

A Survey on Outcomes of Patients Operated with Kocher Approach in the Posterior Acetabulum Wall Fractures

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Abstract

Background: There are many challenges in using the type of treatment method for acetabular fractures, and the incorrect treatment of these fractures can have many complications for the patient. Therefore, we decided to do some research to examine the treatment results of patients who underwent surgery with a posterior approach.

Methods: The files of patients admitted to the orthopedic department of the Ayatollah Mousavi Hospital in Zanjan City, Iran, were examined. After contacting the patients, performance outcomes were examined six months after the treatment of surgery results and final follow-up using the Harris Hip Score (HHS).

Results: In this study, the total number of patients was 25, of which 80% were men and 20% were women. Treatment results were evaluated as good or excellent in 15 (60%) patients and had no statistically significant relationship with age and gender. 48% had no pain and lameness, and the others showed different degrees of pain. 96% of the people were able to climb the stairs, but 4% were unable to climb the stairs. 76% of the people could use public transportation, and the rest of the people could not. 40% of the people did not need to use crutches, and the rest depended on crutches to varying degrees.

Conclusion: According to the therapeutic results obtained from the surgery, it can be concluded that this surgery has acceptable results.

Keywords: Acetabulum; Fractures; Surgery

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Background

Open reduction and internal fixation (ORIF) is still performed as the golden method in anatomical reduction, and stable fixation is the primary goal (1, 2). However, sometimes, due to the deterioration of the general condition, the impossibility of anesthesia or the delay in the treatment of the disease (three weeks or more after the fracture), and the decrease in the probability of favorable surgical results, these patients are treated with a non-surgical method and through stretching and protected walking (3). This basic and traditional treatment, which has been in practice since before the 19th century, has also been successful in some cases (4). On the other hand, in Wright et al.'s article, a small amount of good to excellent outcomes and a higher rate of complications than expected following non-surgical treatment were reported (5). Fica et al. also achieved such a result in the approach of non-surgical treatment (6). This problem shows the inadequacy of the non-surgical approach in dealing with patients with acetabular fractures.

In many other studies, doctors relied on surgical methods to find a more effective therapeutic response to heal these types of fractures. Harvie et al. introduced the surgical treatment of unstable acetabular fractures with better outcomes and improvement of the patient's condition (7). Moreover, Yu et al. listed the surgical treatment of displaced fractures of the dorsal column and back wall of the acetabulum and fixing the fracture with screws and plates as the treatment of choice for this type of fracture (8). In Osgood's study, the results of surgical treatment of unstable fractures of the back wall of the

acetabulum were estimated to be good, except in obese and elderly patients (9). In spite of these results, Deo et al. found poor results, impossibility of obtaining optimal positioning, and damage to the sphincter at the time of surgery (10).

However, in various studies, there is always a big difference of opinion regarding the therapeutic and surgical approaches and the effectiveness of these results. In many studies, the conventional method for simultaneous but separate fixation of posterior and anterior columns through combined anterior and posterior approaches or extended iliofemoral approaches has been associated with significant intraoperative and postoperative complications (6, 11). Considering the invasive nature of the combined anterior and posterior approach and the extensile approach, the concept of using surgery through the posterior approach to manage these fractures has emerged. The posterior pelvic approach is a commonly used surgical approach that provides excellent access to the acetabulum and proximal femur (12).

Quality of life (QOL) and function are often important criteria for patients and health-care providers. The Harris scoring system is one of the criteria used to measure the treatment outcome after hip surgery.

In 1969, Harris invented this scoring system with a 100-point rating scale and criteria such as pain, function, activity, deformity, and movement. This scoring system was designed for young men who developed osteoarthritis after Smith-Petersen arthroplasty surgery due to acetabular fractures. Although it was not originally designed for total hip arthroplasty (THA), it was widely used for these patients (13).



Considering that there are many challenges in using the type of treatment method in acetabular fractures and the incorrect treatment of these fractures can have many complications for the patient, having sufficient knowledge of the effectiveness of these methods and investigating the consequences is inevitable and necessary, and this can only be achieved by designing and implementing different studies and checking the results and the level of satisfaction with these methods. Therefore, we decided to do some research to examine the treatment results of patients operated on with a posterior approach.

Methods

The files of patients admitted to the orthopedic department of the Ayatollah Mousavi Hospital in Zanjan City, Iran, were examined. Posterior acetabular fractures were registered based on the diagnosis of the treating doctor and the performed imaging. Patients that at least six months had passed since their surgery were included in the study. Demographic information of patients was extracted from the files and registered in a pre-prepared form. In addition to the fracture mechanism, the type of fracture, the associated injuries, the amount of nerve damage, the amount of deep vein thrombosis (DVT), and fat embolism were also recorded. After contacting the patients and obtaining consent to participate in the study and describing the work steps, the Harris Hip Score (HHS) index was used to measure the performance outcomes and treatment results six months after the operation, the treatment results, and the final follow-up (14, 15). This tool includes four main parts: pain, the performance of the patient during various activities, the degree of deformity, and the range of motion (ROM) of the hip joint. The scores are in four categories: excellent (90-100), good (89-80), moderate (79-70), and weak (less than 70). The recorded data will then be entered into SPSS software and analyzed.

Research Community: The study population consisted of patients with posterior acetabular fractures admitted to Ayatollah Mousavi Hospital between 2015 and April 2016 who underwent posterior approach surgery.

Variables: Variables included these items: age, gender, pain, amount of walking ability, activity, ability to use public transportation, need to use crutches, degree of lameness, ability to climb stairs, degree of comfort while sitting, degree of limb flexion, degree of limb abduction, degree of external rotation of the limb, and degree of adduction of the limb.

Sample Selection Method: All people who suffered a posterior acetabular fracture between 2015 and April 2016 were included in the study six months after surgery at the Ayatollah Mousavi Center in Zanjan City using the posterior approach method.

Research Implementation Method: Patients with posterior acetabular fractures who were admitted to Ayatollah Mousavi Hospital during 2015-2016 were selected. For this purpose, the files of patients admitted to the orthopedic department of the hospital were examined. The posterior fracture of the acetabulum was confirmed based on the diagnosis of the attending physician and the performed imaging. Patients that at least six months had passed since their surgery were included in the study. Patients whose phone numbers or residences had changed and were not possible to reach were excluded from the study. Demographic information of patients was extracted from the files and recorded in a pre-prepared form. In

addition to that, fracture mechanism, types of fractures, related injuries, rate of nerve damage, and rate of thrombosis were also registered.

After contacting the patients and obtaining consent to participate in the study and explaining the work steps, measurement of performance outcomes and treatment results was conducted six months after the surgery and final follow-up using the HHS (14, 15).

In addition to recording demographic variables, the variables included in the Harris score such as pain, lameness, use of crutches and support tools, the distance the patient was able to walk, the degree of comfort in sitting on the chair, the ability to use public transportation, the ability to climb stairs, comfort in wearing socks and shoes, the degree of deformity, and ROM of the joint were examined. Besides, patients were examined in terms of surgical complications such as infection or length difference between two limbs.

Analysis Method: The data were entered into SPSS software (version 16, SPSS Inc., Chicago, IL, USA), calculated using descriptive statistics of percentage and frequency, and reported in table format. To check the difference in means, first, the normal distribution of the data and their compliance with the normal distribution were checked using the Kolmogorov-Smirnov test. When this test was not significant, parametric tests were used to compare the mean of Harris scores in two groups of men and women, as well as between the two genders, by the independent t-test. When the data distribution did not follow the normal distribution, non-parametric tests were used: Mann-Whitney for comparing two groups and Kruskal-Wallis for multiple groups. The significance level for all tests was considered 5%. All analyses were done using SPSS software.

Results

There were 25 patients in total, of which 80% were men and 20% were women.

Our patients were generally in the age group of 10-60 years. 12% of people were in the age group of 10-20 years, 32% of people were in the age group of 21-30 years, 36% were in the age group of 31-40 years, 12% were in the 41-50 age group, and 8% were in the 51-60 age group.

The results of scoring system criteria in patients operated with a posterior approach for posterior acetabular wall fractures based on gender (Table 1) and age (Table 2) showed that none of the Harris criteria had a statistically significant relationship with them.

Discussion

Our results showed that at least 3 out of 5 patients who underwent posterior approach surgery for acetabular posterior wall fracture had good or excellent treatment results.

Etemadifar et al. conducted a study on 30 patients with posterior acetabular fractures who were operated on with a posterior approach. They concluded that according to the Harris score, more than 80% of patients had a good or excellent result (16). This difference can be caused by the difference in the severity of the accidents that the patients in the two studies underwent surgery due to that accident, and the different age and gender distribution of the two populations can also be effective in this difference. The difference in underlying diseases and the type of self-care used by compliant patients to medical recommendations after surgery can be effective in this field.

Table 1. Examining the results of the Harris scoring system criteria in patients who underwent surgery with a posterior approach in fractures of the posterior wall of the acetabulum according to gender

| Harris criteria | Condition | Gender [n (%)] | | P-value |
|---|------------------------------------|----------------|--------|---------|
| | | Men | Women | |
| Intensity of pain | Not having or not mattering | 9 (45) | 3 (60) | 0.816 |
| | Sometimes hurting | 6 (30) | 2 (40) | |
| | Mild | 3 (15) | 0 (0) | |
| | Moderate | 1 (5) | 0 (0) | |
| | Severe | 1 (5) | 0 (0) | |
| Severity of lameness | Disabled | 0 (0) | 0 (0) | 0.458 |
| | Not having | 9 (45) | 3 (60) | |
| | Mild | 6 (30) | 2 (40) | |
| | Moderate | 5 (25) | 0 (0) | |
| Ability to use stairs | Severe or incapacitated on the way | 0 (0) | 0 (0) | 0.762 |
| | Without leaning on the fence | 6 (30) | 1 (20) | |
| | Leaning on the fence | 7 (35) | 3 (60) | |
| | Hardly | 6 (30) | 1 (20) | |
| Ability to use public transportation | Disabled | 1 (5) | 0 (0) | 0.349 |
| | Yes | 16 (80) | 3 (60) | |
| | No | 4 (20) | 2 (40) | |
| Need to use crutches | No need | 9 (45) | 1 (20) | 0.139 |
| | On long routes | 4 (20) | 0 (0) | |
| | Most of the times | 5 (25) | 4 (80) | |
| Degree of limb flexion | With a crutch under his arm | 0 (0) | 0 (0) | 0.933 |
| | With two crutches under his arm | 2 (10) | 0 (0) | |
| | Disabled | 0 (0) | 0 (0) | |
| Degree of abduction | Not having | 0 (0) | 0 (0) | 0.435 |
| | 0-8 | 0 (0) | 0 (0) | |
| | 8-16 | 0 (0) | 0 (0) | |
| | 16-24 | 0 (0) | 0 (0) | |
| | 24-32 | 1 (5) | 0 (0) | |
| | 32-40 | 1 (5) | 0 (0) | |
| | 40-45 | 0 (0) | 0 (0) | |
| | 45-55 | 1 (5) | 1 (20) | |
| | 55-65 | 2 (10) | 0 (0) | |
| | 65-70 | 3 (15) | 1 (20) | |
| | 70-75 | 4 (20) | 1 (20) | |
| | 75-80 | 4 (20) | 1 (20) | |
| | 80-90 | 2 (10) | 0 (0) | |
| | 90-100 | 2 (10) | 1 (20) | |
| | 100-110 | 0 (0) | 0 (0) | |
| | Not having | 0 (0) | 0 (0) | |
| | 0-5 | 0 (0) | 0 (0) | |
| 5-10 | 5 (25) | 1 (20) | | |
| 10-15 | 9 (45) | 1 (20) | | |
| Degree of external rotation of the limb | 15-20 | 6 (30) | 3 (60) | 0.293 |
| | Not having | 0 (0) | 0 (0) | |
| | 0-5 | 7 (35) | 0 (0) | |
| | 5-10 | 10 (50) | 4 (80) | |
| The degree of limb adduction | 10-15 | 3 (15) | 1 (20) | 0.835 |
| | Not having | 0 (0) | 0 (0) | |
| | 0-5 | 3 (15) | 1 (20) | |
| | 5-10 | 11 (55) | 2 (40) | |
| | 10-15 | 6 (30) | 2 (40) | |

Table 2. The treatment results of patients operated with a posterior approach in fractures of the posterior wall of the acetabulum according to age

| Age (year) | Harris score | n (%) | P-value |
|------------|--------------|----------|---------|
| < 40 | 30-70 | 4 (20) | 0.403 |
| | 70-79 | 5 (25) | |
| | 80-89 | 5 (25) | |
| | 90-100 | 6 (30) | |
| | Total | 20 (100) | |
| ≥40 | 30-70 | 1 (20) | |
| | 80-89 | 3 (60) | |
| | 90-100 | 1 (20) | |
| | Total | 5 (100) | |

On the other hand, Pascarella et al. conducted a study on 121 patients with a posterior wall fracture of the acetabulum who underwent surgery. It was concluded that according to the Harris scoring system, the average score of the patients was 91.5, which shows high satisfaction with this method for patients (17), which was different from our study (the mean of our study was 78.16) and this difference could be due to the above issues.

In this study, we also examined the treatment results of posterior acetabular wall fracture surgery in relation to age in two age groups of under 40 years and over 40 years. 55% of people under the age of 40 had treatment results with a Harris score above 80, and 80% of people over 40 had treatment results with a Harris score above 80. The results generally showed that the results of posterior approach surgery in posterior wall fractures of the acetabulum in people over 40 years old were better than

in people under 40 years old. However, the effect of the expectation of people with an older age group on treatment results can be effective in this field.

On the other hand, the different levels of activities in the two age ranges, which can affect the amount of pain, lameness, and limitation of movements, are also not without influence in this field. Therefore, young people, due to their greater capacity in physical activities, naturally get more inappropriate grades that will be attributed to their situation.

In the present study, we examined the treatment results of posterior approach surgery for acetabular posterior wall fracture in terms of two genders. The results were almost the same in men and women.

In addition, the results did not show a significant difference even among the criteria of the Harris scoring system between the two genders.

However, the need for crutches was higher in female participants. This can be related to the higher frequency of osteoporosis in women. In addition, the psychological aspect of using a cane can be effective in this field in the case of women (due to the need for more emotional support compared to men). In addition, the feeling of greater vulnerability in men may make the need for crutches appear weaker in this gender. In the end, due to the low number of samples, especially in the female gender, it is not possible to give a decisive opinion in this field.

In conducting this study, we encountered the following limitations. First, the effect of literacy status of the study participants on how to score the HSS criteria can be one of the limitations of this study; however, the loading and obtaining information from the patients was done by an orthopedic specialist. This loading should be determined carefully.

Second, the small sample size can affect the power of the study. Third, although self-talk can be effective in expressing the criteria of surgery, the study leaders made it clear to the patients that this was only research work and all their information remained confidential. On the other hand, the compatibility between pain and lameness, as well as the specific impact of activities that require overcoming the force of gravity (such as climbing stairs), can indicate the validity of the obtained data.

Conclusion

According to the therapeutic results obtained from the surgery, it can be concluded that this surgery has acceptable results. Additionally, the treatment results of the posterior approach surgery in the fracture of the posterior wall of the acetabulum did not have a significant relationship with the age and gender of the patients.

It is suggested that according to the results of our studies and similar studies, in the next studies, investigations should be done on a larger number of people. Besides, considering the small number of women studied, it is suggested that, if possible, in the next studies, an equal number of both genders participate in the study so that a correct comparison based on gender can be achieved. Moreover, considering that in people under 40 years of age compared to people over 40 years of age, the results of posterior acetabular wall fracture surgery using the posterior approach method were not very satisfactory, it is suggested that until more evidence becomes available, recommending this type of surgery should be done more cautiously in people under 40 years of age.

Further, considering that people's conditions, both physical and in terms of daily activity and underlying diseases, can have an impact on the results obtained from surgery, it is better that items such as occupation, activity level, underlying diseases, and body mass index (BMI) of people be taken into account.

Conflict of Interest

The authors declare no conflict of interest in this study.

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References

- Matta JM. Operative treatment of acetabular fractures through the ilioinguinal approach: A 10-year perspective. *J Orthop Trauma*. 2006;20(1 Suppl):S20-S29. [PubMed: 16385203].
- Ponsen KJ, Joosse P, Schigt A, Goslings JC, Luitse JS. Internal fracture fixation using the Stoppa approach in pelvic ring and acetabular fractures: technical aspects and operative results. *J Trauma*. 2006;61(3):662-7. doi: 10.1097/01.ta.0000219693.95873.24. [PubMed: 16967004].
- Rockwood CA, Buchholz RW, Green DP, Court-Brown, Heckman JD, Tornetta P. *Rockwood and Green's Fractures in Adults*. Philadelphia, PA: Lippincott Williams and Wilkins; 2010.
- Prevezas N. Evolution of pelvic and acetabular surgery from ancient to modern times. *Injury*. 2007;38(4):397-409. doi: 10.1016/j.injury.2007.01.035. [PubMed: 17445528].
- Wright R, Barrett K, Christie MJ, Johnson KD. Acetabular fractures: long-term follow-up of open reduction and internal fixation. *J Orthop Trauma*. 1994;8(5):397-403. doi: 10.1097/00005131-199410000-00005. [PubMed: 7996322].
- Fica G, Cordova M, Guzman L, Schweitzer D. Open reduction and internal fixation of acetabular fractures. *Int Orthop*. 1998;22(6):348-51. doi: 10.1007/s002640050275. [PubMed: 10093799]. [PubMed Central: PMC3619685].
- Harvie P, Chesser TJ, Ward AJ. The Bristol regional pelvic and acetabular fracture service: Workload implications of managing the polytraumatised patient. *Injury*. 2008;39(8):839-43. doi: 10.1016/j.injury.2008.01.001. [PubMed: 18586250].
- Yu JK, Chiu FY, Feng CK, Chung TY, Chen TH. Surgical treatment of displaced fractures of posterior column and posterior wall of the acetabulum. *Injury*. 2004;35(8):766-70. doi: 10.1016/j.injury.2003.09.036. [PubMed: 15246799].
- Osgood GM. Posterior wall acetabular fractures: update on surgical indications, fixation techniques and outcome measurements. *Current Orthopaedic Practice*. 2009;20(5):511-21. doi: 10.1097/BCO.0b013e3181b3a5f2.
- Deo SD, Tavares SP, Pandey RK, El-Saied G, Willett KM, Worlock PH. Operative management of acetabular fractures in Oxford. *Injury*. 2001;32(7):581-6. doi: 10.1016/s0020-1383(00)00200-x. [PubMed: 11524093].
- Oh CW, Kim PT, Park BC, Kim SY, Kyung HS, Jeon IH, et al. Results after operative treatment of transverse acetabular fractures. *J Orthop Sci*. 2006;11(5):478-84. doi: 10.1007/s00776-006-1045-6. [PubMed: 17013736].
- Giordano V, Pecegheiro do AN, Franklin CE, Pallottino A, Pires E Albuquerque, Giordano M. functional outcome after operative treatment of displaced Fractures of the Acetabulum: A 12-month to 5-year Follow-up Investigation. *Eur J Trauma Emerg Surg*. 2007;33(5):520-7. doi: 10.1007/s00068-007-6092-y. [PubMed: 26814937].
- Wamper KE, Sierevelt IN, Poolman RW, Bhandari M, Haverkamp D. The Harris hip score: Do ceiling effects limit its usefulness in orthopedics? *Acta Orthop*. 2010;81(6):703-7. doi: 10.3109/17453674.2010.537808. [PubMed: 21110703]. [PubMed Central: PMC3216080].
- Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. An end-result study using a new method of result evaluation. *J Bone Joint Surg Am*. 1969;51(4):737-55. [PubMed: 5783851].
- Marchetti P, Binazzi R, Vaccari V, Girolami M, Morici F, Impallomeni C, et al. Long-term results with cementless Fitek (or Fitmore) cups. *J Arthroplasty*. 2005;20(6):730-7. doi: 10.1016/j.arth.2004.11.019. [PubMed: 16139709].
- Etemadifar M, Nemati A, Chinigarzade M. Operative management of acetabular fracture: A 10-year experience in Isfahan, Iran. *Adv Biomed Res*. 2016;5:169. doi: 10.4103/2277-9175.190941. [PubMed: 27995108]. [PubMed Central: PMC5137236].
- Pascarella R, Cerbasi S, Politano R, Balato G, Fantasia R, Orabona G, et al. Surgical results and factors influencing outcome in patients with posterior wall acetabular fracture. *Injury*. 2017;48(8):1819-24. doi: 10.1016/j.injury.2017.05.039. [PubMed: 28602179].