

Lower limb (healthy leg) compartment syndrome after the patient was in the lithotomy position during the operation: a case study

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Summary

In this case report, we describe compartment syndrome of the lower extremities that occurred during and after the operation in a patient with a gynecologic tumor who underwent minimally invasive surgery in the lithotomy position to prevent venous thrombosis. Lower limb compartment syndrome has also been reported in a number of other similar cases. The use of sequential compression stockings for deep venous thrombosis prophylaxis in patients in the lithotomy position is inappropriate. We expect to have a complete set of guidelines or expert consensus to guide the prevention of venous thrombosis in minimally invasive surgery for patients with gynecologic tumors.

Key words: Lithotomy position; Lower limb (healthy leg); Compartment syndrome; Venous thromboembolism.

Introduction

Lithotomy position is commonly used in gynecologic minimally invasive surgery as it is convenient for perineal and vaginal operations. Studies have shown that compartment syndrome of the lower extremities can occur during and after the operation in patients with gynecologic tumors undergoing minimally invasive surgery in the lithotomy position.

Case Report

A 39-year-old obese woman was diagnosed with a stage Ib1 squamous-cell carcinoma of the cervix. The patient was placed in the lithotomy position during laparoscopic radical hysterectomy and pelvic lymphadenectomy and wore elastic stockings over the knee to prevent venous thrombosis. The operation lasted for about six hours, and 1,600 mL of intraoperative fluid infusion was given.

Urine volume was 600 mL and blood loss was about 100 mL. The patient complained of intolerable pain in both lower limbs 12 hours post-surgery, while the dorsalis pedis arterial pulse was normal, as was the skin temperature of both legs; a muscle strength of grade 3 was observed. Lower extremity color duplex flow imaging (CDFI) showed bilateral popliteal, posterior tibial, calf muscle vein thromboses, and an embolism, as well as a left vena saphena magna mural thrombus.

Vascular surgeons recommended speeding up the rehydration process and injected furosemide intravenously to maintain the balance of body fluids as well as enoxaparin sodium (6,000 IU, Q12H) subcutaneously, and applied a

hydropathic compress of 50% magnesium sulfate solution on both lower limbs. The patient complained of severe pain in both lower extremities and numbness extending to the feet 24 hours after the operation. The dorsalis pedis arterial pulse was weak and the legs were swollen.

In consultation with orthopedic surgeons, they diagnosed compartment syndrome in both lower extremities and prescribed emergency treatments including bilateral calf osteofascial compartment decompression, bilateral leg vacuum sealing drainage (VSD), and negative pressure drainage, which were immediately performed (Figure 1). Subcutaneous injection of enoxaparin sodium and application of a hydropathic compress of 50% magnesium sulfate solution were continued. Lower extremity CDFI showed a bilateral calf muscle vein thrombosis with the lower limb veins remaining unobstructed, and a small amount of fluid was observed in the gastrocnemius in the right leg 12 hours after emergency treatment. Rivaroxaban tablets (15 mg) were given daily. Intravenous injection of furosemide (20 mg) after intravenous drip of albumin (10 g), and intravenous drip of mannitol (25 g, bid) were also administered.

Bilateral leg debridement and suturing were performed on the 10th day after the operation. Stitches in the lower limb incisions were removed two weeks later, and then the patient was discharged from the hospital. A telephone follow-up one week after discharge suggested that the patient was able to walk normally.

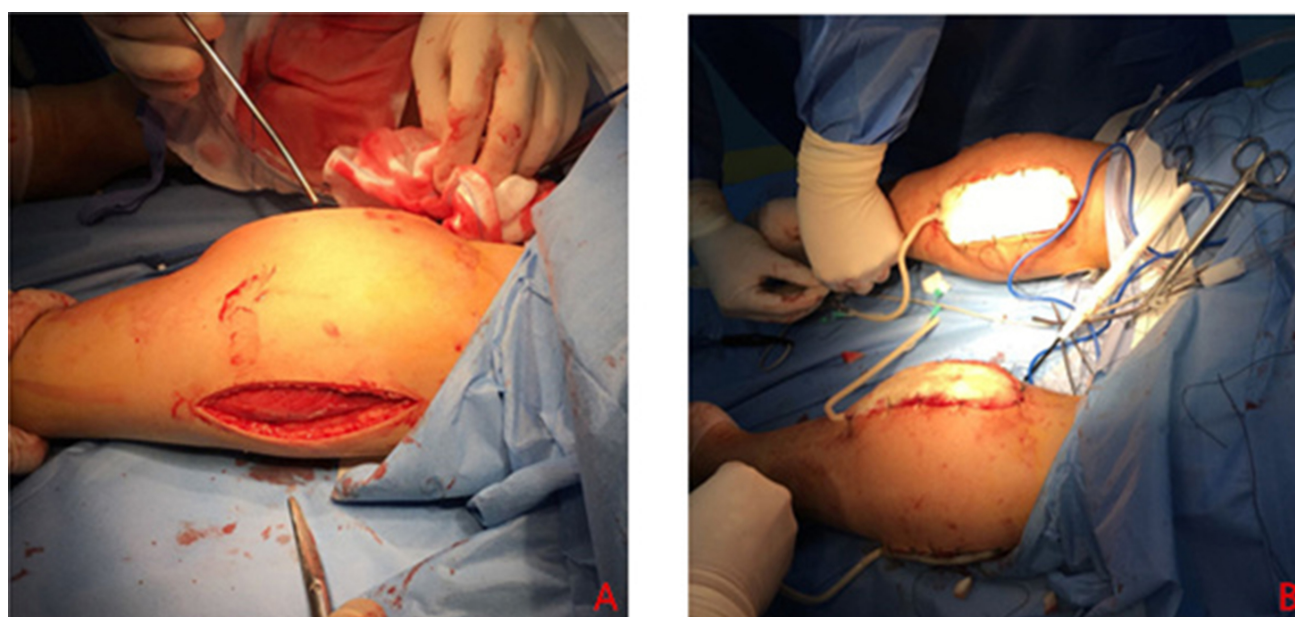


Figure 1. — (A) Bilateral calf osteofascial compartment are marked along the operative incision to achieve complete decompression. (B) Incision in the bilateral legs are positioned so as to accommodate negative pressure drainage (VSD) to absorb tissue effusions.

Discussion

One of the potential serious complications of prolonged surgery in the lithotomy position is calf compartment syndrome. Turnbull *et al.* estimated that the fall in mean arterial pressure of the lower limb is 2 mmHg for every vertical inch of elevation of the lower limb above the heart [1].

The pressure in the lower limb compartment increases owing to ischemia, anoxia, and edema, which are caused by hypoperfusion. The onset of this disease may be delayed up to 24 hours or longer after surgery. Risk factors include intraoperative hypotension, vascular insufficiency, surgical position, obesity, and others [2]. Lower limb elevation and joint flexion resulting from the lithotomy position can decrease perfusion to the legs, even in people without vascular diseases [3]. Moreover, it is generally accepted that the operation time (>5 hours) is associated with a sharp increase in the occurrence of compartment syndrome [4]. During surgery, application of mechanical methods for preventing lower limb thrombosis, which could be dynamic (intermittent pneumatic compression devices) or static (graduated compression stockings), is not without complications. It has been reported that compartment syndrome may result from the malfunction of intermittent pneumatic compression devices, and graduated compression stockings may cause leg pressure injuries [2].

Perfusion to the lower extremities decreases if surgery is performed with the patient in the lithotomy position, and it is further reduced if sequential compression stockings are used, resulting in ischemia and anoxia in the leg tissue [3].

Blood flow to the leg recovers when the patient is placed in the supine position postoperatively, and platelets become activated through the release of prostaglandins and throm-

boxane, which can induce deep vein thrombosis, thus increasing venous pressure, decreasing local blood flow again [4], and subsequently resulting in capillary leakage and tissue edema [2].

The pressure in the fascial compartment continues to increase after tissue edema, resulting in compartment syndrome. Therefore, the use of sequential compression stockings for deep venous thrombosis prophylaxis in patients undergoing gynecologic minimally invasive surgery in the lithotomy position is inappropriate [3].

Osteofascial compartment syndrome requires prompt diagnosis and treatment to prevent irreversible neuromuscular damage, ischemic contracture, rhabdomyolysis, acute kidney injury, infection, and death [5]. The treatment requires urgent fasciotomy to relieve the symptoms of ischemia and hypoxia and prevent irreversible sequelae [6]. The outcome is usually good without long-term sequelae if fasciotomy is performed within 12 hours after the occurrence of clinical symptoms such as motion weakness and dragging pain [4].

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Conflict of Interest

There is no conflict of interest to declare.

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