

Sacroiliac Separation that Can be Diagnosed After Pelvic Fixation During Surgery: A Case Report and Review of Literature

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Abstract

Introduction: Sacroiliac joint separation is a life-threatening serious condition in pelvic injuries. It should be diagnosed early and treated properly. Although these injuries can often be detected by imaging methods, in some cases, it is not diagnosed.

Case presentation: We report a rare case of pelvic injury with sacroiliac separation during surgery, while the sacroiliac joint was completely normal on X-ray and CT and no pelvic binder was used in the patient. The sacroiliac separation noticed during the operation was fixed with a sacroiliac screw.

Conclusion: Pelvic injuries, especially ligament injuries, may not be detected on both physical examination, direct radiography, and CT.

Introduction

Pelvic ring injuries are serious, life-threatening injuries. An incidence of 23 per 100,000 per year has been reported. (1) Separation of the sacroiliac joint is often an injury caused by high-energy trauma, increasing complications and mortality in pelvic injuries. (2–4) At present, fixation is performed with reconstruction plates or sacroiliac screws in sacroiliac separation treatment.(5)

There are studies reported that Computer tomography (CT) should be performed in pelvic injuries and CT is superior to X-ray. CT is frequently used in the diagnosis and classification of pelvic injuries.(6, 7) There are case reports in the literature stating that pelvic injuries may be overlooked in patients undergoing pelvic compression device on CT.(8, 9)

We are reporting a rare case with a pelvic injury who had sacroiliac separation during surgery while the sacroiliac joint was completely normal on X-ray and CT. To our knowledge, this case is the first case in which sacroiliac separation can be detected during surgery, although the pelvic compression device was not applied to the patient and the X-ray and CT were completely normal.

Case Presentation

A 19-years old woman was involved in a high-energy pedestrian-vehicle accident. She was brought to the emergency room 30 minutes after the accident. At arrival, Glasgow Coma Scale (GCS) was 3 and pupils were reactive, she was intubated, and volume therapy was begun. Her vital signs were as follows; Heart rate 102 bpm, blood pressure 110/70 mmHg body temperature 37,2°C, oxygen saturation 96%.

Pelvic instability was detected in the first physical examination of the unconscious patient. In the trauma series taken in the emergency department, left iliac wing fracture and ipsilateral superior and inferior pubic ramus fractures were revealed on Pelvis AP, inlet, and outlet direct radiographs (Fig. 1). The preliminary diagnosis was confirmed with the Pelvis CT (Fig. 2). Pelvis injury was evaluated as type 2 according to the Young-Burgess classification of type B2 according to the Tile classification. However, no

sacroiliac injury findings were seen on both x-ray and CT of the patient. The patient also had left subdural hematoma in the left upper frontal gyrus, grade-1 liver laceration, bilateral hemopneumothorax, and multiple maxillofacial fractures. The patient's first arrival haemoglobin was 15.1 and lactate was 3.5. The patient's injury severity score was calculated as 41.

The patient was taken to the intensive care unit by applying bilateral thoracic tube. The patient was followed in the intensive care unit until he became hemodynamically stable and prepared for orthopaedic operation. During the period until surgery, the patient was extubated, the GCS increased to 15 and the lactate value was measured as 1.4 on the fifth day. The patient, who was hemodynamically stable, was operated under general anaesthesia on the fifth day of hospitalization.

First, a retrograde screw was applied to the patient with a mini-incision under fluoroscopy for fixation of the superior pubic ramus. Afterwards, the fracture was fixed with three reconstruction plates using lateral window for the iliac wing fracture. Dislocation was observed in the ipsilateral sacroiliac joint in the control fluoroscopy and x-ray images of the patient after fixation (Fig. 3) The patient's sacroiliac dislocation was reduced, and the joint was fixed with one cannulated screw and washer. The operation was ended after control fluoroscopy and x-ray (Fig. 4) The patient was not give full weight bearing until the 12th week. Outpatient clinic controls of the patient were performed at 6-12-24 weeks. (Fig. 5) The patient and her families were informed that data from the case would be submitted for publication.

Discussion

Sacroiliac joint dislocation is a high-energy injury and must be surgically treated for good functional results (10). Patients can usually be diagnosed with X-ray and CT. However, there are studies reporting that Sacroiliac joint injuries may be overlooked in the presence of minimal separations and pelvic compression device (8, 9). In the current study, without any pelvic compression device, sacroiliac joint injury findings could not be detected with X-ray and BT images of the patient. Sacroiliac joint dislocation was observed after fixation of the anterior pelvic ring during surgery. To our knowledge, this case report is the first in the literature.

Reliability of both physical examination and plain radiography is low in pelvic injuries. Sauerland et al. stated in a meta-analysis that they found false-negative results in 9% (49 out of 549) after physical examination. They also stated that 3 of 49 (6%) patients had an indication for surgical treatment.(11) In another study, it was reported that the sensitivity of pelvic radiography was less than pelvic CT in diagnosing pelvic injuries and it was stated that 33% of fractures missed. (7) In the current case, the patient had pelvic instability on physical examination and ipsilateral superior and inferior pubic ramus fractures were seen on pelvis AP inlet and outlet direct radiographs taken in the emergency department. There were no findings suggestive of sacroiliac separation in both physical examination and direct radiographs.

Most pelvic ring injuries can be diagnosed accurately and reliably with CT imaging. However, there may be difficulties in both diagnosis and classification in the presence of pelvic compression devices.

Clements et al. reported that pelvic injury was overlooked in CT due to the application of a pelvic binder in two cases they presented. Also, these cases were type II and type III AP compression injuries according to the Young-burgess classification that required surgery.(9) In another case report, Jamme et al. reported that, in a 49-year-old patient who underwent pelvic binder after a traffic accident, pelvis graphs and CT imaging was completely normal. However, they suspected that there was a pain in the pubic symphysis of the patient and reported that when the pelvic binder was removed and CT was performed again, it was an AP type 2 open book injury according to Young Burgess classification.(8) Gabbe et al. reported in their article that the use of pelvic binders makes it difficult to classify pelvic injuries correctly.(12) In our study, although a pelvic binder was not used in the patient, no findings indicating sacroiliac separation were observed in physical examination, radiography and CT. However, sacroiliac separation, which can be detected after the fixation of superior pubic ramus and iliac wing fractures during surgery, was found. Due to this situation, this case report is considered the first and only in the literature.

Conclusion

Pelvic injuries, especially ligament injuries, may not be detected on both physical examination, direct radiography, and CT. Therefore, orthopaedic surgeons should be careful and sceptical at every stage of the diagnosis and treatment of pelvic injuries.

Declarations

Author Contributions: Concept - İ.A.Y.; Design - İ.A.Y, A.Ö.Y; Supervision - İ.A.Y., A.Ö.Y.; Materials - İ.A.Y., T.A, Data Collection and/or Processing - İ.A.Y., T.A.; Analysis and/or Interpretation - İ.A.Y., A.Ö.Y.; Literature Search - İ.A.Y., T.A.; Writing Manuscript - İ.A.Y.; Critical Review - İ.A.Y., A.Ö.Y., Read and Approved the Manuscript- All authors

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Statement of informed consent: Identifying information, including the patient's name, initials, or hospital number, were not published in written descriptions, photographs, or pedigrees. The patient and her family had consented to the submission of the case report to the journal.

Conflict of Interest: No conflict of interest was declared by the authors.

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Figures

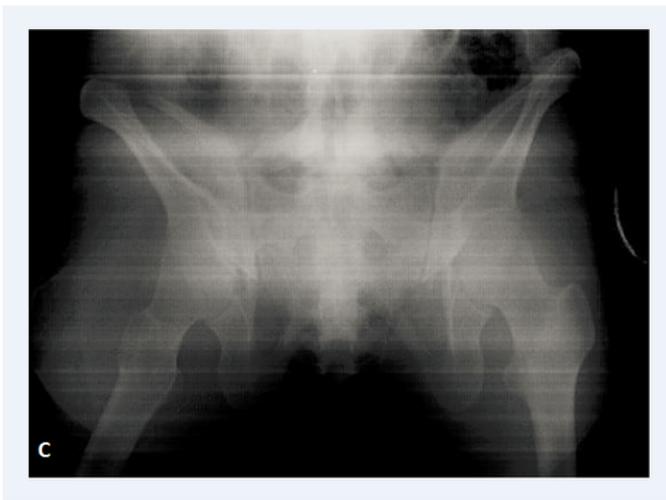
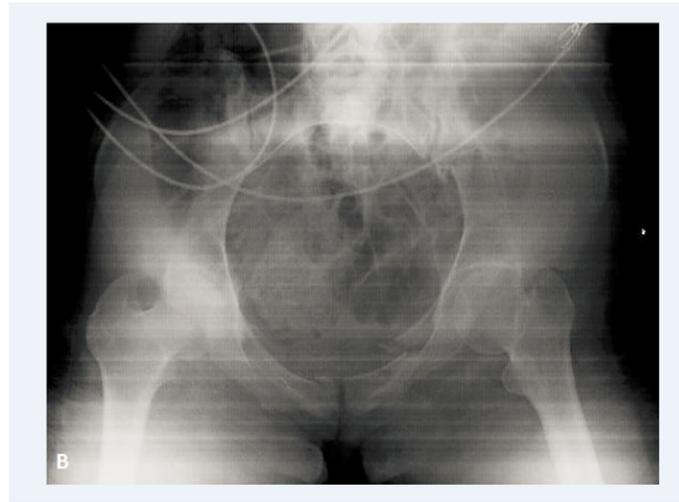


Figure 1

Direct radiographs taken in the emergency department with a portable x-ray machine (a) AP pelvis radiograph (b) Pelvis inlet view (c) Pelvis outlet view.

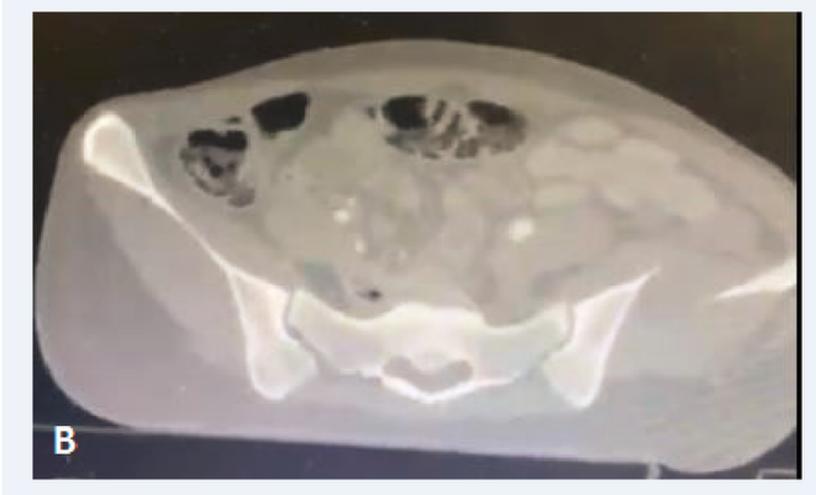
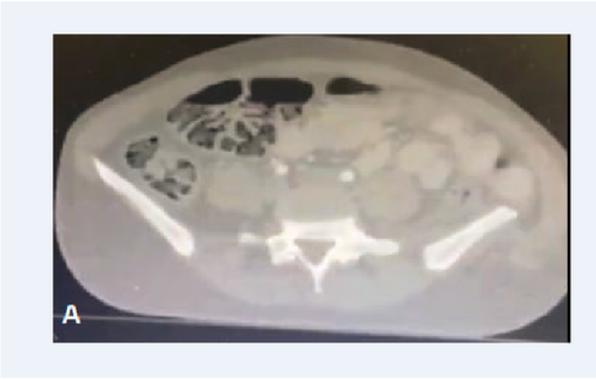


Figure 2

CT images taken in the emergency department (a-c) Pelvic CT horizontal images (d) Pelvic CT-3D image.



Figure 3

Direct radiographs taken after pelvic fixation in the surgery room. Sacroiliac separation had been diagnosed (a) AP pelvis radiograph (b) Pelvis inlet view (c) Pelvis outlet view.

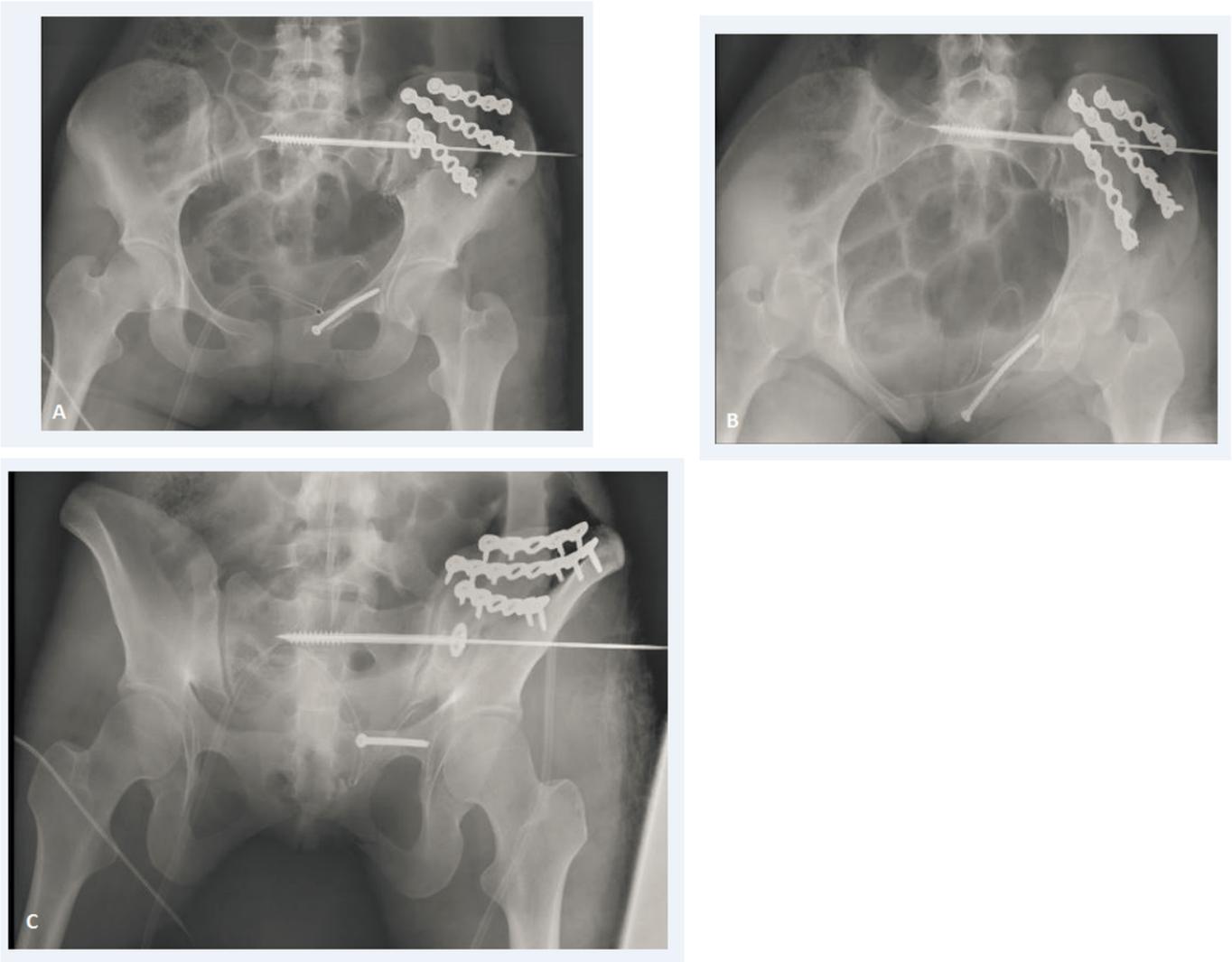


Figure 4

Direct radiographs taken after sacroiliac fixation with cannulated screw (a) AP pelvis radiograph (b) Pelvis inlet view (c) Pelvis outlet view.

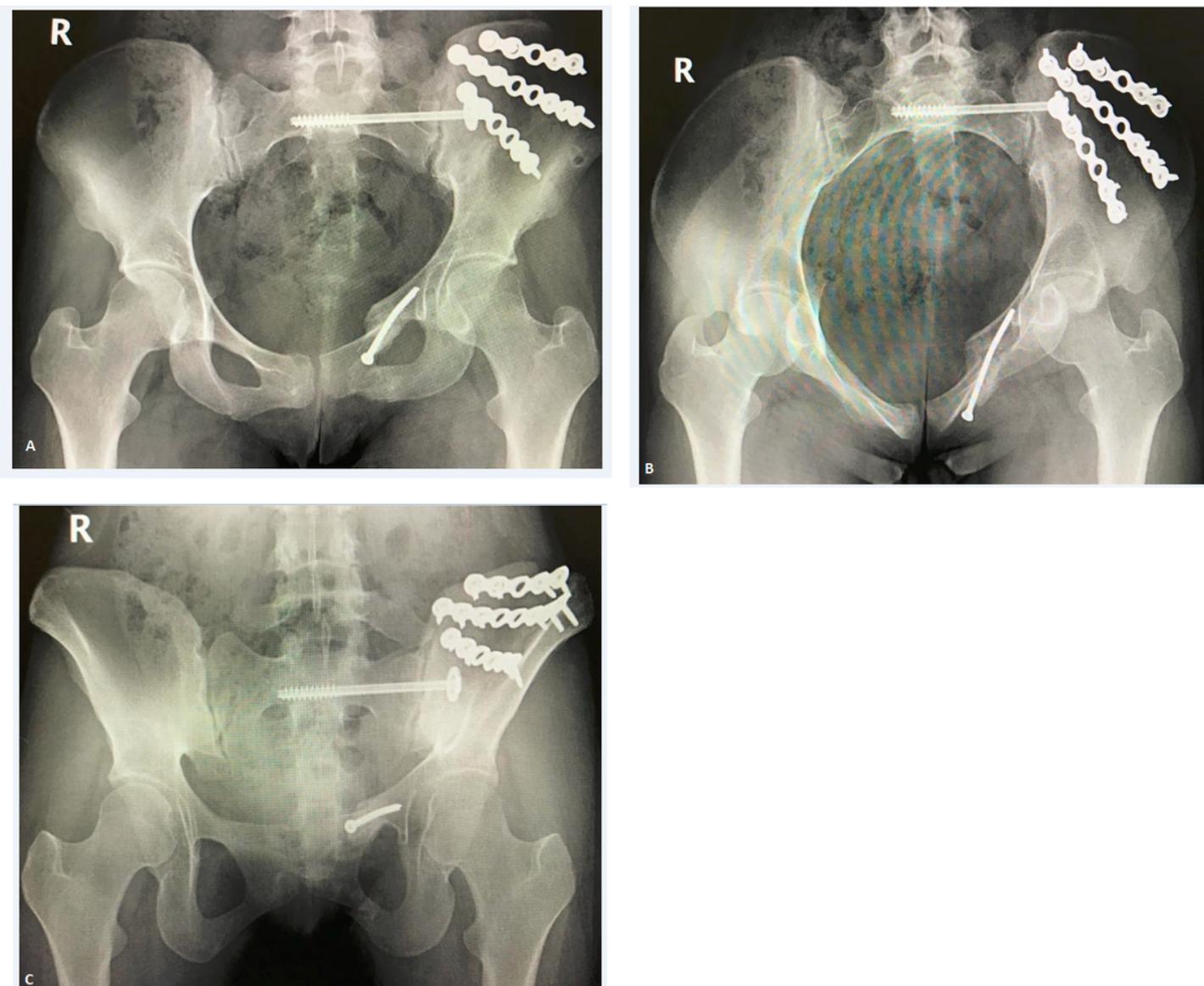


Figure 5

Direct radiographs taken 6 months after surgery (a) AP pelvis radiograph (b) Pelvis inlet view (c) Pelvis outlet view.