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Effectiveness of conservative treatment on adult pelvis fracture

Erişkin pelvis kırıklarında konservatif tedavinin etkinliği

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Abstract

Aim. In this study, clinical outcome of long-term conservative treatment on adult pelvis fractures were evaluated. **Methods.** Adult patients (n=75) admitted to the Emergency and Orthopedics and Traumatology Services of Cumhuriyet University Hospital for major pelvic trauma from 2000 to 2007 were retrospectively studied. All patients were treated with various conservative methods. **Results.** Of the study population, 31, 11, and 33 patients were Tile Types A, B, and C, respectively. Subsequent to the treatment, patients were evaluated by IPS scoring system and excellent, good, medium, and bad results in 44, 17, 7, and 7 patients, respectively, were obtained. **Conclusions.** In this study, conservative treatment was performed in all the patients. Long-term hospital stay and long-term recovery was prominent in the Tile Type C managed with a success rate of 81.4%. Conservative treatment has been considered as safe and effective in Tile Types A and B fractures. Although the popularity of surgical treatment in Tile Type C fractures has been increasing, when the surgical risks are considered, conservative treatment may be also alternative treatment method.

Keywords: Pelvis fracture, conservative treatment, long-term outcome, orthopedic major trauma.

Özet

Amaç. Bu çalışmada, erişkin pelvis kırıklarında konsevatif tedavinin uzun dönem sonuçları değerlendirildi. **Yöntem.** Cumhuriyet Üniversitesi Hastanesi Acil Servisi ve Ortopedi Servisine 2000–2007 yılları arasında başvuran major pelvik travması olan 75 erişkin hasta retrospektif olarak incelenmiştir. **Bulgular.** Hastaların 31 tanesi Tile Tip A, 11 tanesi Tile Tip B, 33 tanesi ise Tile Tip C pelvik kırık olgusu idi. Tüm hastalar çeşitli konservatif tedavi yöntemleri ile tedavi edildi. Tedavi sonrasında hastalar IPS skorlama sistemine göre değerlendirildi ve 44 hastada mükemmel, 17 hasta da iyi, 7 hasta da orta, 7

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hasta da ise kötü sonuçlar elde edildi. **Sonuçlar.** Bu çalışmada tüm gruplara konservatif tedavi uygulanmıştır. Her ne kadar Tile Tip C grubunda uzun yatış süresi ve normal yaşama dönüş süresinin uzun olması gibi bir takım olumsuzluklar olmasına rağmen % 81.4 oranında başarılı sonuçlar elde edilmiştir. Tile Tip A ve Tip B kırıklarda konservatif tedavi etkili ve güvenli bulunmuştur. Tile Tip C kırıklarda ise cerrahi tedavi popülerliliğini giderek artırmasına rağmen, cerrahi riskler göz önüne alındığında, konservatif tedavi de alternatif bir tedavi yöntemi olduğu düşünülmelidir.

Anahtar sözcükler: Pelvis kırığı, konservatif tedavi, uzun dönem sonuç, ortopedik major travma

Introduction

Pelvis fractures cover only 3% of all fractures, and they are known as destructive injuries, which require cautious treatment in emergency service [1-6]. Pelvis fractures are divided into two groups as stable and unstable. Stable fractures include low energy traumas such as accidently falling at home and sport injuries. Unstable fractures include generally high-energy traumas such as motor vehicle accidents, falling from high, and occupational accident [6, 7].

Treatments of stable fractures arising from low energy traumas are easy and generally, they may be treated conservatively only by short-term hospitalization and immobilization [8]. Treatment of unstable fractures arising from high-energy traumas varies by fracture types and existence of additional injuries. These occur frequently in high-energy motor vehicle accidents and are related to mortality and morbidity caused by neurovascular, urogenital and gastrointestinal system injuries [3, 4, 9-12]. The patients with unstable fractures have both long-term hospitalization and also longer immobilization besides treatment costs and extended workforce losses are extra problems.

Being lack of unanimity about classification of pelvis fractures and the course of disease after trauma bring along various difficulties on development of treatment approaches. Treatment manners and prognosis after treatment of pelvic injuries still differ in several clinics [1, 2]. The advantages and disadvantages between conservative and surgical treatment are still a matter of debate [8, 11]. In this study, clinical outcome of long-term conservative treatment of patients with adult pelvis fractures were evaluated.

Material and Methods

Seventy-five adult patients admitted to the Emergency and Orthopedic Trauma Services of Cumhuriyet University Hospital for major pelvic trauma from 2000 to 2007 were retrospectively studied. Trauma history, findings of physical examination and radiological studies, and course and outcome of cases were abstracted from patient charts. The approval of Human Ethics Committee was obtained and the chart of the patients were reviewed. For the collection of clinical data, pelvis fracture information questionnaire designed by authors were filled for the following: age, gender, education level, type of injuries, presence of additional injury, time of accident and arrival to hospital, stay in emergency service, presence of blood transfusion, hospital stay, class of fracture, and type of treatments applied and in their last examination, first supported mobilization time and then unsupported mobilization time, and return to work.

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When the patients were admitted to the emergency service, physical examination, X-ray, and routine laboratory tests were performed. In their last physical examination, the following data were recorded: range of motion (ROM) controlling, presence of hitch, and pain.

Outcomes of the study population were assessed by using the Iowa Pelvic Score(IPS) [13]. The IPS is a pelvic injury-specific assessment divided into the following 6 items: daily living activities (20 points),return to work (20 points), pain (25 points), limping (20 points), visual pain line (10 points), and cosmesis (5 points) as a total of 100 points. The result of IPS scoring recorded as excellent, good, average, and poor. Follow-up duration was calculated as average 43.1±14.9 with a range of 24-108 months after injury.

Statistical analysis

Clinical data were evaluated statistically after patients grouped according to type of treatment, stay at hospital, traction applied, supported and unsupported walking and duration of being back to in business, range of joint mobility, pain and with regard to having a hitch. A p value of less than 0.05 was accepted as significant.

Results

Of 119 patients, 37 cannot be included in data analyses because of incomplete data forms. Seven patients were excluded because of lost to follow-up. Of remaining 75 patients, 52 patients (69.3%) were male and 23 patients (30.7%) were female. Mean age of patients was 40.4±18.9 with a range of 16-89. Mean ages of female and male patients were 40.1±20.6 and 40.5±18.2, respectively.

The most frequent etiologic factors causing pelvis fracture were in vehicle traffic accident 28 (37.3%), secondly, falling from high 17 (22.7%). The frequency of other factors were found as tractor accident 11 (14,7%), out vehicle traffic accident 8 (10.7%), work accident 8 (10.7%), motorcycle accident 1 (1.3%), bicycle accident 1 (1.3%), falling from the steps 1 (1.3%). Of 75 patients, 31 (41.3%) were Tile Type A, 11 (14.7%) were Tile Type B and 33 (44%) were Tile Type C (Table 1).

Table 1. Fracture types of study population.

Fracture type	n	Percentage
Tile Type A	31	41.3 %
Tile Type B	11	14.7 %
Tile Type C	33	44.0 %
Total	75	100 %

Table 2 presents the ratio of treatment methods used for the management of pelvic fractures in the study population. The most preferred methods were supracondylar traction, bed rest, and skin traction. The less preferred methods were hummocks, tuberoses tibia traction, supplier, and plaster. In some of the patients, treatment methods were combined. When the study population grouped according to the fracture type, the most frequently used treatment methods in Tile Type A group were bed rest (54.8%) and skin traction (25.8%). In patients with Tile Type A pelvic fracture, skeleton traction was not a preferred method. The most frequently used treatment methods in Tile Type B

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group were skeleton traction (45.5%) and bed rest (27.3%). The most frequently used treatment methods in Tile Type C group were supracondylar skeleton traction (33.3%) and combination of skin and skeleton traction (27.3%).

Table 2. Treatment methods of study population.

Treatment method	n	Percentage
Supracondylar traction	32	42.6%
Bed rest	23	30.7%
Skin traction	16	21.3%
Hummock	4	5.3%
Tuberoses tibia traction	2	2.7%
Supplier	1	13%
Plaster	1	1.3%

Clinical findings at the last examination of the study groups as ROM, pain, work history, and hitch status were presented in the Table 3. The biggest point was in Tile Type A as 91.51±8.2. Secondly, Tile Type B 79.9±10.8, and thirdly, Tile Type C 72.3 ±17.5.

Table 3. Clinical findings at last examination of the study groups.

	Tile Type A	Tile Type B	Tile Type C
ROM			
Normal	25 (80.6%)	7(63.6%)	23(71.1%)
Limited	2 (6.5%)	3(27.3%)	8(23.6%)
Markedly limited	4(12.9%)	1(9.1%)	2(5.3%)
Hitch			
Absent	28(90.3%)	9(81.8%)	25(75.8%)
Present	3(9.7%)	2(18.2%)	8(24.2%)
Pain			
Absent	26(83.9%)	7(63.6%)	14(50%)
Infrequent	3(9.7%)	2(18.2%)	11(42.1%)
Frequent	2(5.45)	2(18.2%)	8(7.9%)
Return to work (month)	2.5±0.3	2.62±0.4	6.0±3.0

Table 4 presents the IPS scores of the patients with Tile Type A, B, and C pelvic fractures. Chi-square test was not used because of small sample size. Overall, the excellent outcome is the most frequent in patients with all types of pelvic fractures. The success rate of treatment procedures were somewhat lower in patients with Tile Type C pelvic fractures.

Table 4. IPS scores of study population at last examination.

	Tile Type A	Tile TypeB	Tile Type C
Excellent	28(90.3%)	4(36.4%)	12(36.4%)
Good	2(6.5%)	6(54.5%)	9(27.2%)
Average	1(3.2%)	0	6(18.2%)
Poor	0	1(9.1%)	6(18.2%)

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Discussion

As motor vehicles facilities the faster transportation, they became an essential integral part of our life yet this situation also brought along with the undesirable high intensity accidents. We encounter much more frequent with the high energy traumas resulted from either in vehicle or out vehicle accidents. We also encounter undesirable accidents arising from modern vehicles used in agriculture and during the process of building high constructions.

The etiologic reasons of pelvis fractures are quite various. Yair et al. [14], in their study which includes 808 treated patients, have found that most frequent reason is motor vehicle accident with the rate of %51 and second and third frequent are respectively accident out of vehicle with %20 and falling from high with %16 so as that percentages are close to ones we found. Yıldız et al. [15], in their study includes 142 patients with pelvis fracture, have shown the most frequent motor vehicle accident with 62.7% as trauma mechanism and falling from high with 26.4%. Richard et al. [7], in their study includes 37 patients with pelvis fracture, have shown the most frequent motor vehicle accident with 62% as the trauma mechanism and falling from high with 15%.

In our study population as the etiologic factors, the first one was the motor vehicle accident with rate of 47.9%. The second was falling from high with a rate of 22.6%, the third was tractor accidents with a rate of 14.6%, and the fourth was working accident with a rate of 8%. Overall, the rates of etiologic factors were somewhat different from the pertinent data of literature, the most frequent etiologies were found as smilar.

In the literature, the rate of pelvic fractures were different according to gender [7, 16, 17]. Sokolski et al. [16] have found the rates of male patients as 64.1% and the rates of female patients as 35.9%. Poole et al. [17] have found the rates of male patients as 39% and the rates of female patients as 61% in their study with 236 pelvis fracture patients. Richard et al. [7] have found the rates of male patients as 57% and the rates of female patients as 43% in their study with 37 pelvis fracture patients. In our study male patient rate was 69.3% and female patient rate was 30.6% out of 75 patient. We concluded that the rate of pelvic fractures according to gender were found in accordance with the pertinent data in the literature.

One of the most significant factors that affect the treatment method is pelvis fractures type. Yair et al. [13], have found that the rates of patients with Tile Type A as 60%, rates of patients with Tile Type B as 20% and rates of patients with Tile Type C as 20% in their study with 808 pelvis fractured patient. In our study on 75 patients we found that 31 patients (41.3%) have Tile Type A, 11 patients (14.6%) have Tile Type B, 33 patients (44%) have Tile Type C pelvis fractures. Our data is not compliance with the data of this study. We think the reason of this situation arising from the difference between the numbers of including patient.

Treatment methods applied to patients differ from each other. Richard et al. [7], in their study with 37 patients, they have found that bed rest has been applied to 21 patients (57%), skeleton traction has been applied to 12 patients (32%), hummock has been applied to 6 patients (16%), plaster has been applied to 3 patients (8%). Yair et al. [14], in their study with 808 pelvis fractured patients, 65% of patients have been treated conservatively and 35% of the patients have been treated surgically and also they have

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foreseen that surgical rates has rapidly increased. We have applied conservative treatment to all patients. Supracondylar skeleton traction has been applied to 32 patients (42.6%), bed rest has been applied to 23 patients (30.7%) and skin traction has been applied to 16 patients (21.3%). Hummock has been applied to 4 patients (4.6%), pelvic supplier has been applied to 1 patient (1.1%) and position boat plaster has been applied to 1 patient (1.1%). Findings were discordant and the differences between the rates are engaged with the number of patients and fracture type. And the increasing in surgical rates is engaged with the development of scanning methods and increasingly developed surgical technics.

With regards to the hospitalization duration of patients; as there are no significant differences between group A (15.2±14.6) and group B (12.4±12), significant differences have been detected between group C (30.2±19.4) and the other two groups. As expected group C has the longest hospitalization duration, group B has the shortest duration. But the expectation is intended to shorter in group A. We think that the reason of this result is the differences in number of patients between two groups.

In long-term observation of our 75 patients; the average Iowa Pelvic Score (IPS) was 81,3 (30-100). We obtained excellent results in 44 patients (58.7%), good results in 17 patients (22.7%), average results in 7 patients (9.3%) and bad results in 7 patients (9.3%). 6 patient (85.7%) out of 7 that we obtained bad results were in Tile Type C group. The functional results of patients were positive.

Nepola et al. (13) in their study with 33 pelvis fractured patients; average IPS was found as 81.3 (40-100). They obtained excellent results in 19 patients (58%), good results in 6 patients (18%), average results in 6 patients (18%) and bad results in 2 patients (6%). Comparing the results of both researches, average IPS scores were observed approximately same. Rates of most frequently results among the groups were observed similar and also the differences among the groups are engaged with the number of patients.

As the limitation of this study, we think that an additional study group undergone surgical management, lack of a protocol specified prior to the treatment, and prospective design may provide valuable information for orthopedic surgeons for chosing appropriate treatment method.

In conclusion, we observed that the treatment modalities preferred in this study population can be accepted as considerably successful; however, in Tile Type C, outcome of treatment modalities is not satisfactory compared to those of Tile Types A and B. According to general belief, the suitable treatment methods in Tile Type A group is conservative treatment, in Tile Type B group is conservative or surgical treatment, in Tile Type C is surgical treatment. In this study, we preferred conservative treatment modalities in all the study population. Although there was some clinical problems such as long-time hospitalization and delayed return to work, we found satisfactory results in 81.4% of the study population. Considering the short- and long- term risks of surgical management, conservative treatment may be also a good alternative in patients with Tile Type C pelvic fractures as like Tile Types A and B.

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Conflict of Interest

Authors declare that there is no conflict of interest.

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