Summary

Introduction. Unstable pelvic ring injuries are among the most serious injuries of skeletal system. As they are often associated with young age and multiple organ injuries they are difficult for management. Material and Methods. This study included 26 unstable pelvic ring injuries surgically treated at the Department of Orthopedic Surgery and Traumatology from August 2008 until August 2015. The average age of 22 males and 4 female patients was 45.4 years. The most common mechanism for injury was a traffic accident (19), fall from height (6), and one patient was buried under rubble. Out of 26 patients who were operated, 24 had type C injury and two had type B injury according to Tiles classification. The average follow-up time was 23 months (8 – 84 months). The functional outcome was assessed by means of Majeed and Iowa Pelvic Score. Results. Pelvic ring injuries were healed in all 26 patients. A leg length discrepancy was found in 13 patients and it was 9 mm on average. Four patients reported using walking stick, and 5 out of 26 patients had sexual dysfunction. Majeed score was 72.1 on average (23 to 100), and Iowa Pelvic Score was 76.5 (38 to 100). Conclusion. Unstable pelvic ring injuries are difficult to be surgically treated. When these injuries are treated adequately and timely, good results can be expected. Average scores achieved by our patients are very good for both scales.

Key words: Pelvic Bones; Fractures, Bone; Fracture Fixation, Internal; Treatment Outcome; Disability Evaluation; Pain Measurement

Sažetak


Ključne reči: karične kosti; prelomi kosti; umetna rasvjeta; fiksacija pelvne skale; ishoda lećenja; procena nesposobnosti

Introduction

Pelvic ring injuries with its complicated three-dimensional osseous anatomy and close relation to all neuro-vascular structures for lower extremities are challenging for treatment. As a result of high energy trauma, they are often associated with other organs and system injuries. Since their prevalence is 20 – 37 per 100,000 people, they are not common [1]. Pelvic ring injury accounted for 20% of injuries in polytraumatized patients thus having vast influence on high morbidity and mortality [2]. The aim of this study was to report the functional outcome of first 26 unstable pelvic ring injuries surgically treated at the Department of Orthopedic Surgery and Traumatology in Novi Sad.

Material and Methods

Unstable pelvic ring injuries were surgically treated in 26 patients in the period from August 2008 to January 2015. They were classified according to Marvin Tiles classification (Table 1) [3]. There were 24 males and 4 female patients (Figure 1). The youngest and the oldest patient were 22 and 74 years old, respectively. The average age was 45.4 years. Majority of our patients were injured in a motor vehicle accident (19), fall from height (6), and one patient was buried under rubble. Only one patient was operated on the day of injury, and one 20 days after trauma. On average, the patients were operated 7.8 days after getting injured. All injuries were stabilized with the external fixator, plates and screws.

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or just screws, or a combination of these. Table 2 shows the fixation techniques applied in our patients. According to our protocol early mobilization and rehabilitation started on the first postoperative day with the passive range of motion of hip and knee on the injured side and muscle strength exercises. The patients were also encouraged to walk with crutches without weight bearing on the first postoperative day.

The average follow-up time was 23 months (8 – 84 months). The functional outcome was assessed by Majeed [4] and Iowa Pelvic Score [5].

Results

All pelvic ring injuries were healed. The average Majeed score was 72.1 (ranging from 23 to 100) which is considered a good clinical grade. Pain is the most common residual problem after pelvic ring injuries. Most of patients in these series had slight or mild pain, and only one had intense pain associated with activity. The average score for pain was 22 points. Ideally, all patients return to their pre-injury job and level activities. According to the results of this study most patients were able to get back to their job but the average working score was 15 points. None of the patients felt pain in sitting position. Of five patients who had a sexual intercourse issue, three complained that it was uncomfortable and two said it was even painful if prolonged, the average score being 3.7 points. Four patients were using one stick while walking. The average section five Majeed score was 11.7. Most of our patients had some degree of limp, scoring 8.7 points on average. Walking distance was limited for most patients (7.8 points on average).

The average Iowa Pelvic Score was 76.5, ranging from 38 to 100. IPS (Iowa Pelvic Score) has two major sections: activities of daily living (20 out of 100 points) and individual score (80 out of 100 points). When asked various questions, our patients replied they could perform most of activities of daily living with 15.5 points on average. The lowest score for pain and limp was recorded in the second section “Individual score”, being 71 points on average.

Discussion

There were some attempts at surgical treatment of unstable pelvic ring injuries in previous decades which were not standard of care at that time at the Department of Orthopedic Surgery and Traumatology. Internal fixation of unstable pelvic ring injuries became standard of care in 2008, and since then it has been applied in these 26 patients included in our study. Benefits of surgical treatment of these injuries are undisputable as stated by Marvin Tile [6]. He pointed out that internal fixation could prevent instability and malunion of pelvic ring and also result in lower incidence of complications such as deep vein thrombosis, pneumonia, urinary infections, decubitus ulcers etc. Because of biomechanical studies more trauma surgeons believe that unstable ring injuries must be fixed internally [7, 8].

In our study, the most common mechanism of injury was a motor vehicle accident – 69%. Van Loon et al. found that 94.8% of patients with open book pelvic lesion were injured in a car accident [9]. Many others have found that car accidents are the most frequent injury patterns for pelvic ring [10–12].

Pain is the most common residual symptom after internal stabilization of pelvic fractures. That is the reason why Majeed and authors of Iowa Pelvic Score included pain in both scoring systems and allocated the most points for pain [4, 5]. Routt et al. suggest minimally invasive percutaneous screw fixation for rapid relief of pain [13]. Borg et al. agree with Majeed’s conclusion that pain has the most important role in determining the functional outcome after pelvic ring injury fixation [14].

One of the most frustrating difficulties after pelvic ring injury and internal stabilization is sexual dysfunction. Sexual intercourse is made very difficult for male patients due to the pain felt across the pubic symphysis or SI (sacroiliac) joints, depending on fracture pattern [4]. Kellam et al. report that women usually complain of dyspareunia after lateral compression injuries [15]. Oliver et al. found that 31% of female patients from their study sample had dyspareunia but this did not
Table 2. Fixation techniques

<table>
<thead>
<tr>
<th>Type of fixation</th>
<th>Patients Pacijent (%)</th>
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<tr>
<td>Symphyseal plate/Ploča za simfizu</td>
<td>1 4</td>
</tr>
<tr>
<td>External fixator/Spoljašnji fiksator</td>
<td>3 12</td>
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<tr>
<td>SI screws/SI zavrtnjevi</td>
<td>3 12</td>
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<tr>
<td>Posterior plate/Ploča pozadi</td>
<td>3 12</td>
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<tr>
<td>Symphyseal plate + posterior plate/Ploča za simfizu + ploča pozadi</td>
<td>2 8</td>
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<tr>
<td>Symphyseal plate + SI screws/Ploča za simfizu + SI zavrtnjevi</td>
<td>7 28</td>
</tr>
<tr>
<td>Symphyseal plate + anterior plate + SI screws/Ploča za simfizu + ploča napred + SI zavrtnjevi</td>
<td>1 4</td>
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<tr>
<td>Anterior plate + posterior plate/Ploča napred + ploča pozadi</td>
<td>3 12</td>
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<tr>
<td>SI screws + external fixator/SI zavrtnjevi + spoljašnji fiksator</td>
<td>1 4</td>
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<tr>
<td>SI screws + anterior plate/SI zavrtnjevi + ploča napred</td>
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 affect the ability to have an orgasm [11]. Five of our patients (19.2%) reported sexual dysfunction.

Van Loon et al. reported excellent Majeed score of 95.7 points in their study. Asci et al. also reported excellent functional outcome of 93.3 points per Majeed scale, with minimal score of 72 and maximal of 100 [16]. Milenkovic et al. had eleven patients (57.9%) with excellent and eight (42.1%) with good results [17]. In our series of first 26 patients the average Majeed score was 72.1. If three patients with the lowest score were excluded, the average score would increase to 87.8 points.

Van Loon also analyzed his patients with Iowa Pelvic Score. The lowest result was 82, and highest 90, the average score being 86 points. In the study of Salari et al., 72 patients were treated with percutaneous screw stabilization of SI joint [18]. All patients were asymptomatic and the mean IPS was 95 (SD 5.5). Ayvaz et al. reported in their article the average IPS to be 86 (range 82–90), with eleven excellent and nine good IPS scores [19]. The average Iowa Pelvic Score in our patients was 74.9, the lowest score being 60 and maximal 100 points in two patients [19].

Conclusion

Unstable pelvic ring injuries need to be anatomically reduced and internally fixed to achieve good and excellent functional outcome. The surgical treatment is not without complications. However, conservative treatment leads to malunions, gross disability and dependence on other people. The long-term outcome of non-surgical treatment of pelvic ring fractures is connected with even bigger problems because of gait disturbance, vertebral column secondary deformity and a lot of pain. Because of the possibility of percutaneous fixation of fractured pelvic ring in majority of cases, non-surgical treatment should not be taken into consideration.

References


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