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Source / Izvornik: **Collegium antropologicum, 2013, 37, 183 - 187**

Journal article, Published version
Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

Permanent link / Trajna poveznica: https://urn.nsk.hr/urn:nbn:hr:239:905189

Coll. Antropol. **37** (2013) 1: 183–187
Original scientific paper

Reducing Pain and Improving Quality of Life for Patients Suffering the Acetabular Fracture

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A B S T R A C T

The rationale for this paper was to find out assessment tools and relevant factors that may reduce pain, and improve the quality of life and ability to perform activities of daily living in surgically and conservatively treated patients who sustained the acetabular fracture. One hundred and three patients with the acetabular injury were analysed during the 10-year retrospective case-control study. The case group consisted of 21 patients in whom the posterior acetabular wall was fractured and who were treated surgically. The control group comprised 82 patients with complex acetabular fracture in whom conservative treatment was applied. In order to assess post injury and postoperative quality of life different factors, such as the intensity and chronicity of pain, as well as the ability to resume activities of daily living, the patients were surveyed by anamnestic questionnaire to acquire the results. The quality of life was mostly better in patients from the case group who were operated on. At the follow-up, the features of pain were lower, management overall length shorter, and return to normal daily life activities faster in the surgically treated patients, compared to those who were not. In conclusion, based on our research we assume that surgery may notably decrease features of pain and improve the quality of life in patients with the acetabular injury.

***Key words**: acetabular fracture, hip joint, pain, quality of life, surgery*

Introduction

The purpose of this article was to analyze particular assessment tools and various relevant factors that may reduce features of pain, and improve the quality of life as well as the ability to resume activities of daily living in surgically and conservatively treated patients suffering the acetabular fracture.

A typical pelvic injury with the hip dislocation is the result of a direct force applied to when the knee is in the flexed position. It is usually a posterior dislocation that immediately places the leg in an internally rotated and adducted position and may result in a fracture of the femoral head as well as the acetabular socket. Such a fracture is typically a consequence of the increased pelvic instability, appearing more often at the particular side of the body where neuromuscular function is less strong and loading force more prevailing[1,2]. The treatment of the acetabular fracture is a demanding task for surgeons and requires meticulous traumatological skills.

Non-operative treatment consisting of non weight bearing protocol for 6–8 weeks is guided by the plain X-ray examinations. It may be most feasible in younger patients (those who are under the age of 70). Therefore, the preference for operative intervention depends on patient age, fracture location, and surgeon's assessment.

Open reduction and internal fixation (ORIF) of the displaced fracture is the choice of surgical management[3–6]. The goal of surgery is to realign and stabilize the displaced hip joint, and to enable the patient avoiding skeletal traction and prolonged bed rest. Furthermore, it appears that surgery may notably reduce the rate and grade of the hip joint periarticular calcifications in patients who sustained the acetabular fracture[7].

Received for publication November 19, 2012

Although there are various conservative methods of dislocated pelvic fracture treatment[8], surgery should be favoured when the acetabular roof arc angle is less than 45 degrees[9]. Any treatment should be followed by a program of extensive physical rehabilitation, taking into consideration the patient's age, gender and activity level. Rehabilitation exercises should be started almost immediately post injury or post operatively to avoid further atrophy of the surrounding muscles. In order to maximize the outcome of these patients, particular attention must be paid to postoperative muscle strengthening protocols[10]. A standard rehabilitation protocol usually consists of 3 phases, starting with the protection phase (in the first post-operative week), that is followed by the motion phase (in the second to the fifth post operative week), and concluded by the strengthening phase (in the last 6–8 post operative weeks). Munin[11] has shown that the faster the rehabilitation protocol is imposed, the faster the patient returns to normal daily activities, while Oldmeadow[12] has recommended an early assisted ambulation within 48 hours post surgery that would accelerate functional recovery after the hip fracture surgery.

Nevertheless, proper ambulation is the main component of such a patient's functional recovery. Various factors such as male gender, younger age, use of assistive walking device, and early surgery may be associated with recovery of ambulation. However, only about 50% of patients usually regain their previous level of function, while almost 20% may remain completely non-ambulatory. Van Balen[13] has found that only 43% of patients had reached the same level of walking ability as before an injury.

Remembering the above, the main hypothesis of this study is that surgery may considerably reduce the features of pain and improve the quality of life, as well as the ability to resume activities of daily living in patients with the acetabular injury.

Material and Methods

One hundred and three patients with the acetabular fracture were hospitalized at the Department of Surgery, »J. J. Strossmayer« University, Osijek University Hospital Centre, Osijek, Croatia, and were analysed during the 10-year retrospective consecutive case series.

The patients were divided into two groups. The case group consisted of 21 patients in whom the posterior acetabular wall was fractured and who were treated surgically. The control group included 82 patients with the complex acetabular fracture in whom a conservative treatment was applied. Surgery was performed using either an ilio-inguinal or the posterior approach[14–16]. The ORIF technique for the fracture stabilization was carried out by spongy screws and adaptive plates[17]. Model procedure for the conservatively treated patients was bed rest, two-way graded skeletal traction, active muscle tonization and weight bearing dome, if necessary.

To acquire the results, as well as to assess their quality of life, the patients were surveyed after at least a 3-year period post discharge, when different factors, such the pain intensity and chronicity, and the patients ability to resume activities of daily living were examined and analyzed by a written anamnestic psychometric questionnaire consisting of Visual Analogue Scale (VAS), and Mainz Pain Staging System (MPSS)[18], as pain assessment tools.

The features of pain, as well as the time needed to resume normal daily living activities were employed as the quality of life indicators. The pain intensity was expressed by recording the VAS points between 1 and 10 for each surveyed patient, where the maximum amount of points was assigned for the strongest possible intensity of pain. For the purpose of this study the patients were allocated into three VAS categories: patients with no pain or those with minor pain intensity (VAS 0–1), with mild pain (VAS 2–3), and those suffering moderate to strong pain intensity (VAS>3). The pain chronicity was estimated employing the MPSS distinguishing three pain stages (I–III), ranging from acute to chronic pain. This classification took into account temporal and spatial dimensions of pain, the medication usage (analgesics, opioids, and previous drug withdrawal treatments), and the utilization of the health care system (pain-related hospitalizations, surgical procedures, and functional rehabilitation stays). The advanced pain chronicity was verified by pain Stages II and III of the MPSS.

The time needed to resume daily life activities was divided in two categories according to the number of months spent for recovery. The first category (early recovery) included time between 3 and 9 months post injury, and the second one (postponed recovery) comprised the time over 9 months following injury.

The SPSS for Windows, version 6.1. program package was used for the data statistical analysis. The frequency in differences of the investigated variables between the groups was obtained by a χ^2-test for equal proportion. A two-sided p-value of $p<0.0001$ was considered to be statistically significant.

Results

The average age of patients was 43.7 years. It was 54.7 years for men and 40.3 years for women respectively. Twenty one (20.4%) patients from the case group were operated on, while 82 (79.6%) were treated conservatively.

Taking into account the pain intensity throughout the hip joint mobility that was measured by VAS, in 12 out of 21 (57%) surgical patients VAS between 0 and 1 was recorded, while in the remaining 9 (43%) patients VAS between 2 and 3 was observed at the follow-ups (Figure 1, Table 1). At the same time, VAS between 2 and 3 was recorded in 46 out of 82 (56%) patients from the control group, while in the remaining 36 patients, VAS greater than 3 was recorded in 29 (33.4%), and 7 (8.6%) patients had VAS between 0 and 2. (Figure 2, Table 1). The difference in the intensity of pain between surgically and conservatively treated patients was highly statisti-

TABLE 1
THE PAIN INTENSITY (VAS)

	VAS 0–1	VAS 2–3	VAS >3	Total (%)
Case group – surgery	12 (57.1%)	9 (42.9%)	0 (0%)	21 (100)
Control group – conservative	7 (8.5%)	46 (56.1%)	29 (35.4%)	82 (100)
Total	19 (18.5%)	55 (53.3%)	29 (28.2%)	103 (100)

VAS – Visual Analogue Scale, VAS 0–1 – no pain or minor pain intensity, VAS 2–3 – mild pain intensity, VAS>3 – moderate to strong pain intensity

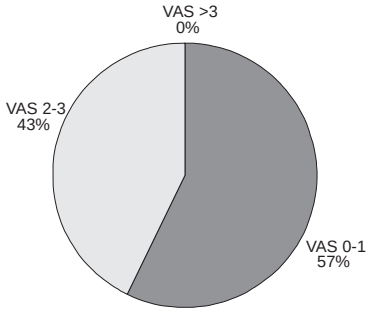

Fig. 1. Division of the case group patients according to the intensity of pain (VAS), VAS 0–1 – no pain or minor pain intensity, VAS 2–3 – mild pain intensity, VAS >3 – moderate to strong pain intensity.

cally significant for 2 out of 3 VAS categories (VAS 2-3 and VAS >3), (χ^2=29.38; p<0.0001).

Advanced pain chronicity characterized by pain Stages II and III of the MPSS was present in 3 out of 21 (11.3%) surgical patients and in 31 out of 82 (37.8%) conservatively treated ones (Table 2). The difference in the chronicity of pain between surgically and conservatively treated patients was highly statistically significant for both MPSS categories. For MPSS Stage I: χ^2=15.78; and for MPSS Stage II–III: χ^2=23.05 (p<0.0001).

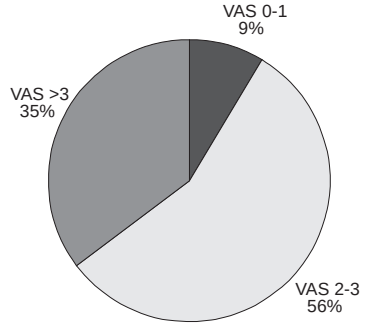

Fig. 2. Division of the control group patients according to the intensity of pain (VAS), VAS 0–1 – no pain or minor pain intensity, VAS 2–3 – mild pain intensity, VAS >3 – moderate to strong pain intensity.

All 21 patients recovered in a period between 3 and 6 months after surgery, compared to non-surgically treated patients, where 75 out of 82 (91.5%) patients recuperated in a period of more than 9 months after injury. The remaining 7 (8.5%) patients from the case group resume normal activities of daily living in a period between 3 and 6 months after the start of the hip joint lesion treatment (Table 3). The difference in time needed to resume normal daily living activity between surgically and conservatively treated patients was highly statistically significant (χ^2=69.88; p<0.0001).

TABLE 2
THE PAIN CHRONICITY (MPSS)

	Stage I	Stage II–III	Total(%)
Case group – surgery	18 (85.7%)	3 (11.3%)	21 (100)
Control group – conservative	51 (62.2%)	31 (37.8%)	82 (100)
Total	69 (67.0%)	34 (33.0%)	103 (100)

MPSS – Mainz Pain Staging System, MPSS Stage I – acute pain, MPSS Stage II–III – advanced pain chronicity

TABLE 3
RESUMING NORMAL DAILY LIVING ACTIVITIES

	3–6 months	>9 months	Total (%)
Case group – surgery	21 (100%)	0 (0%)	21 (100)
Control group – conservative	7 (8.5%)	75 (91.5%)	82 (100)
Total	28 (27.2%)	75 (72.8%)	103 (100)

Discussion

The main objective of this paper was to recognize predictive variables associated with reducing the features of pain and improving the quality of life in patients who sustained the acetabular fracture, as well as to identify the course of recovery after such an injury.

As a rule, the pelvic ring fracture is an unusual, complex and difficult injury. The aim of surgery is to realign and stabilize the fracture, what may well decrease features of pain and improve the outcome as well as the quality of life[19–22].

Taking into account the pain intensity that was measured by VAS, it was distinctly reduced by surgery. The

average VAS was outstandingly lower for surgical patients in contrast to conservatively treated ones in our series (Table 1, Figures 1 and 2). The difference was statistically significant, favouring surgical patients who generally expressed notably lower level of pain ($p<0.0001$).

Considering other features of pain such as pain chronicity, the difference between the groups was also statistically significant, in favour of the surgical patients in whom lesser pain chronicity was recorded ($p<0.0001$, Table 2).

Concerning the criterion of resuming normal daily living activities, it was noticed that surgically treated patients from the case group returned to normal life earlier, faster and more completely (Table 3). The difference in time needed to resume normal daily living activity between surgically and conservatively treated patients was highly statistically significant favouring surgically treated patients who resumed their normal daily activity faster, while the recovery period in non-surgical patients was significantly longer ($p<0.0001$).

Nonetheless, although normal muscle strength recovery is possible after operative repair of the acetabular fracture[23], the entire recuperation after the acetabular posterior wall fracture is unusual, with the remaining functional deficits related to broad character of everyday living[24].

According to our results, it seems that the validated instruments for measuring some features of pain and disability are proved to be appropriate for classifying the outcome after pelvic ring fractures[25].

Conclusion

Certain specific pain assessment tools and particular surveys inquiring resume of daily living activities can help to identify important aspects influencing favorable recovery. Based on the data presented, the employment of these evaluation instruments may allow recognition of factors that will improve the quality of life in patients after the acetabular injury. In particular, the level and chronicity of pain were of a lesser intensity and duration, while the resume to normal activities of daily living was faster in surgically treated patients in our series. Therefore, our results confirm the main hypothesis of the study.

At last, we would like to underline some restrictions of this article that arise from its retrospective character and relatively small number of patients from the case group. Since the research was not designed as a randomized prospective clinical study but rather as a consecutive case series originating from our clinical practice, it is clear that additional learning is required to maintain our results.

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SMANJENJE BOLI I POBOLJŠANJE KVALITETE ŽIVOTA U BOLESNIKA S PRIJELOMOM ACETABULUMA

S A Ž E T A K

Cilj je ovoga rada utvrditi način procjene i bitne čimbenike koji mogu umanjiti bol te poboljšati kvalitetu života i mogućnost obavljanja svakodnevnih aktivnosti u kirurški i konzervativno liječenih bolesnika s prijelomom acetabuluma. Analizirano je 103 bolesnika s prijelomom acetabuluma tijekom desetgodišnje retrospektivne »case control« studije. Ispitivanu skupinu činio je 21 bolesnik s prijelomom stražnjega zida acetabuluma, a ovi su ispitanici bili kirurški liječeni. Kontrolnu su skupinu sačinjavala 82 bolesnika sa složenim prijelomom acetabuluma koji su liječeni konzervativno. Kako bi se procijenila kvaliteta života poslije ozljede i operacije, sačinjen je upitnik s pitanjima vezanim uz intenzitet i kronicitet boli, kao i sposobnosti obavljanja svakodnevnih životnih aktivnosti. Kvaliteta života bila je veća u ispitivanoj skupini. U kirurški liječenih bolesnika također je zabilježen manji intenzitet bolova, kraće trajanje hospitalizacije i brži povratak svakodnevnim aktivnostima, u usporedbi s konzervativno liječenim bolesnicima. Zaključno, temeljem rezultata našega istraživanja, kirurško liječenje može značajno umanjiti bol i poboljšati kvalitetu života u bolesnika s ozljedom acetabuluma.