福岡大医紀（*Med Bull Fukuoka Univ*）：32(1), 21–25, 2005

Near–Fatal Pulmonary Embolism after a Pelvic Osteotomy Associated with Uterine Myoma —A Case Report—

Hiroshi JOJIMA, Takashi MORI*, Takeshi SERIKAWA*,
Takahiro MURAYAMA*, Yoshihiro TAKAMORI, Keiichi TANAKA*,
and Masatoshi NAITO

Department of Orthopedic Surgery Fukuoka University School of Medicine
*and *Department of Emergency and Critical Care Medicine Fukuoka University School of Medicine*

Abstract：A case of pulmonary embolism (PE) associated with a uterine myoma is herein reported. The patient developed PE after undergoing a Chiari pelvic osteotomy. A prompt diagnosis and appropriate treatment enabled us to save this near–fatal patient. At 6–days post operation, the patient developed a PE despite receiving thromboembolic prophylaxis. Angiography revealed emboli in the pulmonary artery which were surgically removed with supporting percutaneous cardiopulmonary support (PCPS). The surgical findings from the pulmonary artery confirmed the presence of thrombosis caused by deep vein thrombosis (DVT) in the lower extremities. After the operation, intravenous urokinase was administered to treat the remaining thrombus. A radio imaging (RI) venogram showed DVT to still exist in the popliteal vein in spite of administering thrombolitic therapy. To prevent a recurrence of the PE, a permanent intravenous filter was placed in the vena cava.

Key words：**Pulmonary embolism (PE), Deep vein thrombosis (DVT), Pelvic osteotomy, Uterine myoma**

Introduction

Pulmonary embolism (PE) is a fatal complication that can sometimes occur during and after orthopedic surgery as a consequence of deep vein thrombosis (DVT).[1] The venous prophylactic treatments for DVT have been well discussed in patients undergoing orthopedic surgery.[2] In our department, pneumatic compression boots are routinely used after hip operations and their usefulness has been previously demonstrated.[3] A case of PE which developed after a Chiari pelvic osteotomy and was successfully treated is herein reported. Thrombi in the pulmonary artery originated due to DVT which had been caused by blood stasis in the pelvis due to the presence of an asymptomatic uterine myoma.

The patient was told that the data concerning her case would be submitted for publication, and she gave her informed consent.

Case report

A thirty–nine–year–old woman with worsening dysplasia of the left hip presented for an elective Chiari pelvic osteotomy. Her height was 154 cm, while her weight was 63.4 kg and body mass index was 26.1. Preoperatively, we realized that she had an asymptomatic uterine myoma which had not

Correspondence to Hiroshi JOJIMA, MD
Department of Orthopedic Surgery Fukuoka University School of Medicine
7–45–1 Nanakuma, Jonan–ku Fukuoka 814–0180, Japan
Phone：81–92–801–1011 Fax：81–92–864–9055 E–mail address：jojima@fukuoka–u.ac.jp

yet been treated. Her physical examination findings were only notable for Trendelenburg symptoms and severe tenderness at Scarp's triangle of the left hip. No clinical symptoms indicated anything that might lead us to suspect DVT, such as pain, swelling, palpable cords, or positive Homan's sign in the bilateral calf. A routine preoperative electrocardiogram (ECG) taken on admission showed normal tracing. In the preoperative laboratory results, iron deficiency anemia due to uterine myoma was revealed and the coagulation panel was within the normal range. An x-ray film of the hip showed a low CE angle, a small bearing surface, sclerotic changes in the subchondral bone of the left acetabulum (Fig. 1). A computed tomographic scan of the pelvis visualized the uterine myoma (Fig. 2), however, we considered that the presence of this lesion would not impede the operation. A Chiari pelvic osteotomy was thus performed under epidural anesthesia without any intraoperative complications (Fig. 3). For thromboembolic prophylaxis, the patient was encouraged to move her ankle intermittently after the operation and she also wore pneumatic compression boots at other times. At 2-days post op, she was permitted to sit up on the bed. At 6-days post op, she suddenly complained of chest pain and a choking sensation just after she put on the pneumatic

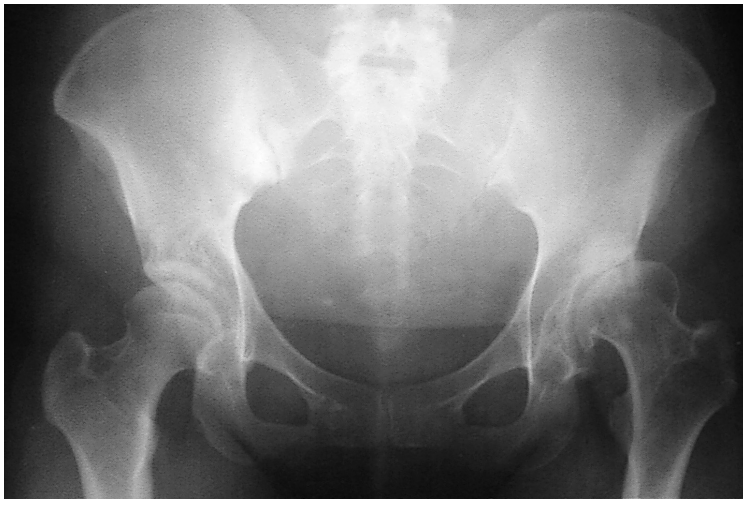

Fig. 1. A preoperative radiograph of the patient demonstrating dysplasia of the left hip showing a low CE angle (Rt 25° Lt 0°), a small bearing surface, and sclerotic changes in the subchondral bone of the left acetabulum.

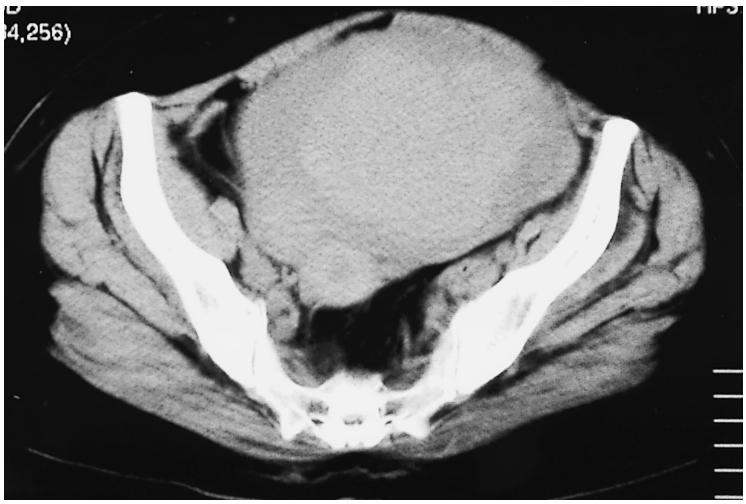

Fig. 2. A CT scan shows a uterine myoma in the pelvis.

compression boots. At this point, her blood pressure decreased to 86/44 mmHg, heart rate was 104 bpm, and SpO_2 was 40%. An arterial blood gas analysis (ABG) showed severe hypoxemia and respiratory alkalosis. The serum D-dimer level was high, showing 18.1 μg/ml (normal range 1.0≧). An electrocardiogram (ECG) showed S waves in lead Ⅰ and inverted T waves in lead Ⅲ. An ultrasonic cardiogram (UCG) visualized the dilated right ventricle. The findings indicated typical acute right ventricle failure. Based on these findings, PE was suspected, and angiography was performed, with the results showing thrombotic occlusion in the right pulmonary artery (Fig. 4). Attempts to remove the thrombi with a catheter were unsuccessful. Cyanosis and hypoxia progressed, and thereafter her SpO_2 showed 60% despite receiving 100% O_2 ventilation. To improve her respiratory function, PCPS was employed. A temporary filter was inserted into the inferior vena cava to prevent an extension of the PE. Thereafter, catheter intervention was abandoned. A surgical pulmonary embolectomy was thus performed. The operative findings showed that clots obstructed the pulmonary arteries and they were thus thoroughly removed (Fig. 5). ECG and UCG showed an improvement in the over load of the right ventricle immediately after the operation.

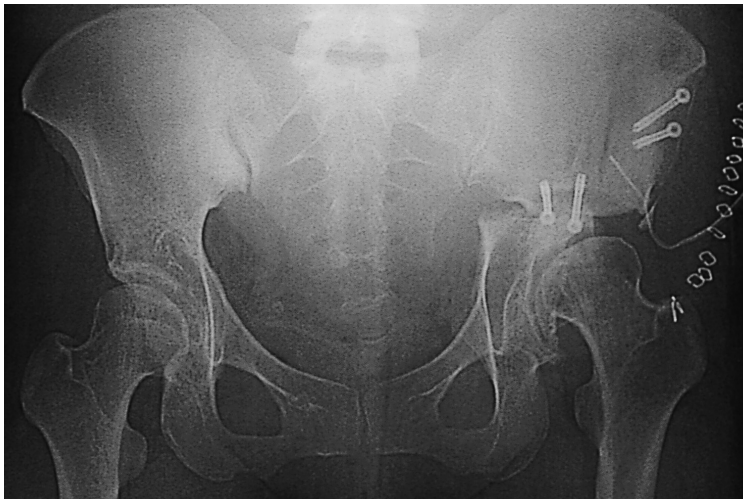

Fig. 3. A radiograph taken after the Chiari pelvic osteotomy.

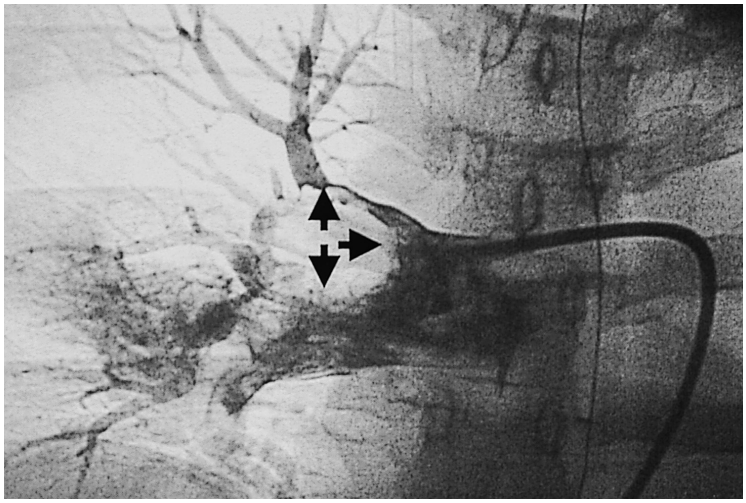

Fig. 4. A pulmonary angiogram shows thrombotic occlusion (arrowheads) of the right pulmonary artery.

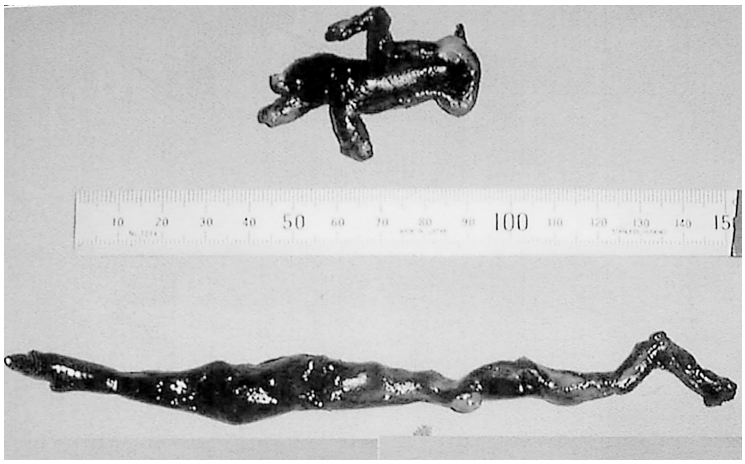

Fig. 5. The thrombi are removed from the bilateral pulmonary artery.

Postoperatively, intravenous urokinase and heparin sodium were administered to treat the remaining thrombus. To improve the venous return in the pelvis, a total hysterectomy was performed at 15-days post op. The uterus measured 15 cm×15 cm in size and weighed 1300 g, which was large enough to obstruct the pelvic blood flow. After performing a hysterectomy, RI venography showed the DVT to still exist in the left popliteus in spite of the thrombolitic therapy. To prevent a recurrence of PE, a permanent intravenous filter was inserted into the inferior vena cava. The patient was discharged without any respiratory impairment and is continuing to receive oral anticoagulant therapy. At one year after undergoing the Chiari pelvic osteotomy, the patient demonstrated no symptoms in the hip joint and bone union was confirmed by X-rays, and no adverse clinical features, respiratory impairment or varicose veins of the lower legs were observed to develop at all. The patient has been receiving warfarin potassium 5 mg/day as anticoagulant therapy for a year.

Discussion

PE is a well-known thromboembolic disease that sometimes occurs as a complication of orthopedic surgery as a consequence of DVT. Wolf et al. reported 0-7% of fatal PE in total hip joint arthroplasty.[4] Shibayama et al. reported that PE occurred in 2.1% of the patients after undergoing a Chiari pelvic osteotomy.[5]

In this case, the patient complained of acute chest pain and dyspnea immediately after putting on the pneumatic compression boots. The patient's symptoms and overall condition led us to suspect PE right away. An angiogram revealed thrombi in the pulmonary artery and an attempt was made to remove them using PCPS and a temporary filter. To successfully treat the rest of the thrombi, urokinase and heparin sodium were administered. A total hysterectomy was also performed to improve the blood flow in the pelvis and to accelerate anticoagulation, however, RI venography showed that DVT still existed in the popliteal vein.

Nevertheless, thromboembolic prophylaxis was performed postoperatively and, as a result, thrombi were generated. The occurrence of such thrombi suggested that some factor may have caused PE other than postoperative hypercoagulity. Nishikawa et al. reported a case in which a huge uterine myoma compressed veins in the pelvis thus resulting in an impaired blood flow which caused DVT and PE.[6] Likewise, a uterine myoma was found in this patient. Obviously this condition was potentially dangerous because blood stasis caused pelvic thrombi which led to the development of a PE.[7] A high D-dimer serum level at the PE event indicated that a DVT already existed during the bed rest period after the patient had undergone a Chiari pelvic osteotomy.[8] We consider that the PE which occurred in this patient was preventable. Prior to performing the osteotomy, the uterine myoma should have been appropriately treated. If we had been aware of the fact that a uterine myoma had a potential to cause pelvic thrombi,

then much stronger anticoagulants would have been used. Careful attention should thus be paid to the anatomical uniqueness of the left iliac vein when it is compressed by the right iliac artery and vertebral body thus resulting in a "nutcracker" phenomenon.[9] In addition, surgeons should also keep in mind that a left pelvic osteotomy has a potential to impair the iliac vein.

This was a very rare case, because the uterine myoma was considered to play a role in the development of PE after a Chiari pelvic osteotomy. Thromboembolic prophylaxis should therefore be carefully considered even for high-risk cases when pneumatic compression boots are used after surgery.

References

1) Lonner JH, Lieberman JR : Coagulation and Thromboembolism in Orthopaedic Surgery. In : Koval KJ (ed), Orthopaedic Knowledge Update 7, pp. 55-62, American Academy of Orthopaedic Surgeons (Rosemont), 2002.

2) Sculco TP, Colwell CW Jr, Pellegrini VD Jr, Wistrich GH, Bottner F : Prophylaxis against venous thromboeombolic disease in patients having a total hip or knee arthroplasty. J Bone Joint Surg Am 84 : 466-77, 2002.

3) Fujisawa M, Naito M, Asayama I, Kambe T, Koga K: Effect of calf-thigh intermittent pneumatic compression devices after total hip arthroplasty : comparative analysis with plantar compression on the effectiveness of reducing thrombogenesis and leg swelling. J Orthop Sci 8 : 807-811, 2003.

4) Wolf LD, Hozack WJ, Rothman RH : Pulmonary embolism in total joint arthroplasty. Clin Orthop 288 : 219-233, 1993.

5) Shibayama K, Higuchi F, Shiwa N, Yamashita H, Ookawa T, Inoue A : Pulmonary Embolism after Hip Surgery. Rinsho Seikei Geka (Clinical Orthopaedic Surgery) 29 : 999-1006, 1994.

6) Nishikawa H, Ideishi M, Nishimura T, Kawamura A, Kamochi H, Tahara H, Tsuchiya Y, Shirai K, Okabe M, Arakawa K : Deep venous thrombosis and pulmonary thromboembolism associated with a huge uterine myoma : a case report. Angiology 51 : 161-166, 2000.

7) Riedel M : Acute pulmonary embolism 1 : Pathophysiology, clinical presentation, and diagnosis. Heart 85 : 229-240, 2001.

8) Turpie AG, Chin BSP, Lip GY : Venous thromboembolism : pathophysiology, clinical features, and prevention. BMJ 325 : 887-890, 2002.

9) Cockett FB, Thomas ML : The iliac compression syndrome. Brit. J. Surg 52 : 816-821, 1965.

(Received on October 12, 2004,
Accepted on December 13, 2004)