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External Iliac Artery Injury Occurring Following Pelvic Ring and Acetabulum Fracture: A Rare Case Report

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Abstract

After head trauma, pelvic fractures are the most common cause of death in patients with multiple trauma. The primary cause of death in patients with a pelvic fracture is uncontrollable bleeding, and in cases of delayed intervention, hemorrhagic shock is the principal cause of death. Bleeding from the external iliac artery following Pelvic Ring and acetabulum fracture is an uncommon orthopedic emergency.

A 48-year-old man who suffered pelvic trauma was referred to the hospital, and an Antero-Posterior Compression type- II (APC II) of the Pelvic Ring and Acetabulum fracture was diagnosed. The patient developed thrombosis of the external iliac artery 48 hours after admission. CT angiography was performed for further assessment. Then, the anterior column of the acetabulum, disruption of the symphysis underwent open reduction. Internal fixation with a 3.5 reconstruction plate via a modified Stoppa approach was done. Sacroiliac disruption on the right side was repaired via percutaneous sacroiliac screw fixation. In the same session, the vascular repair was done via interpositional PTFE graft. After surgery, the patient's general condition was satisfactory, and he was discharged without complications.

Keywords: Fifth Metatarsal, Fracture, Casting, Bracing.

Introduction

The pelvic cavity is a shield for the intestines, bladder, uterus, and reproductive organs placed in the pelvis. In injuries and fractures, the pelvis can hold a lot of blood and make the patient prone to life-threatening shock. Unfortunately, pelvic fractures affect significant complications and mortality due to pelvic lesions and other concomitant injuries. Accompanying injuries with lead to bleeding into the pelvis or posterior abdomen and severe complications for the patient. However, lesions due to thrombosis or arterial injury are relatively rare, especially in the main branches. Arterial bleeding contributes just to around 15 percent of the hemorrhage, especially from the iliac artery branches. The iliac

artery trauma is not very common¹⁻⁷. However, the most common cause of iliac artery trauma is penetrating trauma. In 10% of reported cases caused by Gunshot and 2% of the reported cases of stab wounds to the abdomen, iliac artery trauma was observed^{6,7}. Letournel revolutionized definitive surgical management of pelvic and acetabulum fracture in 1961. The Iliioinguinal approach has allowed surgeons to perform anatomical reduction with adequate visualization of the fracture fragments by exposing the pelvis's inner surface from the anterior aspect of the sacroiliac joint to the pubic symphysis¹.

Numerous small arteries and veins are located around the pelvis and may be torn by the broken end of the

bones or sacroiliac joints. The area around the pelvis is considered a "potential space" because it can expand and hold large amounts of blood. For this reason, bleeding in this space may not show many external symptoms ².

Pelvic ring fracture (PRF) and Acetabulum fracture are frequent in limb injuries, especially the pelvic area. The management of the pelvic ring's traumatic disruption has become a focus of attention, and such disorders should be stabilized at operation ³⁻⁵. Stabilization may be essential for the patient's survival, and beneficial to promoting the long-term functional results of such injuries. Injury to main arteries is among the most life-threatening potential complications with pelvic fractures ⁶.

In this case, we look at the arterial injury and external iliac artery thrombosis caused by a pelvic ring fracture in a young man.

Case Presentation

A 48-year-old man experienced a traffic accident trauma and was referred to the hospital. Clinical examination and X-ray plain film revealed symphysis widening, Disruption of sacrospinous and sacrotuberous ligaments, and anterior-posterior sacroiliac joint diastasis (Fig. 1). It represented an Anterior-Posterior Compression II fracture based on the Young-Burgess

Classification.

The patient developed thrombosis in the external iliac artery 48 hours after trauma. At the arrival, this condition was diagnosed as a lack of femoral pulse; surprisingly patient had no manifestation of ischemia, and the only routine physical exam revealed the absence of the femoral pulse. Arterial angiography was performed for further examination.

In surgery, the anterior column of the acetabulum, on the left side, symphysis disruption, an open reduction, and internal fixation with the reconstruction of 3.5 plates via the modified Stoppa approach were used. Sacroiliac disruption on the right side was repaired by percutaneous sacroiliac screw fixation.

In the same session, vascular surgery and the vascular arterial flap were done. During the operation, localized thrombosis was seen in the external iliac artery, which was diagnosed after intimal flap arteriotomy, and the damaged part of the artery was repaired with a PTFE graft. With iliofemoral bypass, a PTFE graft was used to treat due to the proximity of the distal lesion to the inguinal ligament.

After the treatment interventions, the patient's distal pulses started beating again, his general condition was satisfactory, and he was discharged without any particular complication (Fig. 2&3).



Figure 1: X-ray plain film of pelvic.



Figure 2: Post-treatment pelvic x-ray.



Figure 3: CT angiography imaging.

Discussion

Pelvic fracture accounts for about 3 percent of all fractures. Pelvic-associated bleeding often occurs due to the pre-sacral and lumbar venous plexus or the fracture of the primary site. Bleeding is far less likely as a result of arterial hemorrhage (15-20 percent) and is particularly rare as a result of external iliac artery (EIA) hemorrhage. Iliac artery injury-related mortality rates range from 38% to 72%. In the arterial damage, a complete body CT scan with contrast medium, angiography, or packing may be administered. In specific scenarios, embolization may stop bleeding, but urgent surgery is necessary whenever there is interference with the aorta, common iliac artery, or EIA⁸.

Pascarella reported five patients with rupture of the EIA. At first, a C3 pelvic injury with third-degree Gustilo exposure and dislocation of the right hemipelvis, who had bleeding at the right iliac fossa, was treated by prosthesis implantation vascular surgery. The second case was a C2 pelvic injury and diastasis of the symphysis pubis, left sacroiliac dislocation, fracture of the right ilio-pubic branches, and probable right fracture of the sacrum, which had a lesion of the right EIA, which caused her death. Another C3 pelvic injury with fracture-dislocation of the right sacroiliac joint, third-degree open lesion of the perineum, and left iliac wing fracture had rupture of the EIA, treated by Hemipelvectomy. Next case deceased cause of type B3 pelvis lesion that caused lesion of EIA, with no treatment for vascular injury. A case of fracture of two

columns of the acetabulum with a fragment occupying the prominent sciatic notch experienced EIA lesions and was treated by vascular graft, but the outcome was death. As seen in our case, various fracture types in the pelvic could lead to EIA lesions⁸.

Ruotolo et al. reported a 32-year-old female with high anterior column/posterior hemitransverse acetabular fracture, that her angiogram revealed a left external iliac artery injury treated with thrombectomy and a 25-year-old man with right T-type acetabular fracture who's right internal iliac had bleeding and was treated by Coils for embolization⁹.

In a report of eight cases by Carrillo, Serious pelvic fractures related to multiple traumatic injuries were experienced by all patients. On the right side, five injuries occurred. A related right vertical shear pelvic fracture occurred in two patients. In the first six hours following admission, vascular damage was observed in five patients. Two months after his initial injury, one patient presented with an aneurysm of the proper common iliac artery¹⁰.

The external iliac artery hemorrhage diagnosis is based on the clinical exams and findings and is verified by arteriography. It seems that the most probable cause of such an injury is arterial hyperextension with intimal injury¹⁰.

Iliac artery trauma is sometimes caused by blunt trauma, which is rare and has been reported in numerous case reports. Nevertheless, common iliac artery trauma and internal iliac branch trauma are well-known, and external iliac artery isolated trauma is rare. The most common manifestation of iliac artery trauma is the absence of a femoral pulse with shock, and the most irregular presentation of this type of trauma is the asymptomatic patient. In a motor vehicle crash, femoral artery damage happened in a thirty-one-year-old man who experienced acetabular fractures on the left¹¹.

In individuals with severe pelvic trauma, artery injuries are a significant cause of morbidity and mortality. Bleeding, which is the principal determinant of mortality, occurs in up to 40 percent of individuals with pelvic fractures due to severe traumatic injury. Trauma to the main pelvic arterial and venous components and vascular disruption due to osseous fractures are causes of bleeding inside the pelvis¹².

In summary, comparing the various methods used in literature to treat this condition¹⁰⁻¹², currently, in a healthy person who can tolerate surgery, the technique

of retroperitoneal surgery and resection and repair of arteries seems to be the best method. The significant complications of open surgery include spinal and rectal ischemia (either as a temporary ligation or as a permanent ligation of the artery when the artery is not repairing), and therefore should be performed before pelvic artery ligation using pelvic angiography. If there is stenosis or thrombosis in the proximal medial iliac of the opposite side, ligation of the artery is prohibited and may cause ischemia of the pelvis and gluteal region.

Also, the presence of vascular variation, especially in the arteries of the pelvic and their accidental amputation, can cause problems in the treatment process, increase the duration of surgery and the length of treatment, and ultimately endanger the patient's life. Furthermore, despite the absence of symptoms of acute ischemia in our case, surgery was performed to prevent future claudication.

Conclusion

In this case report, the patient had no manifestation of ischemia, although he was suspected of a lack of femoral pulse. Therefore, timely diagnosis of asymptomatic cases of a rare condition like this has great importance to conduct further therapeutic interventions.

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Conflict of Interest Disclosures

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Authors' Contributions

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Ethical Statement

A consent form was signed by the patient and he was

aware of the treatment procedure.

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