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Delayed diagnosis of single compartment muscle contusion after radical hysterectomy in the lithotomy position: A case report

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ABSTRACT

INTRODUCTION: Muscle contusions usually occur as a result of blunt trauma, which damages the muscle fibers and connective tissue without breaking the skin. Rapid bleeding can cause an increase in pressure that requires surgical intervention, commonly referred to as compartment syndrome. Here, we report a case with delayed diagnosis of single compartment muscle contusion in which compartment syndrome did not develop.

PRESENTATION OF CASE: A 50-year-old woman underwent radical hysterectomy. She complained of edema and tenderness in the lower left leg on postoperative day 6. The serum creatine phosphokinase level was slightly elevated at 177 IU/L (normal range: 6–142 IU/L). T2-weighted magnetic resonance imaging revealed swelling of the muscle in the deep posterior compartment of the lower left leg, edematous fascia, and subcutaneous adipose tissue. She recovered naturally without other complications.

DISCUSSION: In the lithotomy position during surgery, muscle contusion might occur, without general symptoms.

CONCLUSION: Magnetic resonance imaging is useful for diagnosis. For patients who complain of edema and tenderness in the lower leg after surgery in the lithotomy position, muscle contusions should be considered.

1. Introduction

Compartment syndrome is a devastating and life-threatening complication [1] that occurs in 1 of 3500 surgeries performed in the lithotomy position [2]. It is characterized by myoglobinuria and increased intracompartmental pressure and can progress from severe contusions [2]. At the very least, slight muscle contusion can occur with the lithotomy position. Here, we describe a female patient who underwent a radical hysterectomy in the lithotomy position who experienced a slight single compartment muscle contusion, from which she recovered naturally. However, because the clinical manifestations of the contusion were not apparent until 6 days after the surgery, it could have been missed and progressed to compartment syndrome.

2. Case presentation

This case report has been prepared as per the CARE guidelines [3].

A 50-year-old, married, 2 gravida, 2 para, non-smoking woman (height, 158.1 cm; weight, 62.2 kg; body mass index, 24.9 kg/m^2) complained of atypical genital bleeding. Vaginal and rectal examinations did not suggest vicinal, rectal, or parametrial invasion. Punch biopsy from the cauliflower-like uterine cervix indicated adenocarcinoma. Ultrasonography, computed tomography (CT), and magnetic resonance imaging (MRI) did not suggest metastasis. Transvaginal ultrasonographic tomography and MRI showed a tumor, 25 mm in diameter, of the uterine cervix. Apart from uterine cervical cancer (FIGO stage IB1), she was in good health on physical and medical examinations, with no evidence of tachycardia, hypertension, or diabetes mellitus.

Before entering the operation room for a radical hysterectomy, her legs were bilaterally compressed with serial compression stockings (TOLAY, Tokyo, Japan). After receiving general endotracheal anesthesia, she was placed in the lithotomy position with the calves supported by Levitator stirrups (Mizuho, Tokyo, Japan), and intermittent pneumatic compression (IPC; 40 mmHg pressure) was applied to the feet during the operation with A-V Impulse™

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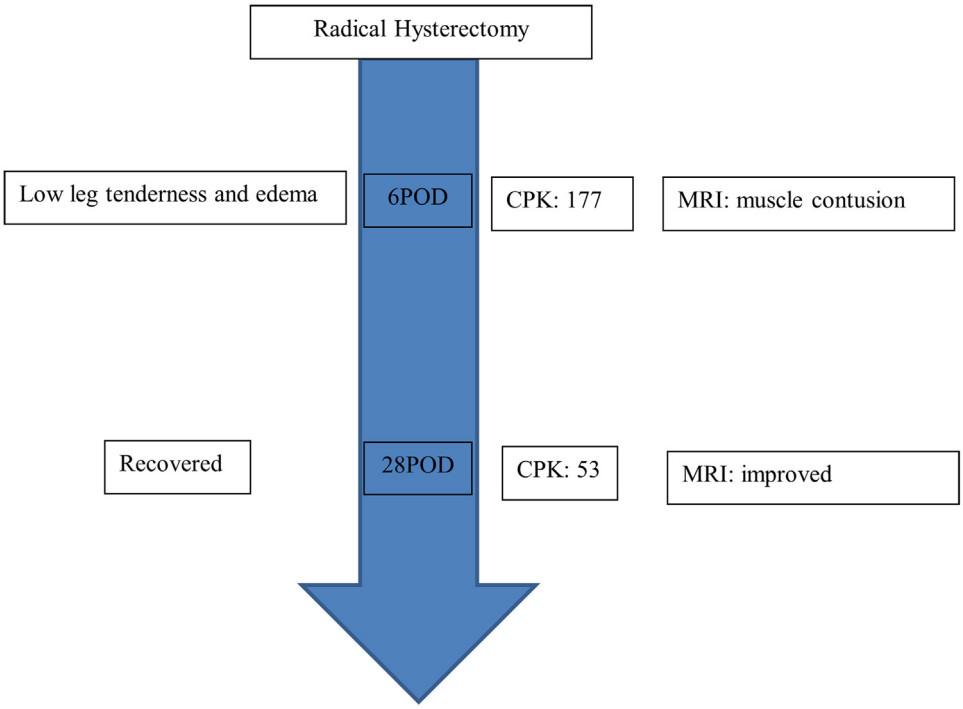

Fig. 1. Timeline of events.

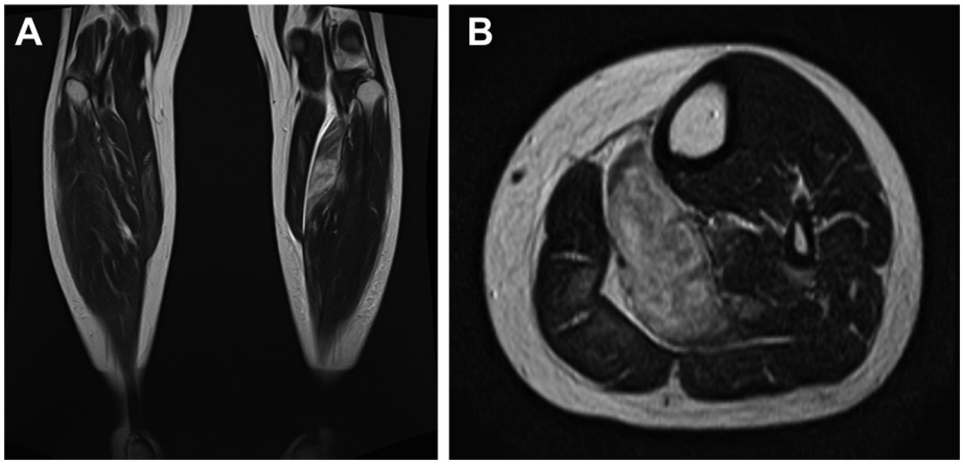

Fig. 2. Swelling of the muscle in the deep posterior compartment of the lower left leg, edematous fascia, and subcutaneous adipose tissue on T2-weighted magnetic resonance imaging. A: coronal section; B: horizontal section.

(Japan Medicalnext, Co., Ltd, Osaka, Japan). Her vital signs remained stable before, during, and after surgery. The durations of surgery, anesthesia, and the lithotomy position with IPC were 338, 396, and 358 min, respectively. The blood loss during surgery was 2700 mL, and blood transfusion was performed with red cell concentrate in mannitol adenine phosphate (8U) and fresh-frozen plasma (4U).

Three days postoperatively, the biochemical examination of blood levels, including lactate dehydrogenase, was normal. The patient had no complaints at postoperative day 5; however, the patient complained of edema and tenderness in the lower left leg on postoperative day 6 (Fig. 1). There was no rubor, and we initially suspected deep vein thrombosis (DVT). A low-density area, with a contrast medium-enhanced circumference, was detected in the lower left leg on CT. The serum creatine phosphokinase (CPK) level was slightly elevated at 177 IU/L (normal range: 6–142 IU/L). Myoglobinuria and renal dysfunction were not observed. T2-weighted MRI revealed swelling of the muscle in the deep posterior compartment of the lower left leg, edematous fascia, and subcutaneous adipose tissue (Fig. 2). A muscle contusion in the deep posterior compartment of the lower left leg was diagnosed. The other compartments were intact. She recovered naturally; MRI one month later revealed improvement of the muscle contusion.

3. Discussion

This case suggests that surgeries performed in the lithotomy position can result in a single-compartment muscle contusion without compartment syndrome, that occurs almost a week after surgery. Further, blood loss and anti-DVT devices [4–8] likely contributed to the muscle contusion, with similar underlying mechanisms as those of compartment syndrome. Compartment syndrome occurs when the circulation and function of tissues within a closed space are compromised by increased pressure [9]. In this situation, perfusion of the lower extremities is impaired,

and muscles and nerves enclosed in these compartments are susceptible to injury [6,8]. Prolonged surgery in the lithotomy position is infrequently associated with the development of compartment syndrome [1]; the tools used to support the calf or knee during the lithotomy position increase the intracompartment pressure [5]. Also, anti-DVT devices restrict the volume of the leg compartment, thus increasing intracompartmental pressures [6].

In the present case, although compartment syndrome did not develop, the duration of compression of the lower legs was sufficient through the use of the leg support tools, serial compression stockings, and intermittent pneumatic compression. MRI is helpful for diagnosis of manifest compartment syndrome in clinically ambiguous cases. Using MRI, Rominger et al. [10] detected a muscle contusion, edematous fascia, and subcutaneous adipose tissue. Compartment syndrome is primarily a clinical diagnosis. Patients typically complain of severe and otherwise unexplainable leg pain [11]. Although measurement of intracompartmental pressure is useful, gynecologists have a poor understanding of compartment syndrome and the measurement of pressure. However, gynecologists are more familiar with MRI [12]. In a study conducted in Japan, compartment syndrome was diagnosed with MRI, emphasizing its usefulness and objectivity [12]. In particular, reports of light muscle contusion do not exist; therefore, data regarding the usefulness of measuring intracompartmental pressure, which is more invasive, are lacking. Therefore, MRI might help to detect a light muscle contusion that would otherwise be missed after surgery.

We usually suspect DVT with complaints of lower leg pain and edema. However, elevated serum CPK levels can help in identifying muscle contusion and avoiding unnecessary CT and radiation exposure, which can increase the risk of cancer in the future [13]. We could also only examine blood samples, which is less invasive and of low cost. In fact, creatine kinase is the one of most useful serum markers of muscle injury [14].

4. Conclusions

A muscle contusion can occur with surgery in the lithotomy position. When the patient complains of edema and tenderness in the lower leg and has risk factors for compartment syndrome, we should suspect muscle contusion as a differential diagnosis. Otherwise, this diagnosis might be missed. Serum CPK levels and MRI are useful to diagnose the condition, are less invasive than measuring intracompartmental pressure, and avoid the radiation exposure of CT. Additional cases are needed to determine if unidentified muscle contusions are frequently present and if routine careful physical examination can contribute to their identification.

Conflicts of interest

R. Konno received research funding from Yakult Pharmaceutical Industry Co. (Tokyo, Japan) and Chugai Pharmaceutical Co. (Tokyo, Japan), as well as lecture honoraria from Japan Vaccine Co. (Tokyo, Japan), MSD Japan (Tokyo, Japan), and Chugai Pharmaceutical Co. (Tokyo, Japan). All other authors have no conflict of interest.

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Ethical approval

This is case report, so it is not relevant at our ethics committee.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Author contributions

Conception and design of study: Kenro Chikazawa.
Acquisition of data: Keiko Akashi, Yurina Suzuki.
Drafting the manuscript: Kenro Chikazawa.
Revising the manuscript critically for important intellectual content: Sachiho Netsu, Ryo Konnno, Shigeru Motomatsu.

Guarantor

All of authors accept full responsibility for the work and conducted the study, had access to the data and controlled the decision to publish.

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References

[1] I. Karmaniolou, C. Staikou, Compartment syndrome as a complication of the lithotomy position, West Indian Med. J. 59 (2010) 698–701.
[2] R.G. Leff, S.R. Shapiro, Lower extremity complications of the lithotomy position: prevention and management, J. Urol. 122 (1979) 138–139.
[3] J. Gagnier, G. Kienle, D.G. Altman, D. Moher, H. Sox, D.S. Riley, The CARE group: the CARE guidelines: consensus-based clinical case report guideline development, J. Clin. Epidemiol. 67 (2013) 46–51.
[4] F.A. Matsen 3rd, Compartment syndrome. An unified concept, Clin. Orthop. Relat. Res. 113 (1975) 8–14.
[5] S.D. Pfeffer, J.R. Halliwill, M.A. Warner, Effect of lithotomy position and external compression on lower leg muscle compartment pressure, Anesthesiology 95 (2011) 632–636.
[6] E.A. Lachmann, J.L. Rook, R. Tunkel, W. Nagler, Complications associated with intermittent pneumatic compression, Arch. Phys. Med. Rehabil. 73 (1992) 482–485.
[7] M.H. Verdolin, A.S. Toth, R. Schroeder, Bilateral lower extremity compartment syndromes following prolonged surgery in the low lithotomy position with serial compression stockings, Anesthesiology 92 (2000) 1189–1191.
[8] S.A. Cohen, W.G. Hurt, Compartment syndrome associated with lithotomy position and intermittent compression stockings, Obstet. Gynecol. 97 (2001) 832–833.
[9] G.B. Werbel, F.T. Shybut, Acute compartment syndrome caused by a malfunctioning pneumatic-compression boot, J. Bone Joint Surg. Am. 68 (1986) 1445–1446.
[10] M.B. Rominger, C.J. Lukosch, G.F. Bachmann, MR imaging of compartment syndrome of the lower leg: a case control study, Eur. Radiol. 14 (2004) 1432–1439.
[11] E.C. Bauer, N. Koch, W. Janni, H.G. Bender, M.C. Fleisch, Compartment syndrome after gynecologic operations: evidence from case reports and reviews, Eur. J. Obstet. Gynecol. Reprod. Biol. 173 (2014) 7–12.
[12] S. Anazume, Y. Yanazume, I. Iwamoto, T. Tsuji, M. Yoshinaga, T. Douchi, Severe leg compartment syndrome associated with dorsal lithotomy position during radical hysterectomy, J. Obstet. Gynaecol. Res. 32 (2006) 610–612.
[13] A. Berrington de González, M. Mahesh, K.P. Kim, M. Bhargavan, R. Lewis, F. Mettler, C. Land, Projected cancer risks from computed tomographic scans performed in the United States in 2007, Arch. Intern. Med. 169 (2009) 2071–2077.
[14] P. Brancaccio, G. Lippi, N. Maffulli, Biochemical markers of muscular damage, Clin. Chem. Lab. Med. 48 (2010) 757–767.