eskal [14], obesity did not seem to be a risk factor for PE, but obesity was not clearly defined. Finally, Flordal et al. [15] evaluated risk factors for thromboembolism in 2070 patients but failed to prove a correlation between obesity and postoperative thromboembolism. However, all patients underwent prophylaxis with low-molecular-weight heparin.

In view of the diverging opinions in the literature regarding obesity as a risk factor for thromboembolic disease and the limited number of prospective studies addressing this question, we decided to determine prospectively the incidence of DVT in a consecutive series of 116 patients undergoing surgery for morbid obesity. Duplex ultrasonography was used for DVT surveillance.

Materials and Methods

Patients

The material comprised 116 patients (101 women, 15 men) who were scheduled to undergo obesity surgery. The median age and body mass index (BMI) were 35 years (range 19–59 years) and 42 kg/m² (range 32–68 kg/m²), respectively. Thirty-five patients were smokers.

Six women used oral contraceptives. One patient had a history of DVT. Seven patients had clinical signs of varicose veins, and four patients had a history of varicose vein surgery. Between postoperative days 3 and 6 all the patients were questioned on a standardized form about pain, tenderness, reddening, or swelling of the legs; in case of symptoms, the patients were examined.

Operative Procedures

All patients were operated on with a Roux-en-Y gastric bypass. This is a major surgical procedure in the obese subject involving complete transection of the stomach with staplers and construction of a jejunal Roux limb, which is brought to the proximal gastric pouch behind the colon and stomach. The gastrojejunos- tomy was usually partly stapled and partly hand-sutured. In 21 patients the operation was a revision after previous failures with other types of bariatric surgery. Such reoperations are often more complex from a technical point of view, cause increased intraoperative blood loss, and are time-consuming. Of the primary cases,
30 procedures were done laparoscopically, which prolonged the duration of surgery by around 100%; the duration varied between 70 and 385 minutes for the whole series. All patients were extubated in the operation theater immediately after surgery. Thereafter the patients were taken to the recovery room, where some of them spent the night. No patient required postoperative ventilatory support.

Thoracic epidural anesthesia with bupivacaine and sufentanl for postoperative analgesia was used in 30% of the patients; 70% were given patient-controlled intravenous analgesia with morphine. All but two patients who required reoperation ambulated the first day after surgery.

Two patients were reoperated after a few days because of leakage in the gastrojejunostomy; they were therefore given enoxaparin as a supplement to dextran (see below) because of prolonged immobilization and a second surgical trauma. Another patient was given the same type of prophylaxis because of a known history of activated protein C (APC) resistance in the family.

**Ultrasonography**

All patients were investigated with duplex scanning the day before operation to exclude the presence of thrombosis or venous insufficiency. The examination was performed by experienced vascular technicians at the vascular laboratory using Acuson 128XP (Acuson, Mountainview, CA, USA) with 5.0- and 3.5-MHz probes. Iliac, femoral, popliteal, and crural veins in both legs were scanned in the longitudinal plane with color flow imaging. Compression tests of the examined vein segment in the transverse plane and augmentation of venous flow by distal compression were routinely used to demonstrate the patency of veins. Lack of compressibility or absence of flow augmentation in distended veins was interpreted as venous thrombosis.

Postoperatively, the duplex scanning was repeated between days 3 and 6. Patients with pathologic findings were reexamined after an additional week.

**Thrombosis Prophylaxis**

Altogether, 100 of the 116 patients were given 500 ml of dextran 70 peroperatively as the only thrombosis prophylaxis. Ten patients were given enoxaparin 20 mg daily during the hospital stay as a prophylactic alternative. Six patients were given dextran 70 followed by enoxaparin daily to treat detected thrombi \(n = 3\); 40 mg), after reoperation \(n = 2\); 20 mg), and for APC resistance in the family \(n = 1\); 20 mg). No compression stockings were used intraoperatively or postoperatively.