



# Lower limb compartment syndrome by reperfusion injury after treatment of arterial thrombosis post-laparoscopic radical hysterectomy and pelvic lymph node dissection for cervical cancer

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Compartment syndrome is a clinical condition associated with decreased blood circulation that can lead to swelling of tissue in limited space. Several factors including lithotomy position, prolonged surgery, intermittent pneumatic compressor, and reperfusion after treatment of arterial thrombosis may contribute to compartment syndrome. However, compartment syndrome rarely occurs after gynecologic surgery. In this case, the patient was diagnosed as compartment syndrome due to reperfusion injury after treatment of arterial thrombosis, which occurred after laparoscopic radical hysterectomy and pelvic lymph node dissection for cervical cancer. Despite its rarity, prevention and identifying the risk factors of complication should be performed perioperatively; furthermore, gynecologist should be aware of the possibility of complications.

**Keywords:** Compartment syndromes; Reperfusion syndromes; Uterine cervical neoplasms

## Introduction

Compartment syndrome is the increased pressure within one of the body's compartments that contains muscles and nerves and can lead to serious problems [1]. Compartment syndrome most commonly occurs in compartments in the leg or arm [1,2]. It can occur after trauma or revascularization after ischemia [3]. However, compartment syndrome is rare and few authors have reported compartment syndrome after gynecologic oncologic surgery. In this report, we described a rare case of lower limb compartment syndrome with thrombosis of left external iliac artery after laparoscopic radical hysterectomy and pelvic lymph node dissection.

## Case report

A 37-year-old gravida 4 woman underwent laparoscopic radical hysterectomy with pelvic and paraaortic lymph node resection for cervical cancer Ib2. The body mass index of patient

was 22.3 kg/m<sup>2</sup>, and she had no medical history of vascular disease, hypertension and diabetes mellitus. The patient had smoked a half of pack per day for 15 years. She was placed in the lithotomy position during operation, and the intermittent pneumatic compression device was placed on the lower extremities. The operation lasted 6 hours 45 minutes under general anesthesia. The patients' vital sign was stable

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**Fig. 1.** (A) Computed tomography angiography on operation day. Computed tomography showed low attenuation in left calf muscle (arrow). (B) Computed tomography venography on operation day. Venography showed no evidence of deep vein thrombosis. (C) Computed tomography angiography on postoperative day 1. Computed tomography angiography indicated a defect in the blood flow in the left external iliac artery (arrow).

throughout the operation. The estimated blood loss was 300 mL and hemoglobin level was 13.2 g/dL at the beginning of the operation and 11.8 g/dL postoperatively. During operation, there was no specific finding. In the recovery room after surgery, the patient complained of pain, tenderness, and numbness in left lower leg, and the numeric rating scale for pain was 9 points. However, pulsation of the dorsal arteries of the feet was confirmed. Then computed tomography venography for evaluation of deep vein thrombosis was performed, and revealed low attenuation and suggested decreased perfusion in left calf muscle. However, there was no evidence of deep vein thrombosis in both legs (Fig. 1A, B). Then using the analgesics such as non-steroidal anti-inflammatory drugs, pethidine and patient controlled analgesia, the numeric rating scale was reduced from 9 to 2 points. The patient was admitted to the intensive care unit for closed observation without any procedure. On the first postoperative day, left lower leg pain was persistent. Computed tomography angiography for evaluation of lower extremity thromboembolism was performed. Computed tomography angiography revealed thrombotic total occlusion at mid to distal left external iliac artery (Fig. 1C); and serum creatine phosphokinase value was elevated up to 9,844 U/L (normal range, 43 to 165 U/L). Immediate thrombectomy was conducted by the radiologist in the angiographic intervention room. Post-thrombectomy angiography confirmed that the occlusion in external iliac artery was disappeared. After intervention, pain and other symptoms related to arterial thromboembolism was disap-

peared. However, about 3 hours post-thrombectomy, the patient complained of aggravating pain, swelling and tenseness of left lower leg. The patient was strongly suspected as having left lower leg compartment syndrome due to reperfusion injury. Emergency left leg fasciotomy was performed by vascular surgeon, 5 hours after thrombectomy. The left lower leg pain was decreased after fasciotomy. Serum creatine phosphokinase values were gradually decreased and normalized by 9 days post-fasciotomy. The wounds of fasciotomy were repaired 5 days postoperatively. The patient was discharged at postoperative 22 days without any complaint of left lower leg numbness, tenderness and complication.

## Discussion

Compartment syndrome is a condition in which increased pressure within a closed space compromises blood circulation and the nerve function [1]. Compartment syndrome is known to develop after trauma or revascularization after ischemia [3]. Some authors reported the cases of compartment syndrome in gynecologic operation. Nakamura et al. [4] reported a case of compartment syndrome due to thrombus of left common iliac artery after prolonged gynecologic surgery with lithotomy position. Cohen and Hurt [5] also described a case of compartment syndrome in gynecologic operation with the intermittent pneumatic compressors of the patient's legs. Table 1 showed some cases of compartment syndrome in gynecologic

**Table 1.** Reported cases of compartment syndrome in gynecologic surgery with lithotomy position

Author	Year	Age (yr)	BMI (kg/m <sup>2</sup> )	Diagnosis	Operation	Operation time	Anti-DVT device	Side	Fasciotomy
Cohen et al. [5]	2001	43		Recurrent vesicovaginal fistula	Vesicovaginal fistula repair	5 hr 41 min	Y	R	Y
Yanazume et al. [7]	2006	33	18.3	Cervical cancer IIb	Radical hysterectomy	4 hr 10 min	Y	L	N
Nakamura et al. [4]	2008	34	21.7	Endometrial cancer IIIc	Radical hysterectomy	6 hr	Y	L	Y
Tomassetti et al. [6]	2009	30		Endometriosis	Laparoscopic radical resection of endometriosis	8 hr	Y	R	Y
Boesgaard-Kjer et al. [8]	2013	45	47	Uterine leiomyoma	Laparoscopic myomectomy	5 hr	N	B	Y
Boesgaard-Kjer et al. [8]	2013	32	41	Endometriosis	Laparoscopic resection of endometriosis	5 hr	N	R	N
Current study	2016	39	22.3	Cervical cancer Ib2	Laparoscopic radical hysterectomy	6 hr 45 min	Y	L	Y

BMI, body mass index; DVT, deep vein thrombosis; Y, yes; R, right; L, left; N, no; B, bilateral.

operation [4-8]. However, compartment syndrome rarely occurs after gynecologic surgery. We experienced the rare case of compartment syndrome. In this case, the patient was diagnosed as left lower leg compartment syndrome by reperfusion injury after thrombectomy of external iliac arterial thrombosis, which occurred after laparoscopic radical hysterectomy.

Some factors including lithotomy position, duration of surgery, anti-deep vein thrombosis devices, smoking history, obesity and other metabolic diseases might increase the risk of compartment syndrome after gynecologic surgery and arterial thrombosis [2,3,7-11]. In this paper, several factors were observed such as smoking, prolonged surgery in lithotomy position, and the use of intermittent pneumatic compressor. These factors might have contributed to patient's compartment syndrome. The reperfusion syndrome after thrombolectomy especially led to compartment syndrome in this case. To our best knowledge, compartment syndrome due to reperfusion injury after thrombolectomy in gynecologic operation has not been reported previously.

In this report, we discussed the first case of compartment syndrome due to reperfusion injury after treatment of arterial thrombosis, which occurred after laparoscopic radical hysterectomy and pelvic lymph node dissection for cervical cancer. The patient was successfully treated with a fasciotomy and blood product transfusions. The physicians should be aware

of the possibility of compartment syndrome in laparoscopic radical hysterectomy and pelvic lymph node dissection.

## Conflict of interest

No potential conflict of interest relevant to this article was reported.

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