

골반환 손상 후 발생한 치명적인 폐색전증: 증례보고

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- Abstract -

Fatal Pulmonary Thromboembolism after a Pelvic Ring Injury : A Case Report

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Pelvic ring and acetabular fractures are major high-energy trauma injuries and are often associated with other injuries or fractures. In particular, a venous thromboembolism is an important common complication in trauma patients with pelvic or acetabular fractures. We report a case of a fatal pulmonary thromboembolism after a pelvic fracture in a 60-year-old female patient. [J Trauma Inj 2014; 27: 224-8]

Key Words: Pelvic fracture, Venous thromboembolism

Pelvic ring or acetabular fractures are caused by high energy trauma, and can be risk factors for the development of thromboembolism.(1,2) The rate of deep vein thrombosis (DVT) after fracture of the pelvis has been reported to be up to 61%,(3) and the rate of pulmonary thromboembolism (PTE) after pelvic trauma up to 10 %. Furthermore, a fatal event was reported in half of this population.(4,5)

The first clinical manifestation of venous throm-

boembolism (VTE) is often PE-related sudden death. Due to delayed diagnosis, sudden onset of symptoms, an unpredictable nature and rapid progression, patients are subject to expire frequently when this complication occurs.

Authors experienced a case of an acute PTE after pelvic ring injury in a previously healthy woman whose life was saved by immediate surgical intervention and report with literature review.

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Submitted : November 12, 2014 **Revised** : December 26, 2014 **Accepted** : December 4, 2014

I. Case

A previously healthy 60-year old woman sustained a pedestrian traffic accident during crossing the road and was transferred to our institution via a local medical center. Initial vital signs were relatively stable. Clinical and radiological assessment revealed a left iliac wing fracture, right femoral midshaft fracture (Winkelmann–Hansen type III), undisplaced left clavicular midshaft fracture and multiple left rib fractures with lung contusion (Fig. 1). The patient complained of left side chest pain and mild dyspnea. Oxygen saturation (PaO_2) initially measured by arterial blood gas analysis was 95%, although she had inhaled 5L of oxygen from the other hospital. It was supposed to operate on the femur and ilium after the lung condition recovered.

The patient had bed rest with skeletal traction for the femoral fracture and a chest X-ray was checked daily. To prevent possible VTE, mechanical prophylaxis with anti-embolic stocking was performed. After 10 days from the time of injury, the patient's

lung condition was improved and the surgery was held. The plan was to operate on the femoral fracture with unreamed intramedullary nail first then open reduction and fixation for pelvis.

About 40 minutes after starting the operation of the femoral fracture under the general anesthesia, near the end of intramedullary nail insertion, the patient rapidly became hypoxic (PaO_2 : 52%) and hypotensive (systolic BP/diastolic BP: 40/30). Peripheral pulsation became weak and eventually uncheckable. During the assessment of situation by the anesthesiologist, cardiac arrest occurred and all operative procedures were stopped. Cardiopulmonary resuscitation started and heart rhythm was restored to sinus after cardiac massage for 1 minute, but oxygen saturation and blood pressure were not regained.

A transesophageal echocardiography was carried out immediately in the operating room and showed multiple thrombi in her right atrium and ventricle with their severe dilatation (Fig. 2). Left ventricular function was relatively maintained without regional

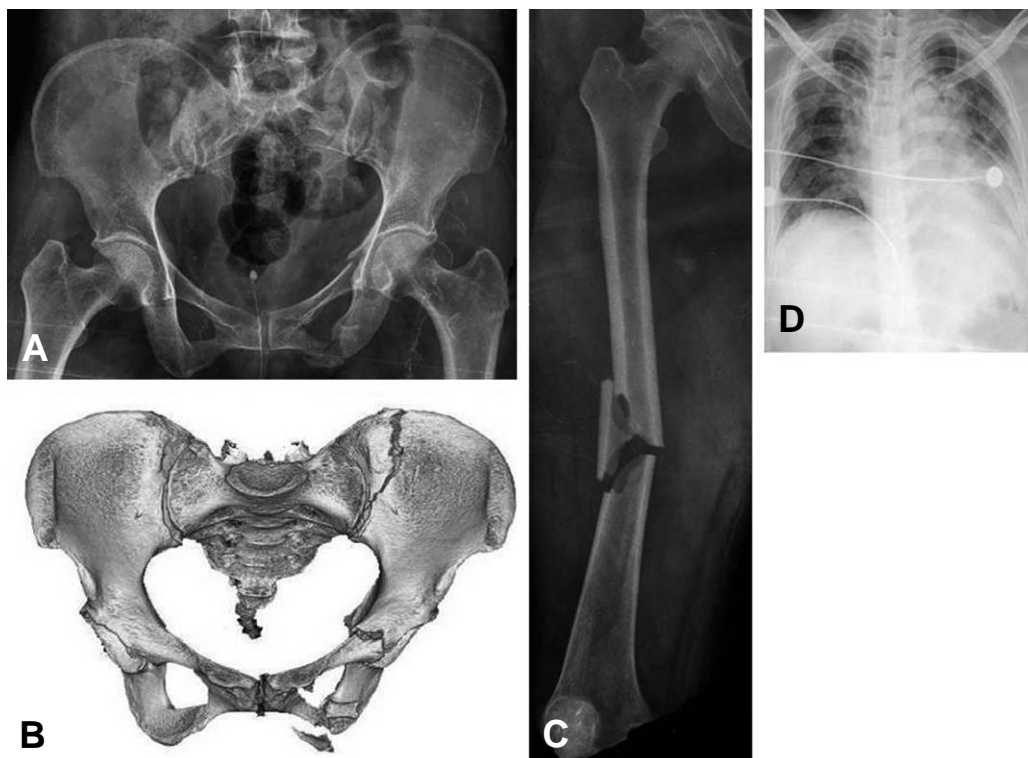


Fig. 1. Simple radiography (A) and 3-dimensional CT (B) showing crescent fracture on left ilium and both superior and inferior rami fractures on left hemipelvis. There is also a fracture on right femoral midshaft (C). She suffered from lung contusion and multiple left rib fractures (D).

wall motion abnormality but slightly interfered with the dilated right ventricle. Acute PTE was diagnosed and immediate pulmonary artery embolectomy was done by a thoracic surgeon with thoracotomy on the spot. Ten pieces of large and small emboli were evacuated (Fig. 2, inset). After then, the patient became hemodynamically stable and a vena cava filter insertion was followed under fluoroscopy in her inferior vena cava via internal jugular vein approach

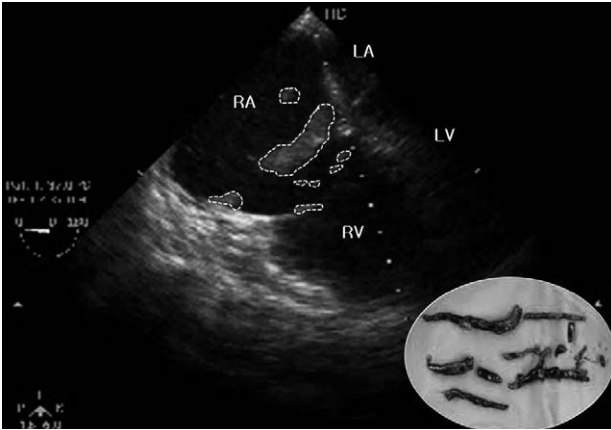


Fig. 2. Transesophageal echocardiogram showing multiple thrombi on her right atrium and ventricle (dot) with severe dilatation of them. Evacuated thrombi (inset).

on the spot. The surgery of the femoral fracture was restarted and 2 distal interlocking screws were fixed without proximal interlocking to finish the operation as soon as possible. It was decided to treat the pelvic ring injury conservatively and the patient was admitted to intensive care unit immediate after surgery with systemic heparinization.

The day after the surgery, she suffered from hyperkalemia (serum K^+ : 9.04 mmol/L) and ventricular tachycardia followed by asystole. Immediate cardiopulmonary resuscitation was done and again, she was stabilized after that.

Her general condition was completely restored after 3 weeks after admission to the intensive care unit and she was transferred to a ward. After 3 months, she was discharged from the hospital. She could walk by herself at that time although a slight limp remained. On her latest follow up after 8 months, the femoral and pelvic fractures were united completely on the radiography (Fig. 3).

II. Discussion

Patients with pelvic trauma are known to be at



Fig. 3. Follow-up radiograph after 8 month showed complete healing of pelvic crescent fracture (A, B) and union of femur (C, D).

increased risk for the development of thromboembolic complications.(4–8) In patients with pelvic and acetabular fractures, the risk of pulmonary embolism is 2% to 10% with subsequent death occurring in 0.5% to 2% of patients.(9) Moreover, thromboembolic complication may occur more commonly in patients with a major pelvic disruption especially if associated lower extremity fractures.(6,10)

Predisposing risk factors of the venous thromboembolism without trauma are known as age greater than 60, malignancy, previous history of DVT or PTE, oral contraceptives, and obesity.(11) In traumatized patients, the factors to increase the risk of venous thromboembolism are old age, spinal cord injury, fractures of the lower extremity and pelvis, and prolonged immobilization.(3,8,10,12) In current case, the patient had several risk factors including age, simultaneous pelvic and femoral fractures, and 10 days' immobilization, although she had no subjective symptoms or objective signs of DVT.

Most pulmonary emboli are known silent and the pulmonary complication of trauma such as lung contusion may obscure the presentation of pulmonary embolism resulting in a delay in diagnosis or misdiagnosis.(4,13) In this case, the patient had multiple rib fractures and lung contusion and complained of slight dyspnea, but it was not thought that this pulmonary symptom was due to an already existing embolus because evacuated emboli were just the shape of deep vein in lower extremity. It is assumed that the cause of PTE in this case was compression of lower extremity with an elastic bandage while preparing the operation and manipulating the lower extremity during intramedullary nail insertion. It is thought that thrombi formed within the deep vein of the leg mobilized and floated to pulmonary artery via the right heart.

Because of high risk of thromboembolic phenomena in multiple trauma patients and effective medical prophylaxis and protection are not established, many authors advised vena cava filter.(5,10,14) Modern vena cava filters are known to be relatively safe and easy to insert, effective mechanical barrier to filter the thrombi off.(15) Although the vena cava filter was placed after embolectomy to prevent possible remained thrombi from floating in current

case, it is thought that this procedure should have done in advance of the surgical intervention.

It has been well established that elderly patients with pelvic ring or acetabular fractures are at greater risk of thrombosis. The majority of reports on the subject have concluded that age significantly affects the development of VTE.(3,9) Accordingly, despite some controversy, age appears to be an important cause of VTE. Thus, it is needed to consider a chemoprophylaxis as well as mechanical prophylaxis, such as anticoagulant agents, in elderly patients with pelvic ring injuries.

Fortunately, the patient's life could be saved because the PTE was detected during the surgery under general anesthesia, and an immediate embolectomy could be done on the spot. Nobody knows what would happen if the symptom emerges in the ward or elsewhere out of the operating theater. As far as we know, there has been no report that saved patient's life after PTE happens yet.

PTE is a fatal complication. Preoperative screening such as DVT-CT or duplex ultrasonography will be useful, especially in patients with risk factors. If DVT is detected, preoperative insertion of vena cava filter or administration of thrombolytic agent will be a great help to prevent PTE. Some method of such prophylaxis should be considered based on a patient's overall clinical situation.

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