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Case Report

Percutaneous cardiopulmonary support for pulmonary thromboembolism caused by large uterine leiomyomata

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Abstract

Objective: Acute pulmonary thromboembolism (PTE) is a common illness that causes death and disability. Deep vein thrombosis (DVT) is often found in patients with a large myomatous uterus, and can occasionally result in acute PTE. Here, we describe the achievement of a favorable outcome in a case of acute PTE.

Case Report: The patient presented with acute PTE caused by a large uterine leiomyoma, without DVT of the lower extremities. Percutaneous cardiopulmonary support (PCPS) was used as an adjunct to thrombolytic therapy to treat the right ventricular thrombus with acute PTE. According to emergency practice, PCPS was initiated, and the patient was successfully treated with thrombolytic and anticoagulant therapy associated with total abdominal hysterectomy.

Conclusions: This case suggests that PCPS can lead to favorable clinical outcomes in patients with large uterine leiomyomata and severe PTE.

Keywords: deep vein thrombosis; percutaneous cardiopulmonary support; pulmonary thromboembolism; uterine leiomyomata; venous thromboembolism

Introduction

Uterine leiomyoma arises from smooth muscle. It is one of the most common benign pelvic tumors of the female genital tract, and is likely to be the most common type of soft tissue tumor. The incidence of leiomyoma far exceeds the frequency of clinical problems, with as many as 50% of women having identifiable fibroids at menopause [1]. Symptoms of leiomyomata are location dependent; small leiomyomata may cause life-threatening uterine bleeding and disabling dysmenorrhea, whereas, very large leiomyomata may result in few symptoms. On rare occasions, large uterine leiomyomata may cause venous thromboembolism (VTE) because of compression of the surrounding structures [2–5].

VTE, which includes pulmonary thromboembolism (PTE) and deep vein thrombosis (DVT), is a common, well-recognized surgical complication [6]. The overall incidence of PTE has been reported to be approximately 0.4% with a mortality rate of nearly 60%, indicating that PTE is a potentially life-threatening cardiopulmonary illness [7,8]. Up to 90% of PTEs are caused by DVT of the lower extremities [9].

In the current report, we describe a patient with a large uterine leiomyoma and severe PTE, without DVT in the lower extremities, who experienced cardiac arrest and was successfully treated using percutaneous cardiopulmonary support (PCPS).

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Case report

A 40-year-old nulliparous Japanese woman was admitted to Fukuoka University Hospital for acute respiratory distress. For several years, she had experienced hypermenorrhea and had suspected the presence of an abdominal mass. During the few days before admission, she also had dyspnea on exertion. Upon admission, she had a Glasgow Coma Scale score of 15. Her blood pressure, pulse rate, and respiration rate were 150/80 mmHg, 134 beats/min and 24 breaths/min, respectively, and she had a body mass index of 21.5 kg/m^2. She had pallor of the palpebral conjunctiva, jugular venous distension, and a distended abdominal area, and she had mild edema of both lower extremities. An electrocardiogram showed right axis deviation of the heart with sinus tachycardia. Chest X-ray showed no specific radiological features suggesting of PTE with cardiothoracic ratio of 55.9%. Transthoracic cardiac ultrasonography showed distention of the right ventricle and flatness of the ventricular septum. In addition, transabdominal ultrasonography showed a 20-cm solid tumor in the pelvis. Laboratory findings revealed a hemoglobin level of 8.0 g/dL, and a hematocrit of 33.3%, indicating the presence of severe anemia. Other hematological parameters were within the normal range. Her coagulation profiles including fibrinogen degradation products, D-dimer, plasmin α2−plasmin inhibitor complex, antithrombin III, protein C, protein S, lupus anticoagulant, and anticardiolipin antibody levels were also within normal limits. Arterial blood gas analysis under oxygen at 10L/min showed PaO_2 of 115 mmHg, $PaCO_2$ of 20.4 mmHg, pH of 7.399 and $HCO3^-$ of 12.2 mmol/L. These laboratory data suggested that the patient had pulmonary embolism.

Computed tomography (CT) of the chest and abdomen was planned to diagnose precisely the pulmonary embolism and abdominal mass. However, immediately after CT examination, the patient suddenly suffered cardiac arrest. Her systolic blood pressure and heart rate dropped to <50 mmHg and 30 beats/min, respectively, and immediate cardiopulmonary resuscitation did not induce sufficient cardiac movement. Therefore, PCPS was applied promptly in an attempt to improve cardiopulmonary function. The PCPS circuit consisted of a centrifugal pump, hollow fiber, microporous membrane oxygenator, and percutaneous thin-walled cannula.

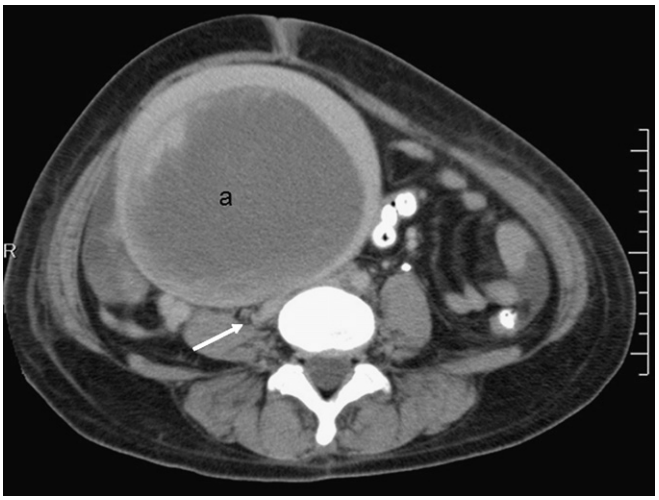

Fig. 2. Computed tomography (CT) imaging of the abdomen. A massive amount of necrotic tissue (a) was found in the large uterine leiomyoma, which compressed the patient's inferior vena cava. The arrow indicates the depressed inferior vena cava.

The Capiox emergent bypass system (Medtronic, Tokyo, Japan) was used. Both catheters and all blood-containing surfaces throughout the system were coated with heparin. While the patient remained conscious, 15-Fr arterial side and 18-Fr venous side cannulae were inserted into the femoral vessels under local anesthesia. Her hemodynamic condition then stabilized at a PCPS flow rate of 1.2−2.1 L/min/m^2. An activated coagulation time was maintained at approximately 200 s, with intravenous administration of heparin during the procedure. Her systemic arterial saturation immediately improved from 81% to 100%. Spiral CT of the chest and abdomen with contrast enhancement showed a thrombus in both pulmonary arteries and a large pelvic mass compressing both the left lateral iliac vein and bilateral common iliac veins (Figs. 1 and 2). On the basis of these findings, the patient was diagnosed as having acute severe PTE caused by a large leiomyoma.

Thrombolytic therapy was instituted using 1,350,000 U tissue plasminogen activator under PCPS treatment. In addition, anticoagulation using unfractionated heparin was also administered. Echocardiography performed a few days after

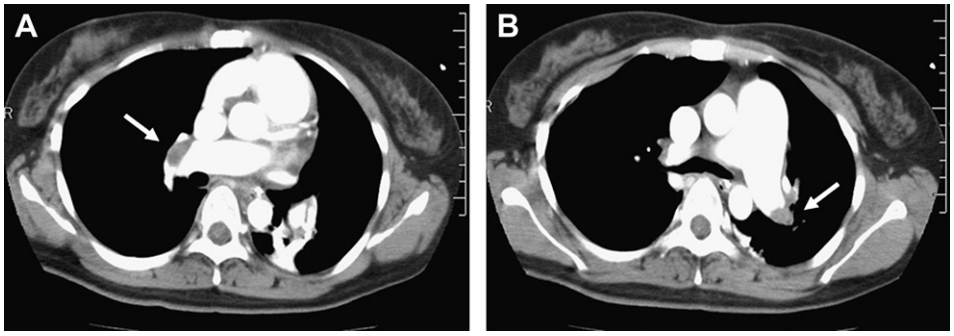

Fig. 1. Computed tomography (CT) imaging of the chest. Pulmonary embolism was present in both the right (A) and left (B) pulmonary arteries. Arrows indicate the intravascular thrombus.