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Case Report

Non-anatomic fixation for longstanding traumatic pubic diastasis using a bone graft: A report of two cases

Giedrius Petryla, Valentinas Uvarovas, Igoris Šatkauskas, Povilas Masionis*, Narūnas Porvaneckas

Department of Orthopedics and Traumatology, Vilnius University Faculty of Medicine, Republican Vilnius University Hospital, Šiltnamių Str. 29, 04130, Vilnius, Lithuania

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ABSTRACT

The incidence of internal fixation failure of symphysis diastasis varies from 6% to 75%. Hardware breakage or migration and symphysis disruption recurrence are often asymptomatic and only in a few cases reoperation is required. This report describes the managements of two cases after failed internal fixation and neglected traumatic symphysis diastasis when it was technically impossible to achieve anatomical reduction of the anterior pelvic ring. Internal fixation and a bone graft for the symphysis without anatomical reposition were performed. Both of the patients achieved good results and had no complaints of pain during daily activities. Restoration of the anatomy should not be the aim in treating recurrence of the symphysis diastasis after failed fixation. The aim of the surgery was static fixation of the anterior pelvic ring with bone grafting.

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Introduction

Pelvic ring injuries are mainly caused by high energy trauma and make up 4.6% of all the fractures.^{1,2} Whereas, only 13%–14% of pelvic bone fractures result in symphysis diastasis (SD).³ Symphyolysis occur due to high energy with external rotary vector affecting pelvis.³ Approximately 30%–40% of the pelvic ring stability depends on pubic symphysis and pubic rami.⁴ In case of an isolated SD internal plate fixation is a completely sufficient measure to restore the stability of the pelvic ring.⁵ As noted in many research articles, primary fixation of SD with anatomical repositioning results in a better outcome.^{2,6} Conservative (non-operational) treatment could be chosen in case of a pubic symphysis gap widening less than 2.5 cm as sacroiliac ligaments remain intact and ensure sufficient pelvic ring stability.³ Otherwise, the overall instability of the pelvic ring is present which requires surgery.^{6–8} Various methods for symphysis fixation have been described in literatures including external fixation, plate fixation, tension band wiring and absorbable sutures.^{9,10} Despite various fixation methods offered, failure of internal fixation continues to be quite a frequent problem.^{11,12} This could be due to specific physiological motion

related to symphysis which causes migration and breakage of the metal construction.^{8,13}

Furthermore, implant breakage, migration and SD recurrence are often asymptomatic and only in a few cases reoperation is required.^{3,7,11} Although, chronic local pelvic pain, limping, herniation of bladder might be indication for revision surgery.^{14,15} Furthermore, longstanding pubic SD results in scarring ligaments of the anterior and posterior pelvic ring that creates resistance to symphysis reduction. To our knowledge, no management of old traumatic SD using a bone graft after failed internal fixation has been reported in literature. This report describes two cases of failed SD internal fixation in B1 type fractures when refixation was needed and it was technically impossible to achieve anatomical reduction of the anterior pelvic ring.

Case report

Case 1

A 46-year-old man has encountered a high energy trauma when skiing. The patient was treated for fractures of the right femur, SD and sacroiliac joint disruption. Open reduction and internal fixation of the symphysis pubis was performed on the sixth day after the accident. The Pfannenstiel incision was used and the symphysis pubis was fixed using a four-hole symphyseal non-locking plate. The patient was cautioned to avoid full weight bearing for four

* Corresponding author.

E-mail address: povilasmasionis@yahoo.com (P. Masionis).

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months. After this period, weight bearing was progressively increased. Seven months later, the patient started to complain of symphysis pain, crepitation in symphysis region and limping. The symptoms were managed non-operatively with repeated injections of non-steroidal anti-inflammatory medications, but there was little relief. Furthermore, physical examination revealed horizontal (open-book) instability when the iliac crest was pressed in antero-posterior direction and there was symphysis pain during external rotation of both hips. Pelvic X-ray showed recurrence of SD, loosening of screws and migration of the plate (Fig. 1). Internal fixation and a bone graft of the symphysis without anatomical reposition were performed eight months after the trauma.

Postoperative period was uneventful. For six weeks the patient remained partial weight bearing with crutches. No sign of unstable pelvis ring was detected on the three years follow-up and the patient had no complaints of pain during daily activities and walking without aids (Fig. 2).

Case 2

A 55-year-old woman has suffered from a bicycle accident. The pelvic injury was diagnosed six months after the accident when she was seen by us for debilitating pelvic pain. The plain radiographs showed SD (Fig. 3). Physical examination revealed instability and pain of symphysis. Open reduction and internal fixation of the symphysis were performed with a six holes plate and six screws through Pfannestiel incision. Four months the patient remained partial weight bearing with crutches. Later, she started to complain of chronic pain of pelvis, resistance for non-steroidal anti-



Fig. 3. A 55-year-old woman has suffered a bicycle accident. X-rays after a six months undiagnosed injury of pelvic ring.

inflammatory medications and limping. Internal fixation and a bone graft of the symphysis without anatomical reposition were performed 10 months after the trauma because the examination revealed clinical and radiological horizontal instability and pain of symphysis with failed internal fixation (Fig. 4).

The patient had no postoperative complaints. For six weeks the patient remained partial weight bearing with crutches. No sign of unstable symphysis was detected at the 12 months follow-up. And the patient had no complaints of pain during daily activities and walking without aids (Fig. 5).



Fig. 1. A 46-year-old man has encountered a high energy trauma. Seven months after pubic symphysis fixation, horizontal instability and painful external rotation of both hips was found. Pelvic X-ray-symphysis diastasis and screws loosening.

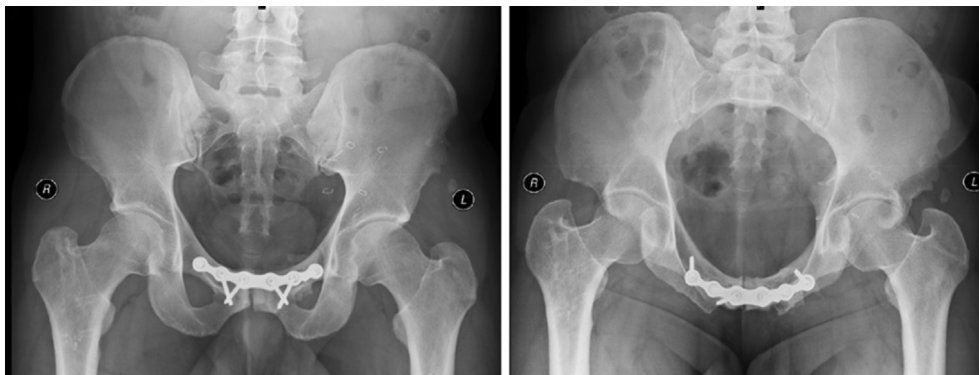


Fig. 2. Three years after refixation and a bone graft of symphysis pubis.

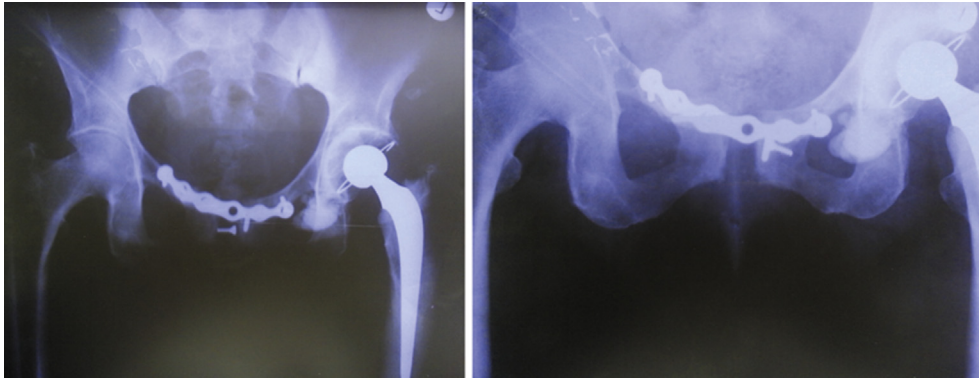


Fig. 4. X-rays revealed recurrence of symphysis diastasis, loosening and breakage of screws.

Operative technique for symphysis pubis arthrodesis

Open reduction and internal re-fixation of the symphysis were planned in both cases. The patients were operated under spinal anesthesia. Pubic symphysis was reached through a Pfannestiel incision. Access to the symphysis pubis was through a longitudinal split in the linea alba and separating the rectus abdominis. The area of the symphysis pubis was cleaned of scar tissue. In the first case it was found that pubic bones were unstable in the vertical direction, but locked in internal rotation of the horizontal plane. In the second case only horizontal external instability was found. In both cases it was impossible to reduce the symphysis diastasis. By using a separate incision above iliac crest the spongicortical bone was removed and in combination with internal fixation was used for the symphysis fusion. Before insertion of a transplant, articular surfaces of symphysis were decorticated until the sponge bone was reached to improve bone to bone accretion. Symphysis was fixated using long plates from six to ten holes and three screws in each of the pubic bone. In the second case the breakage screws were not eliminated and additionally symphysis before plating was fixated with tension wire to achieve more compression.

Discussion

Implant migration, breakage and SD recurrence are not rare conditions after internal fixation, but only in a few cases reoperation is required. The major indication for reoperation is symptomatic instability of the symphysis pubis.¹⁶ In retrospective study of 148 patients with SD treated by internal plate and screw fixation, it was

found that migration or breakage of the hardware occurred in 63 patients while 61 of them were asymptomatic and only five cases required revision surgery due to symptomatic instability of pelvic ring.¹⁶ Furthermore, incidence of plate failure varies from 12% to 31%, SD recurrence from 7% to 24%, and revision of surgery from 3% to 9% in literature.^{11,16–19} In order to achieve definitive stability, SD has a better outcome if reduced anatomically in acute conditions, but there is no data on outcomes after revision surgery of non-union SD when anatomical reduction is impossible.^{17,20}

The use of a bone graft with internal fixation to achieve arthrodesis of the pubic symphysis has been described as the treatment for chronic pain from osteitis pubis resulted from a parturition or chronic traumatic injuries of symphysis.^{21,22} Furthermore, symphysis arthrodesis has its place in cases of osteitis pubis which is resistant to conservative treatment and is associated with pelvic ring instability.²³ Paul R. Williams et al. described a case of seven rugby players with osteitis pubis associated with symptomatic symphysis instability who were treated operatively.²⁴ The authors stated that arthrodesis of the symphysis by bone grafting alone did not result in improving stability and emphasized the importance of internal fixation with bone grafting when performing arthrodesis of the symphysis.

At the time of writing we managed to find one article describing surgical fusion of the SD using a bone graft when anatomical reposition was impossible.¹⁵ The case report presented old traumatic SD complicated by bladder hernia. The author encountered the same problem that it was impossible to retract the pubic rami. Decision was made to use a bone graft from tibia to close the defect. The situation was different from ours because the described patient



Fig. 5. Twelve months after refixation and a bone graft of symphysis pubis.

did not show any sign of instability of the pelvic ring. This means that the purpose of the graft was not creation of stable symphysis diastasis fusion, but to close a favorable way for hernia.

These two cases represent a clinical situation when restoration of the anatomy should not be the aim in treating recurrence of the SD after failed fixation. The aim of the surgery was static fixation of the anterior pelvic ring with bone grafting. There is no data to explain the mechanism of rigidity of the pelvic ring. The authors believe that the most probable reason of rigidity of the pelvic ring is scarring of anterior sacroiliac ligaments which were ripped off during a traumatic accident. This aspect may create asymptomatic SD relapse with a stable pelvic ring or symptomatic SD recurrence with partial pelvic ring stability.

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