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Case Report

Lower Extremity Compartment Syndrome Following a Laparoscopic Roux-en-Y Gastric Bypass.

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Background: Bariatric surgery has the potential for serious complications. A case is presented of unilateral lower extremity compartment syndrome after a laparoscopic Roux-en-Y gastric bypass performed in the modified lithotomy position.

Case report: A 38-year-old female (weight 134.5 kg, BMI 49.6) underwent a laparoscopic Roux-en-Y gastric bypass (operating time 375 min). Postoperatively, she complained of bilateral lower extremity pain that gradually subsided over the course of the day. However, on the 1st postoperative day she developed numbness on the dorsum of the foot and compartment syndrome was diagnosed (anterior compartment pressure 71 mmHg). She underwent emergency fasciotomy, which resulted in a reduction of the pain and numbness on the dorsum of the foot. The next day she ambulated without difficulty and was discharged home on the 5th postoperative day. 12 days after her operation, delayed primary closure of the fasciotomy wound was done with the assistance of a novel device (Proxiderm) that applies constant tension to the wound edges. Subsequent recovery was uneventful, and at 4- month follow-up the patient had a weight loss of 28 kg without any right leg motor or sensory deficits.

Conclusion: Bariatric surgeons should be aware of compartment syndrome as a rare but serious complication. Prevention, early recognition, and prompt fasciotomy are crucial for a favorable outcome.

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Key words: Laparoscopy, morbid obesity, laparoscopic gastric bypass, compartment syndrome

Introduction

Bariatric surgery carries the potential for a variety of peri-operative complications.[1] Lower limb compartment syndrome has been reported after colorectal, gynecological and urological procedures in the lithotomy position.[2-5] No report of this complication has been found in the bariatric surgical literature.

Case Report

A 38-year-old female (weight 134.5 kg, BMI 49.6 kg/m^2) underwent a laparoscopic Roux-en-Y gastric bypass. The operation was performed in the modified lithotomy position with the patient's legs well padded in Allen stirrups (Allen Medical Systems, Mayfield Heights, OH). Leg compression devices were used during surgery and postoperatively. During anesthesia the patient received 6000 ml of crystalloid solution and the urine output was 700 ml. A subcutaneous dose of 5000 Units of heparin was given preoperatively and continued twice daily postoperatively. The operation was

uneventful but technically difficult, which resulted in an operating time of 375 minutes. After recovery from general anesthesia, the patient complained of bilateral lower extremity pain. The pain decreased throughout the course of the day, and she was able to ambulate on the night of surgery. However, on the 1st postoperative day, her physical examination demonstrated a tense right calf with a small area of numbness on the dorsum of the foot. Her abdomen was soft, and urine output during the 1st postoperative day was 1200 ml. Compartment pressures in the anterior and lateral compartments were measured (solid state transducer intracompartmental pressure monitor, Stryker Corp, Kalamazoo, MI) and found to be 71 and 65 mm of Hg respectively, confirming the diagnosis of compartment syndrome.

The patient underwent urgent fasciotomy of the anterior and lateral compartments of the right leg (Figure 1). Postoperatively her pain subsided while the small area of numbness on the dorsum of the foot improved, and she was able to ambulate without difficulty the next day. Duplex study did not demonstrate any evidence of deep vein thrombosis. She was discharged home on the 5th postoperative day. On the 12th postoperative day her fasciotomy wound was re-approximated with the assistance of a Proxiderm (Proxiderm, Progressive Surgical Products, Westbury, NY), a novel device which enables delayed primary closure by application of constant tension to the wound edges (Figures 2 and 3).[6] The device was removed 3 days later, and steristrips were applied (Figure 4).

At 4-month follow-up she had a weight loss of 28 kg; her leg wound was healed (Figure 5), and she had no motor or sensory deficits in the right leg. During a routine postoperative survey she expressed overall satisfaction with her laparoscopic surgery for obesity, and her quality of life improved from "not acceptable" before surgery to "excellent" after the surgery.

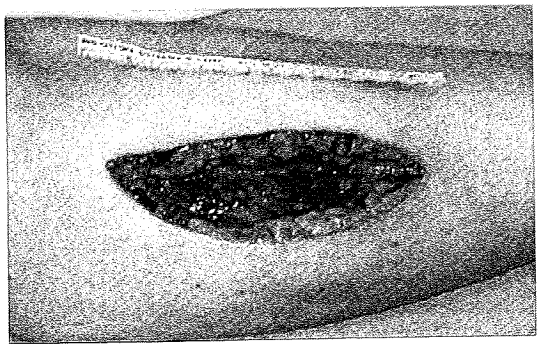

Figure 1. Fasciotomy wound on postoperative day 5.

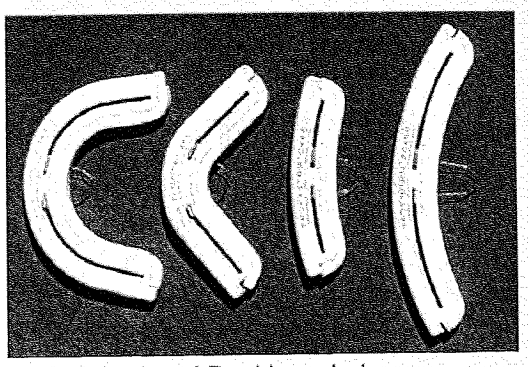

Figure 2. Selection of Proxiderm devices.

Discussion

Compartment syndrome is a condition of increased tissue pressure within a limited anatomic space that compromises the perfusion and function of the tissue within that space.[7] Compartment syndrome is a rare complication of procedures performed in the lithotomy position.[8] The risk factors associated with this serious complication are prolonged procedures, patient's heavy weight, and circumferential binding of the lower extremities.[9] A variety of other factors such as hypotension, hypoxemia, hip and knee flexion, direct pressure, compressive bandages, and compression stockings may all contribute to compartmental hypoperfusion.[10,11] Experimental studies have shown that lithotomy position with Trendelenburg tilt results in decreased arterial perfusion of the lower extremities. This can be one of the major factors leading to

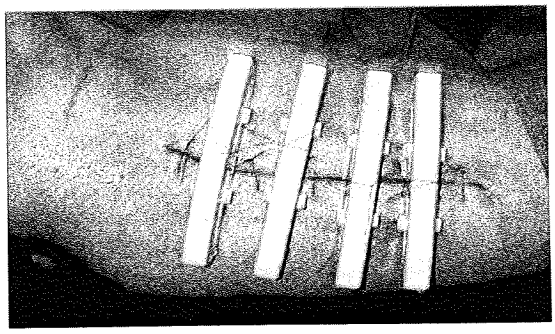

Figure 3. Fasciotomy wound after application of Proxiderm devices.

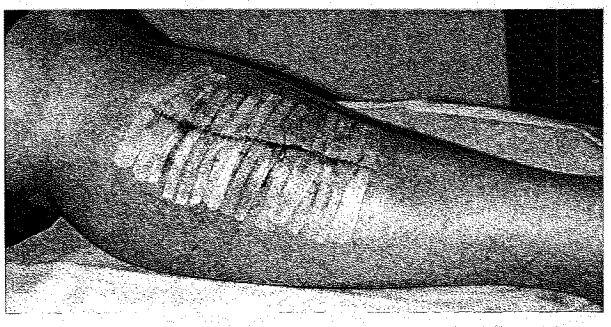

Figure 4. Fasciotomy wound after removal of Proxiderm devices.

ischemia/reperfusion injury and increased compartmental pressure.[12] Ischemia followed by reperfusion and capillary leakage from the ischemic tissue further increases tissue edema that results in further impairment of tissue perfusion. Unless the affected compartment is promptly decompressed, the circle of ischemia and hypoperfusion will lead to permanent neuromuscular damage, which may result in paralysis or amputation.

In an experimental study on healthy volunteers placed in the Lloyd-Davies position an association was found between a BMI of >25 kg/m^2 and a more pronounced fall in the perfusion pressure to the lower extremities.[3] MacIntosh reported in his case series of five patients with compartment syndrome following prolonged procedures in the lithotomy position that four of the five patients were noted to have "heavy muscular limbs". This suggests that the obese patient may be at higher risk for compartment syndome.[9]

Conclusion

Morbidly obese patients are at increased risk for complications resulting from operative positioning.

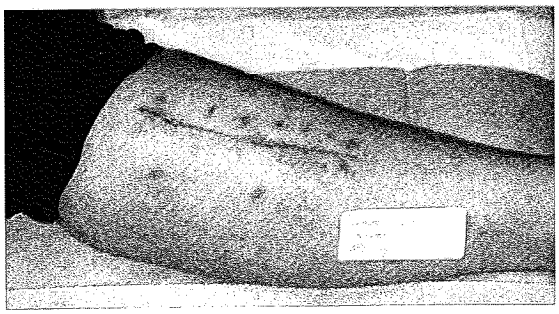

Figure 5. Fasciotomy wound 4 months later.

Careful padding of the extremities, intraoperative inspection of the extremities, reduced operative times, and the use of supine or a split leg table rather than the lithotomy position can minimize the risk of the development of compartment syndrome.

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