CASE REPORT

Overlapped Pubic Symphysis; a Case Report and Review of the Literature

Ahmadreza Afshar, MD; Mehdi Koushkzari, MD

Research performed at Urmia University of Medical Sciences, Imam Khomeini Hospital, Urmia, Iran

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Abstract

Overlapped pubic symphysis is a rare but serious pelvic injury. This study presents a case of overlapped dislocation of the pubic symphysis. He was managed by closed reduction under general anesthesia. The patient had urethral transection. At the latest follow up, seven months post injury; he was able to walk well without any pelvic pain. However, his urologic problems were continued. We also reviewed the literature and analyzed the data of the previous reports as well as the current case collectively. The two terms of "locked pubic symphysis" and "overlapped pubic symphysis" have been used synonymously in the literature. Overlapped pubic symphysis is commonly associated with fracture of the sacrum and urethral injury in the male patients. After closed or open reduction, if pelvic instability persists, it needs anterior and may posterior internal fixation to achieve a stable pelvis.

Key words: Locked pubic symphysis, Overlapped pubic symphysis, Pelvic fracture, Urethral injury

Introduction

An overlapped dislocation of the pubic symphysis is a rare type of the lateral compression injury of the pelvis that an intact pubic body displaces against the contralateral intact pubic body. Subsequently by increasing the compression thrust, the intact pubic body may protrude, trap and lock through the contralateral obturator foramen (1-21).

The proposed mechanism of overlapped dislocation of the pubic symphysis is based on the Eggers concept who first described this injury (7). Hyperextension and adduction or abduction of the femur induces a lateral compression thrust to the pelvis because the femoral head locks in the acetabulum by the tension on the iliofemoral ligament. If the pelvis further being compressed, the thrust may be transmitted to the pubic symphysis and disrupt the pubic symphysis ligaments. Theoretically, internal or external rotation of the femur displaces the pubic bone posterior or anterior to the contralateral intact pubic body (1, 7, 12, 13).

This study presents a case of an overlapped dislocated pubic symphysis. We also reviewed the literature and analyzed the data of the previous reports as well as the current case collectively.

Case report

A 24-year old male unrestraint passenger was involved in an overturned vehicle accident. On arrival, he was conscious with stable vital signs but he complained from intense pain around his pelvis and lower abdomen. He was not able to move his left lower limb which was laid flat on the table. There was no neurologic deficit. There was tenderness on pubic symphysis and lumbosacral region. His bladder was distended. He was not able to void and blood was detected at his urethral meatus. A suprapubic catheter was placed by urologic service.

Antroposterior pelvic radiographs demonstrated an overlapped dislocated pubic symphysis [Figure 1]. Under general anesthesia successful closed reduction was performed by manipulating the left femur in flexion, abduction and external rotation while the pelvis was stabilized by manual pressure on the iliac wings. The

Corresponding Author: Ahmadreza Afshar, Urmia University of Medical Sciences, Department of Orthopedics, Imam Khomeini Hospital, Modaress Street, Ershad Boulevard. Urmia, 57157 81351, Iran.
E-mail: afshar_ah@yahoo.com

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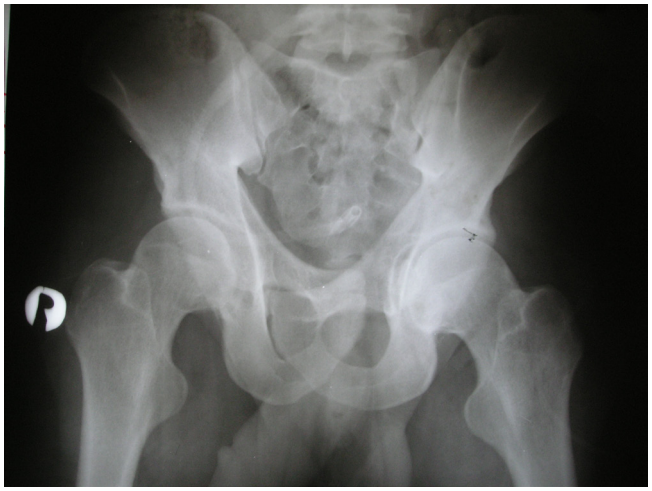

Figure 1. Antroposterior radiograph of the pelvis demonstrates an overlapped dislocation of pubic symphysis. Presence of the suprapubic catheter can be seen.

pelvic ring was stable on post reduction examination [Figure 2]. Post reduction Computerized Tomography (CT) scan demonstrated a non-displaced zone 2 sacral ala fracture on the left side [Figure 3]. A retrograde urethrography demonstrated urethral trans-section. The patient rested in bed for 6 weeks and then he was allowed to walk and bear weight. At the latest follow up, seven months post injury; he was able to walk well without any pelvic pain but his urologic problems were remained.

Discussion and review of literature

Closed reduction of the overlapped pubic symphysis may be accomplished by using the femur as a lever arm in flexion, abduction and external rotation. This position tightens the iliofemoral ligament. Then, gentle rocking motion, rotation and abduction of the femur may reduce the overlapped dislocated pubic symphysis (1, 7, 13). This maneuver has a risk of femoral neck fracture. A

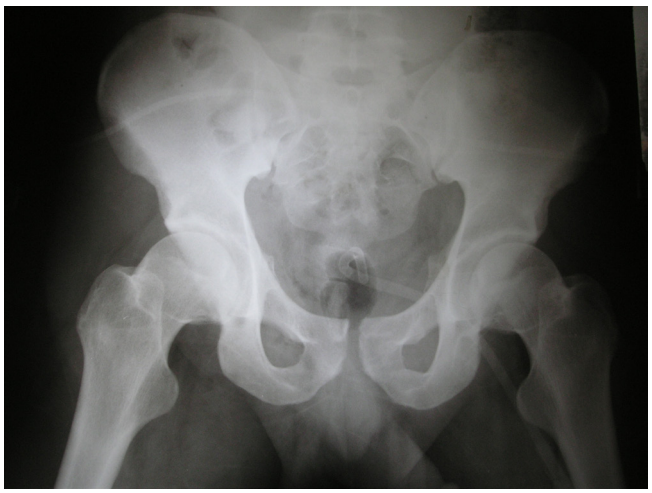

Figure 2. Post reduction radiograph.

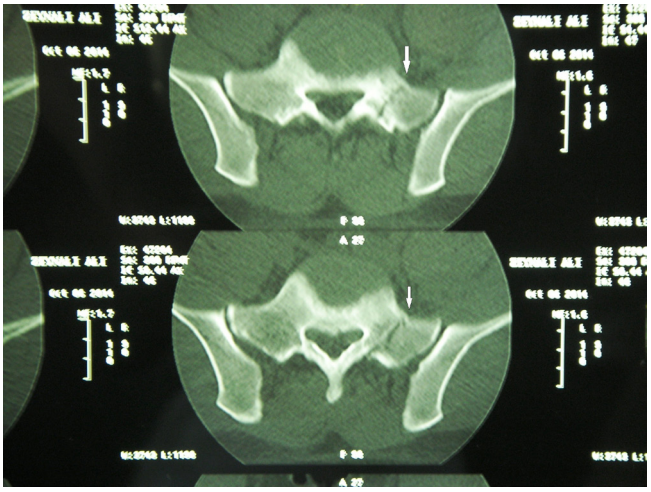

Figure 3. Post reduction Computerized Tomography (CT) scan demonstrates the left posterior pelvic ring lesion through the fracture of the sacrum.

second maneuver applies a lateral compression to the pelvis concurrent with a posteriorly directed thrust to the symphysis (1, 13). However, closed manipulations may fail to dislodge a locked pubic symphysis.

Thulasiraman et al. have suggested a classification based on the overlapped amount of the pubic symphysis; type I: less than 2.5 cm overlap; type II: more than 2.5 cm overlap but no penetration through the obturator foramen and type III: the pubis penetrates through the opposite obturator foramen (19). However, the usefulness of this classification is unclear.

The two terms of "locked pubic symphysis" and "overlapped pubic symphysis" dislocation have been used synonymously in the literature (12). Maqungo et al. have suggested a classification based on: ability to achieve and maintain closed reduction, incarceration of the pubic bone into the opposite obturator foramen and the significance of a posterior pelvic ring injury (12).

Maqungo et al. have presented three grades of overlapped pubic symphysis (12):

Grade 1: overlapped pubic symphysis where closed reduction can be achieved and maintained; Grade 2: overlapped pubic symphysis where open reduction is needed and Grade 3: Locked symphysis and incarceration into the obturator foramen. Each grade has two sub classifications; A: without a significant posterior ring injury and B: with a significant posterior ring injury. Grade 1 injuries can be treated conservatively after closed reduction. Grade 2 and grade 3 injuries need open reduction. After closed or open reduction, if pelvic instability persists, the pelvic ring needs anterior and may posterior internal fixation to achieve a stable pelvis (12).

According to the Maqungo et al. classification, the current case was Grade 1.

A literature search on locked/overlapped symphysis was performed in April 2015 using Google (www.google.com), Science Direct (http://www.sciencedirect.com), PubMed (www.pubmed.com), and Springer (http://link.springer.com) search engines or databases. Keyword

Table 1. The data of the 25 patients with overlapped/locked pubic symphysis

Authors	Number of cases	Age/Sex	Side	Position of the dislocated Pubic body	Posterior sacral injury	Type (Locked/ overlapped)	Urethral injury	Treatment options
Ansari et al. (1)	1	32/M	Left	Posterior	Yes	Locked	No	Open reduction, anterior internal fixation
Blank et al. (2)	1	23/M	Left	Posterior	Yes	Locked	Yes	Open reduction, anterior and posterior pelvic fixation
Botanlioğlu et al. (3)	1	21/M	Right	Posterior	Yes	Locked	Yes	Open reduction, anterior internal fixation
Cannada and Reinert (4)	1	17/M	Right	Posterior	Yes	Locked	Yes	Open reduction, external fixation
Catonné et al. (5)	1	30/M	Right	Posterior	Yes	Locked	Yes	Open reduction, internal fixation
Eggers (7)	1	?/M	Right	Posterior	No apparent damage on X-ray	Overlapped	Yes	Closed reduction
Halıcı et al. (8)	1	31/F	Left	Posterior	Yes	Locked	-	Closed reduction, external fixation
Gordon and Mears (9)	1	39/M	Left	Posterior	Yes	Locked	Yes	Open reduction, anterior and posterior pelvic fixation
Lee and Lee (10)	1	26/M	Left	Posterior	?	Overlapped	Yes	Closed reduction
Li et al. (11)	1	42/F	Right	Posterior	Yes	Locked	-	Open reduction, anterior and posterior pelvic fixation
Maqungo et al. (12)	1	22/F	Left	Posterior	Yes	Locked	-	Open reduction, anterior and posterior pelvic fixation
O'Toole et al. (13)	1	16/M	Left	Posterior	Yes	Locked	Yes	Open reduction, external fixation
Robinson et al. (14)	1	44/M	Right	Anterior	Yes	Overlapped	No	Closed reduction
Shanmugasundaram (15)	1	28/M	?	Posterior	No apparent damage on X-ray	Locked	Yes	Open reduction,
Sreesobh et al. (16)	1	20/M	Right	Posterior	No apparent damage on CT	Locked	No	Open reduction, anterior internal fixation
		23/M	Left	Posterior	Yes	Locked	No	Open reduction, anterior internal fixation
Tadros et al. (17)	3	30/F	Left	Posterior	Yes	Locked	-	Open reduction, anterior internal fixation
		14/F	Left	Posterior	Yes	Locked	-	Open reduction, anterior internal fixation
Thambi Dorai and Kareem (18)	1	30/M	Right	Posterior	Yes	Overlapped	Yes	Closed reduction
		20/M	Right	Posterior	?	Locked	No	Open reduction, anterior internal fixation
Thulasiraman et al. (19)	3	26/M	Right	Posterior	Yes	Locked	No	Open reduction, anterior and posterior pelvic fixation
		26/M	Right	Posterior	Yes	Locked	Yes	Open reduction, anterior internal fixation
Tile (20)	1	20/M	Right	Posterior	Yes	Locked	?	Closed reduction
Webb (21)	1	21/M	Left	Posterior	No apparent damage on X-ray	Overlapped	Yes	Closed reduction
Current study	1	24/M	Left	Posterior	Yes	Overlapped	Yes	Closed reduction

- ?: data are not provided

search terms included: "overlapped pubic symphysis" and "locked pubic symphysis". When available, the search was restricted to the category limitations of human, abstracts, case reports, case series, and reviews. Furthermore, all the articles' references and cross-references were checked and, if relevant, were included in the study. A total of 21 articles were located of which one article was omitted due to inadequate information (1- 21). This provided a total of 20 articles describing 25 patients (including the current case) that were

employed for our analysis. The articles were reviewed for the following data points; age of patients, sex, injury side, locked or overlapped pubic symphysis, presence of posterior pelvic ring injury, anterior or posterior position of dislocated pubic body, presence of urologic injuries and treatment options.

The data are presented in Table 1. There were 20 (80%) males and 5 (20%) females patients with an average age of 26 (range 16- 44) years old. There were 19 (76%) locked and 6 (24%) overlapped dislocated pubic symphyses according to the descriptions of the authors. The sides of the pelvic injuries were right in 12, left in 12 and was not specified in one patient.

All the overlapped cases were managed by closed reduction. The locked positions of two out of the 19 patients were reduced by closed reduction maneuvers; however, 17 cases required open reductions and anterior internal fixation. Five patients needed posterior internal fixations as well as anterior internal fixations to achieve a stable pelvis. Anterior open reduction has been performed through Pfannenstiel approach.

Overlapped dislocated pubic symphysis is commonly associated with the other injuries. Neurologic deficit has been reported in 12% of the patients (2). In the current study, 19 (76%) out of 25 patients had documented sacral fracture on pelvic radiographs or CT scan. In 3 patients there was no apparent posterior pelvic ring lesion on radiographs; however, they had not further sophisticated imaging. One patient had not posterior pelvic ring lesion investigated by CT scan. In 2 patients the presence of posterior pelvic ring lesion was not specified. Urethral injuries are seen in 13 (65%) of the male patients.

Although Eggers, O'Toole et al. have theorized that the overlapped dislocations may be anterior or posterior; however, 24 out of the 25 reported cases had posterior overlapped dislocated pubic symphysis (7, 13). The only case of anterior overlapped pubic symphysis has been reported by Robinson et al.; however, they did not provide imaging documents (14). Therefore, the reported anterior dislocation by Robinson et al is uncertain. Tadros et al. believe that anterior overlap does not exist (12, 17).

Overlapped pubic symphysis is a rare but serious pelvic injury. The two terms of "locked pubic symphysis" and "overlapped pubic symphysis" have been used synonymously in the literature. Overlapped pubic symphysis is commonly associated with fracture of the sacrum and urethral injury in the male patients. After closed or open reduction, if pelvic instability persists, it needs anterior and may posterior internal fixation to achieve a stable pelvis.

Ahmadreza Afshar MD
The Department of Orthopedics, Urmia University of Medical Sciences, Urmia, Iran

Mehdi Koushkzari MD
Lieutenant colonel, Military Hospital, Urmia, Iran

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