



SPINE FRACTURES CONCOMITANT WITH PELVIC REGION FRACTURES

PELVİK BÖLGE KIRIKLARINA EŞLİK EDEN OMURGA KIRIKLARI

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SUMMARY

Aim: To analyze the frequency and treatment modality of spine fractures in concomitant pelvic region fracture diagnosed and followed-up patients

Patients and Methods: The files of the patients, who were treated for pelvis and acetabulum fractures between March 2009 – December 2014, were evaluated retrospectively. Spine injuries and treatment modalities of the 26 patients having spine and pelvis injuries concomitantly were evaluated. Treatment modalities and timing of the surgery for both area injuries due to high energy fractures were analyzed.

Results: Spine injuries were diagnosed in 26 of the 182 patients, who were treated for pelvic region fractures between March 2009 and December 2014. In spine injured 6 patients, 8 burst fractures, in 6 patients 8 compression fractures, in 2 patients 2 spinous process fractures and in 12 patients 25 transvers process fractures were diagnosed. Eight patients were operated for burst fractures and 1 patient was operated for compression fracture. The other patients with other diagnosis were treated conservatively.

Conclusion: Pelvic injuries concomitant with spine injuries is frequent. In the treatment decision, priority is to stabilize vital functions.

Key Words: Pelvis, Spine, fracture

Level of evidence: Retrospective clinical study, Level III

ÖZET

Amaç: Pelvis bölgesinde kırık tanısı ile takip edilen hastalarda eşlik eden omurga yaralanmalarının sıklığını ve tedavi şeklini analiz etmek.

Hastalar ve Yöntem: Mart 2009 ile Aralık 2014 tarihleri arasında kliniğimizde tedavi edilen 182 pelvis ve asetabulum kırıklı hastaların dosyaları geriye dönük olarak incelendi. Aynı zamanda omurga kırığı mevcut olan 26 hastanın omurga yaralanmaları ve uygulanan tedavi yöntemleri incelendi. Yüksek enerjili yaralanmalar sonucunda oluşan her iki bölge kırıklarında tedavi zamanlaması ve tedavi yöntemleri analiz edildi.

Bulgular: Kliniğimizde pelvis bölgesi yaralanması nedeni ile tedavi edilen 182 hastadan 26 tanesinde omurga yaralanması olduğu tespit edildi. Omurga yaralanmalı 6 hastada 8 patlama kırığı, 6 hastada 8 kompresyon kırığı, 2 hastada 2 spinöz çıkıntı kırığı ve 12 hastada 25 transvers çıkıntı kırığı tespit edildi. Opere edilen 8 hasta patlama kırığı nedeni ile 1 hasta ise torakolomber bölgede kompresyon kırığı nedeni ile opere edildi. Diğer omurga yaralanması tanıları olan hastalar konservatif yöntemlerle tedavi edildiler.

Sonuç: Pelvis yaralanmaları ile omurga yaralanmaları birlikteliği sıktır. Tedavi kararını belirlemede yaşamsal fonksiyonları stabilize etmek önceliklidir.

Anahtar Kelimeler: Pelvis, Omurga, kırık

Kanıt Düzeyi: Retrospektif klinik çalışma, Düzey III

INTRODUCTION:

Pelvic and acetabulum fractures are generally formed as a result of the high energetic traumas such as the traffic accidents, falling down from height^{7,10}. A potential spinal trauma should be suspected in each patient exposed to high energetic trauma³. In cases when the pelvic region fractures or other fractures are focused in this patient group, who has injuries frequently in more than one region, spinal fractures might not be noticed. The most commonly seen and accompanying injury besides the pelvic region fractures is the thoracic region injuries¹⁶. No recognition of the spinal fracture might lead to spinal injury or the progress of the existing neurological damage after the spinal fracture³.

The first aim in the poly-traumatized patient is to stabilize the patient. After observing that the vital signs are stable, treatment for the fractures is planned. While the primary aims are to limit the neurological damage and to provide the spinal stability, the correction of the deformation caused by the fracture, diminishing the movement loss and preparation of the ground for the rehabilitation are the secondary aims.

We analyzed the frequency of the accompanying spinal fractures, approach to the spinal fractures, treatment aims, treatment time and priorities in our patient group we treated due to pelvic and acetabulum fractures retrospectively and we aimed to obtain implications from our own experience.

PATIENTS AND METHOD:

The records of the patients who were treated with pelvic and acetabulum region fractures between March 2009 and December 2014 were analyzed retrospectively. As a result of the conducted analysis, the patients having spinal fractures accompanying the pelvic region fractures (n: 27) formed our study group. The pelvic region of the patients and the spinal injury types, administered treatment methods, the time of the administered treatment and the demographic data of the patients were evaluated.

The hospitalization time of the patients, trauma type, pelvic and spinal injury diagnosis, the level of the spinal injury, existence of accompanying additional injury, treatment method and surgery times were analyzed. Pelvic external fixator and open reduction internal fixation methods were administered in patients with pelvic fractures. The administered method in patients with spinal fractures was posterior instrumentation. 6-8 weeks bed rest as a conservative treatment and prophylaxis for the additional complications such as decubitus ulcers and deep vein thrombosis were administered in patients with pelvic fractures.

RESULTS:

27 of the 182 patients, whose records were reached in the retrospective analysis, having pelvic region injuries were detected with the accompanying spinal fractures. 18 of the patients were male and 9 of them were females. The mean age was 35.1(16-73). The trauma formation mechanisms were traffic accident outside of any vehicle in 8 patients, traffic accident in the vehicle in 10 patients, motorcycle accident in 1 patients and falling down from height in 7 patients. The mean hospitalization period was 16 days (3-68 days) (Table-1).

Table-1. Demographical Data (Gender: 1-female, 2-male, Trauma: 1-Traffic Accident Outside of Vehicle (1M: motorcycle), 2-falling down from height (2E: electric shock), 3- Traffic Accident Inside the Vehicle)

Gender	Age	Hospitalization Period	Trauma
1	16	3	1
2	59	45	2
2	26	6	3
2	32	10	2
2	38	8	1M
2	40	12	2E
1	27	7	3
2	36	3	3
2	23	6	1
2	28	8	3
2	56	21	2
1	25	24	2
1	19	15	3
2	43	57	3
1	24	7	2
1	33	3	3
1	48	4	1
2	73	3	1
1	26	4	3
1	61	15	1
2	23	68	2
2	62	12	3
2	44	6	1
2	22	16	3
2	39	24	1
2	25	11	3

It was pointed out that the long hospitalization period of the patients having multiple traumas was the factor increasing the mean. When the pelvic fractures were analyzed, it was seen that there were more than one injuries in the pelvic region in 17 patients and there was isolated pelvic region fracture in 9 patients. It was observed that there was pubic arm fracture in 17 patients, acetabulum fracture in 10 patients, sacrum fracture in 7 patients, pubic dissociation in 11 patients and iliac wing fracture in 3 patients. 8 blow-out fractures in 6 patients, 8 compression fractures in 6 patients, 2 spinous process fractures

in 2 patients and 25 transverse process fractures in 12 patients with spinal fractures were detected. While the spinal injury was one level in 17 patients, it was 2-level in 4 patients, 3-level in 2 patients, 4-level in 2 patients and 5-level in 1 patient (Table-2). There were other extremity injuries in 10

patients besides the pelvic and spinal injuries. Pelvic external fixator was administered to 8 patients with pelvic fractures, 9 patients were fixed with open reduction internal fixation and 11 patients were operated due to other fractures.

Table-2. Injury information (Pelvic: 1-Pubic arm, 2-Acetabulum, 3-Sacrum, 4-pubic diastase, 5-sakroiliac diastase, 6-iliac wing, Vertebra: S: spinosis process, T: transverse process, B: burst, additional injury: 1-fracture in the joint, 2-long bone fracture, Op/ nonop: 0-nonop, 1-op)

pelvis	vertebra?	kaç seviye vertebr?	ek yaralanm?	op/nonop	post enj	P.EF	P.AR+İ	ek yaralanma o	açıklama	p. Enst zamanı	pelvis op zamanı
1	C4S	1	0	0	0	0	0	0	-	-	-
1+2+3	T12B-L1B	2	1+2	1	1	0	0	1	-	30	-
1+2+4+5	L4T	1	0	1	0	1	0	0	-	-	EF:3
1	L2T-L3T-L4T	3	1	0	0	0	0	1	-	-	-
1+6	L1B	1	0	1	1	0	0	0	-	4	-
1	T12K	1	2	1	1	0	0	1	-	9	-
1+3	C7S	1	2	0	0	0	0	1	-	-	-
1+2+4+5	L5K	1	0	0	0	0	0	0	kendi isteği ile taburcu	-	-
2+4+5	L5T	1	0	0	0	0	0	0	-	-	-
4+5	L5T	1	0	1	0	0	1	0	-	28	A:3
1+5+6	L1K	1	2	1	0	0	1	1	-	-	P:11
1+2+3+4	T6K-T8K-L1T-L2T-L4T	5	1+2	1	0	1	0	1	-	-	EF:12
1+3	L3B	1	1+2	1	1	1	0	1	-	13	EF:1
1+2+5	L5T	1	1	1	0	1	0	1	-	-	EF:1
1	L1T-L4T-L3K-L4K	4	1	0	0	0	0	1	-	-	-
3	L5T	1	0	0	0	0	0	0	-	-	-
1+3	L5K	1	0	1	0	0	1	0	-	-	P:1
1+5	L1T-L2T-L3T-L4T	4	0	1	0	1	0	0	-	-	EF:1
5	L2T-L3T	2	0	0	0	0	0	0	-	-	-
2	L1B	1	0	1	1	0	1	0	aynı seans opere	8	A:8
2+3+5	L4T-L5T	2	1+2	1	0	0	1	1	-	-	A:6, P14
1+2	L2B	1	0	1	1	0	1	0	-	3	A:8, P:2
1+4	L5T	1	0	1	0	0	1	0	-	-	A:1
1+4+5+6	T12B	1	0	1	1	1	1	0	vertebra dışmerkez	1	EF:3, A:3
4	L2T-L3T-L4T	3	0	1	0	1	0	0	-	-	EF:1
1+2+3+4	T12B-L1B	2	1	1	1	1	1	1	vertebra dışmerkez	12	EF:1 A6

7 patients, who were operated due to spinal injury, were operated due to the blow-out fracture and 1 patient was operated due to the compression fracture in thoracolumbar region. Surgical intervention for both of two regions due to spinal fracture and pelvic fracture was applied in 6 patients.

When the surgical operation times were examined, while the spinal surgery of 3 those three patients were performed after the pelvic surgery, in 2 of those patients first pelvic external fixator surgery, then the spinal surgery and then the pelvic open reduction and internal fixation surgeries were performed. In 1 patient who was administered the spinal surgery first in an external center, then pelvic surgery was performed. While the spinal surgeries were administered at the 4th week in 2 patients, it was performed in the first 10 days in other patients. Patients having other spinal injury diagnosis were treated with conservative methods. In 9 patients who were treated conservatively for their spines, also conservative treatment was administered for their pelvic injuries.

DISCUSSION:

Since the pelvic region fractures were formed due to high energetic traumas, there are also accompanying injuries. Not to be able to make a complete and reliable examination in cases exposed to multiple traumas, accompanying injuries might be unnoticed¹⁷ or it might cause a delayed diagnosis⁴. Especially

in patients who were taken into intensive care directly from emergency service, who has mental fog due to general condition impairment and who was sedated, the repeated direct graphies and computerized tomography diagnosis are helpful for the diagnosis of the spinal fractures¹⁷.

To be able to recognize the accompanying other fractures to the life threatening pelvic region trauma, firstly fractures should be suspected. Next, basic examination methods such as inspection and palpation, and radiological examination help. In this study, we aimed to evaluate the frequency of accompanying spinal fractures in patients, whose basic application reason was pelvic region trauma, and our treatment approach.

According to advanced trauma life support (ATLS) guidance, the primary graphies that should be taken in the emergency services are cervical collateral, thorax anterior-posterior and pelvic anterior-posterior graphies¹⁷. In patients, who cannot be diagnosed with those graphies, additional graphies might be taken after the patient is stabilized.

Spinal fractures are most commonly seen in thoracolumbar joint among the whole spine³. Most of the stress is accumulated between T10 and L12 since the thoracic spine is rigid and since it is the transition region in between the motile lumbar region. There was thoracolumbar joint injury in 9 of the 26 patients in our study.

A potential spinal trauma should be suspected in patients exposed to high energetic trauma³. In the thoracolumbar region, most frequently, compression fractures, blow-out fractures, flexion destruction injuries and dislocations with fractures are seen³. Most of the compression fractures are treated with the methods other than surgery. It is suggested that surgical treatment should be administered in kyphosis more than twenty degrees and in compression more than 50%. The most important factor for deciding the surgical treatment in blow-out fractures is the presence of the posterior ligamentous complex fissure¹. In our cases, blow-out fracture in 7 of the 8 patients and compression fracture in one patients resulted in the formation of surgical indication.

While the treatment of the patient with spinal fracture is being planned, the neurological condition, spinal stability, deformation level and additional injuries should be considered. Due to the severity of the trauma, cardiovascular, pulmonary and neurological injuries might accompany with the thoracolumbar fractures¹⁹. Canal occupation and progressive neurological injury necessitates the surgical decompression and stabilization. If the instability due to the fracture increases, the rigidity of the surgical treatment increases. The angle of the regional kyphosis might increase in the postoperative period in patients with spinal fracture¹³.

As in the pelvic fractures, thoracolumbar fractures are mostly seen in actively working males between 20 and 40 of ages¹⁵ frequently¹¹. The male patients were dominating in our study group and the mean age was 35.1. The stability of the fracture is significant in the patients with spinal fractures as in the case of the patients with pelvic fractures. If the fracture is instable, it might be the reason for the progressive neurological injury. Conservative treatment is suitable in fractures which are stable and which do not have neurological injury¹². The deterioration in the neurological condition necessitates urgent surgical intervention². Percutaneous techniques might be used as the surgical fixation method¹⁴.

Sacrum, which has significant role in the transfer of the spinal load to the pelvic, has an important role in providing the mechanical stability of the spine. If there is sacrum fracture accompanying to the deterioration of the pelvic ring integrity, there is spinopelvic instability. Stabilization should be performed immediately⁶. The caudal migration of sacrum and the cranial migration of the iliac wings lead to pelvic instability and problems in standing and walking⁵. Major spinal intervention should be avoided in the early period after the injury in borderline patients having multiple traumas⁸. Percutaneous techniques might be administered to provide the stability^{9,18}. Similarly, the administration of the controlled orthopedics principles decreases the morbidity in

patients with pelvic fractures⁷. While the damage controlled orthopedics provides better results in Tile C Type fractures, early total care is suggested in Tile B Type fractures¹⁰. In our study group, while the early stabilization was administered right after the trauma in patients with pelvic instability, the elective surgery was administered between 4-10 days, within the window period.

As a result, spinal fractures are formed as a result of the high energetic trauma as the pelvic fractures. In the patient group who has high neurological injury risk together with hemodynamic instability, the vital functions should be stabilized first while the treatment decision is being made.

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