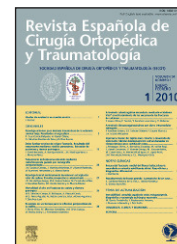


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CASE REPORT

Anterior pelvic ring injury associated with an unusual sacral fracture

V. Polizois, A.F. Mavrogenis, N. Efstathopoulos and D.S. Korres*

Departamento de Ortopedia III, Hospital KAT, Facultad de Medicina, Universidad de Atenas, Kifissia, Greece

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KEYWORDS

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PALABRAS CLAVE

Lesiones de pelvis;
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Abstract

A 52-year-old male sustained a road traffic accident riding a motorcycle. On admission, plain radiograph of the pelvis showed wide diastasis of the pubic symphysis, a midsagittal fracture of the sacrum and a fracture of the right transverse process of the fifth lumbar vertebra. We discuss the treatment of this rare injury.

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Lesión anterior de pelvis asociada a una fractura poco habitual del sacro

Resumen

Hombre de 52 años que sufrió un accidente de tráfico mientras conducía una motocicleta. Las radiografías simples de pelvis tomadas a su ingreso evidenciaron una amplia diastasis de la sínfisis púbica, una fractura mediosagital del sacro y otra fractura de la apófisis transversa derecha de la quinta vértebra lumbar. Presentamos el tratamiento utilizado para abordar esta inusual lesión.

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Case report

Fifty-two year old male suffered a motor vehicle accident while riding a motorcycle. The mechanism of injury was by antero-posterior compression; the patient was crushed between a parked vehicle and his motorcycle. Immediately

after the crash, the patient presented very acute pain in the pelvic area above the sacrum that prevented him from being able to lie down in the supine position. When he arrived at the hospital, he was haemodynamically stable and conscious. The most important symptom he reported was pain in the posterior area of the pelvis. His abdomen was soft on palpation, with no points of tenderness. There was prepubic inflammation, although no blood was found in the urethral meatus. Careful handling of the pelvis revealed antero-posterior instability with a certain degree of anterior

*Corresponding author.

E-mail: dskorres@med.uoa.gr (D.S. Korres).

displacement and marked sensitivity above the sacrum when pressing posteriorly. The logroll maneuver revealed significant tenderness in the area of the sacrum. Muscle tone of the anal sphincter was normal, presenting no sensory abnormalities in the perianal area. The digital rectal exam

did not reveal any elevation of the prostate. No neurological impairment of the lower limbs was detected. At the time, a urethral catheter was put into place.

Basic blood tests were performed, as was cross-typing and urine analysis. The emergency abdominal X-rays and

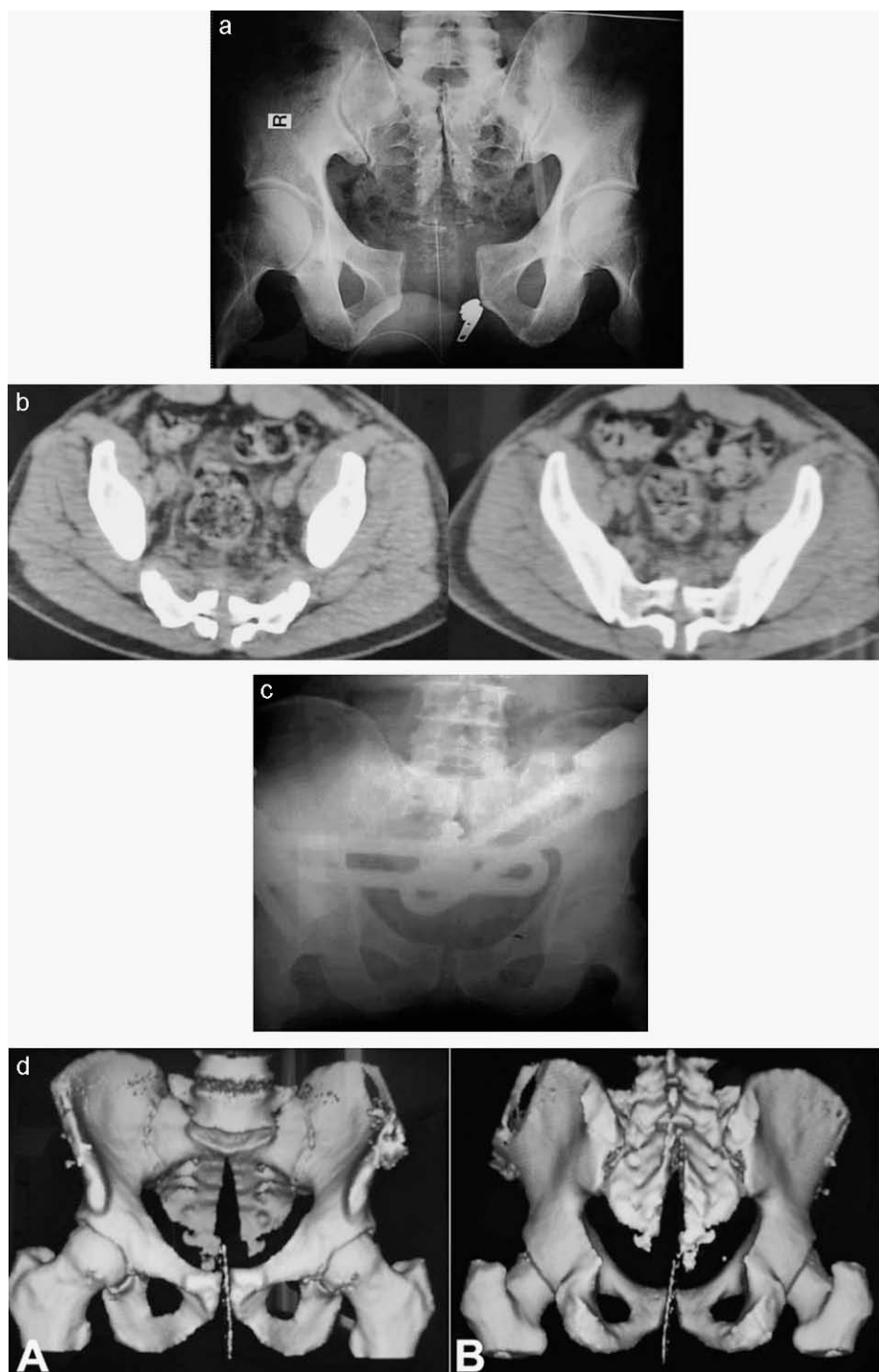


Figure 1 a) Initial antero-posterior X-ray of the pelvis showing diastasis of the pubic symphysis and a mid-sagittal sacral fracture b) Initial CT of the pelvis revealing fracture of the sacrum, c) Antero-posterior X-ray of the pelvis after stabilization of the pelvic ring with the external fixator. d) Post-operative 3D CT (A) anterior and (B) posterior of the pelvis with 3D reconstruction.

ultrasound carried out ruled out any free accumulation of fluid in the abdomen. The urine analysis revealed microscopic haematuria.

The X-ray of the pelvis that was taken upon arrival at the centre showed a wide diastasis of the pubic symphysis, a fracture in the mid-sagittal area of the sacrum, and a fracture of the right transverse process of the fifth lumbar vertebra (fig. 1a). Because the patient remained hemodynamically stable, a computerized axial tomography (CT) scan of the pelvis was performed in order to identify the injury more clearly (fig. 2a, b). The CT confirmed the mid-sagittal direction of the sacral fracture and no concomitant abnormalities were seen in the sacro-iliac joints on either side. Given the wide diastasis of the pubic symphysis, the decision was made to carry out anterior stabilization with an external fixator of the pelvis. Pins were put into the anterior area of the iliac crest (fig. 1c). The patient remained stable during and after surgery, with no changes in his neurological status being recorded.

A new CT was later carried out with 3-D reconstruction of the pelvis and manual removal of the pins for the external fixator (fig. 1d).

This examination made it possible to confirm anterior closure of the pubic symphysis, although posterior widening in the sacral fracture bed was seen at the same time. This greater displacement was deemed to be a sign of instability. The displacement of the coccygeal and sacral fracture with respect to the fracture of the L5 transverse process was interpreted as indicating the existence of a continuous osteoligamentous injury from the coccyx to L5. This possible continuous injury could destabilize the pelvis vertically; consequently, the decision was made to also stabilize the posterior area of the pelvic ring.

The patient was placed in the prone position on the operating table with everything needed to fit the external fixator placed in the anterior part of the pelvis. An incision was made on both sides of the pelvis, one lateral to the postero-superior iliac spine that was extended distally. The lateral iliac surface of the postero-superior iliac spine was approached subperiostically, separating the gluteus maximus to one side. The S1-S2 interspinal space was marked on the skin. An opening was made at this point on both sides and a trochar was inserted arthroscopically to prepare the tunnel into which a transiliac bar would later be placed. A threaded Ilizarov-type bar was introduced (fig. 2a). A nut and washer were used on both sides to stabilize the posterior area of the ring. No attempt was made to close the sacral fracture, since it was thought that this might be dangerous without direct control of the fracture bed to avoid neural entrapment.

Following surgery, the patient reported having less pain and was able to stand up in comfort. He was also able to carry out bilateral straight leg elevation without pain or discomfort. His neurological status remained unchanged. Given the uncommon fracture pattern present in the sacrum, the patient's previous clinical history was studied scrupulously and it was discovered that he had undergone a CT of the lumbar spine 5 years earlier, without any apparent abnormality (fig. 2b).

Discussion

According to Denis's 3-zone classification,² any fracture of the sacrum affecting the spinal canal should be categorized as a zone III injury. This fracture pattern is associated with a 57% probability of suffering neurological complications but occurs in only 16% of all sacral fractures. A vertical mid-sagittal fracture of the sacrum can be classified as a zone III injury, but it is very uncommon and to date, only a handful of cases have been reported.^{1,3-7} Spina bifida occulta has been pointed out as being an etiological factor that predisposes the patient to suffer vertical sagittal fractures. A bifid spinous process can act as a focus for stress concentration; however, this is a condition that could not be documented in the case presented here.^{1,6}

The most important aspect of a sacral injury is its stability. Stability determination is hotly debated. Osteoligamentous injuries are classified into 3 categories on the basis of their intrinsic stability.^{8,9} Type A injuries are the most stable and type C are the most unstable. Type B injuries are occult osteoligamentous alterations. The diagnosis of type B injuries is controversial and can require dynamic challenge

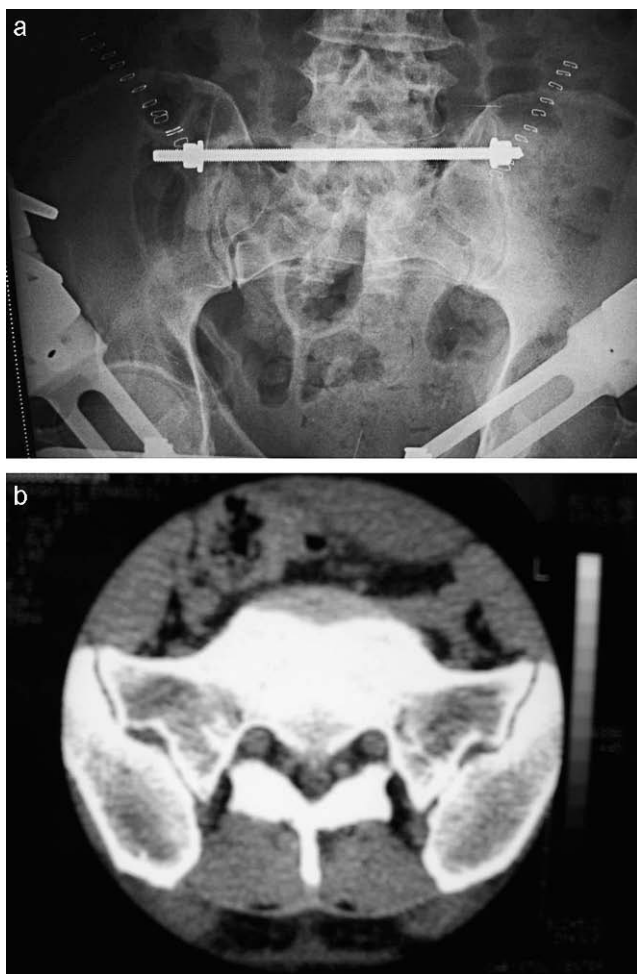


Figure 2 a) Internal fixation of the posterior pelvic injury using transiliac bar. b) CT of the pelvis at S1, 5 years before the accident.

testing to evaluate pelvic ring stability. Conventionally, a fracture of the sacrum with displacement of less than 1 cm has been considered stable.⁸ The displacement of the sacral fracture in our patient was less than 1 cm prior to placement of the anterior external fixator. So far as we know, to date there have been no case reports of secondary opening of a vertical fracture of the sacrum after closure of the anterior pubic symphysis.

A complementary approach could be used to factor in the stability of the lumbosacral junction. Isler⁵ introduced a classification system for injuries to the lumbosacral junction. Type C injuries include fractures of the sacrum through the spinal canal that occur with a concomitant osteoligamentous injury through the L5-S1 facet on the same side. This type of injury destabilizes the lumbosacral junction. In the case presented, the displacement in the fracture bed was more pronounced in the distal area versus the proximal area without any displacement whatsoever of the lumbosacral junction being recorded. Acknowledging this fact and taking into consideration the status of the soft tissue that exhibited contusions and superficial lacerations, we opted to insert a transiliac bar both to minimize the degree of surgical trauma as well as to add greater stability to the posterior area of the pelvic ring.

Stability of the pelvic ring and the lumbosacral junction continues to be controversial and more research is needed.

Clear guidelines for diagnosis and treatment are still pending.

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