

Clinical efficacy research of arthroscopy-assisted closed reduction-guided internal fixation of patella fractures

Cheng Weiqiang, Li Hui

Guangzhou Heping Orthopedic Hospital, Orthopedic Center, Guangzhou, Guangdong, China

Keywords: Patellar fracture, Arthroscopy, Closed reset, Internal fixation, Treatment effect

Abstract: To investigate the clinical effect of arthroscopic assisted closed reduction guide guided internal fixation for patellar fractures, and its role in improving treatment efficiency and promoting patient recovery. This study included a total of 120 patients who underwent arthroscopic assisted closed reduction guided internal fixation treatment for patellar fractures between 2018 and 2023^[1]. They were divided into an observation group (n=60) and a control group (n=60) according to the treatment method. The observation group received arthroscopic assisted closed reduction guided internal fixation treatment, while the control group received traditional surgical treatment. Collect and compare indicators such as fracture healing time, incidence of complications, and postoperative functional scores between two groups of patients. The fracture healing time was significantly earlier ($P<0.05$), and the incidence of complications was significantly reduced compared to the control group ($P<0.05$)^[2]. The postoperative functional score in the observation group was significantly better than that in the control group ($P<0.05$), indicating that arthroscopic assisted closed reduction guided internal fixation therapy has significant advantages in improving treatment efficiency and promoting patient recovery. Arthroscopic assisted closed reduction guided internal fixation can effectively improve the surgical efficiency and treatment effect of patients with patellar fractures, reduce the incidence of complications, promote patient recovery, and is worthy of clinical promotion and application.

1. Introduction

Patellar fracture is a common knee joint injury, and its treatment has always been a research hotspot in the field of orthopedics. Traditional surgical treatment methods have problems such as significant intraoperative trauma, slow postoperative recovery, and high incidence of complications, which seriously affect the rehabilitation effect and quality of life of patients. In recent years, with the continuous development of arthroscopic technology, arthroscopic assisted closed reduction guided internal fixation treatment has gradually attracted the attention of clinical doctors in the treatment of patellar fractures. This method can achieve precise reduction of fractures by assisting internal fixators with precise guidance, while reducing surgical trauma. It is expected to play an important role in improving treatment efficiency and promoting patient recovery^[3]. This study aims to systematically evaluate the clinical efficacy and safety of this treatment method, provide reliable basis for clinical treatment, and provide strong support for improving the treatment effect and

quality of life of patients with patellar fractures.

2. Materials and Methods

2.1 General Information

There was no significant difference in age distribution between the two groups of patients (observation group: average age 35.67 ± 4.28 years; control group: average age 36.14 ± 3.95 years). In terms of gender ratio, the observation group had a male to female ratio of 1.2:1, while the control group had a ratio of 1.1:1. There was no statistically significant difference between the two groups. In addition, there was no significant difference between the two groups of patients in terms of fracture type, fracture location, and history of complications, ensuring the comparability and reliability of the research results.

Inclusion criteria: (1) The sufferers were clinically diagnosed as patellar fracture, with fracture types including horizontal, vertical, or other non-displaced patellar fractures; (2) The sufferers with no serious systemic diseases, such as heart disease, liver and kidney dysfunction, etc; (3) The sufferers were willing to participate and sign an informed consent form.

Exclusion criteria: (1) The sufferers were accompanied by severe osteoporosis or osteoarthritis; (2) The sufferers were accompanied by severe neuromuscular or neurological disorders; (3) The sufferers were accompanied by severe cardiovascular or metabolic diseases; (4) The sufferers have undergone relevant surgery or severe trauma before.

2.2 Method

2.2.1 Control group

The control group patients were treated with traditional surgical methods. Before surgery, X-ray or CT imaging examinations are performed to determine the type and location of the fracture, and surgical plans are designed based on the characteristics of the fracture. The surgery adopts a traditional open surgical approach, which involves direct reduction through incision of the skin and soft tissue, and fixation of fractures using internal fixation materials such as steel plates and screws. Standardized rehabilitation care should be provided after surgery, including early functional exercise, wound care, and functional training to promote patient recovery and functional recovery.

2.2.2 Observation group

The treatment method adopted by the observation group patients was arthroscopic assisted closed reduction guided internal fixation therapy. Firstly, the patient undergoes detailed imaging examinations before surgery to establish the type and location of patellar fractures, while also evaluating the related soft tissue injuries. Secondly, during surgery, arthroscopic techniques are used for treatment. Entering the knee joint through minimally invasive methods, it could be accurately observed the fracture situation under arthroscopy, and assisted in closed reduction. After the restoration is completed, a guide is used to guide the internal fixation material to ensure its firmness and stability, while reducing soft tissue damage and trauma. Then, during the surgical process, refined operations can help reduce intraoperative bleeding and complications. The sterile operating standards were strictly adhered during the surgery process to ensure surgical safety. By reducing surgical trauma and tissue damage, it is beneficial for postoperative recovery of patients. After surgery, patients receive personalized rehabilitation plans. A reasonable rehabilitation plan tailored to the specific rehabilitation needs and situations of patients was developed, including early joint function exercise, muscle strength training, and functional recovery training. During the

rehabilitation period, medical staff closely monitor the patient's rehabilitation situation, adjust the rehabilitation plan in a timely manner, and ensure the smooth progress of the rehabilitation process. In addition, during the postoperative follow-up process, patients are regularly reviewed to evaluate their postoperative efficacy and functional recovery. Through regular postoperative follow-up, timely detection and treatment of postoperative complications can ensure the quality of postoperative rehabilitation for patients.

2.3 Observation indicators

Fracture healing time: defined as the continuous closure of the bone cortex at the patellar fracture site on the X-ray film of the patient, without obvious gaps, and the patient has no obvious pain sensation. Based on clinical experience, the first follow-up examination is usually conducted 6-8 weeks after surgery. If the X-ray shows good healing at the fracture site, it can be confirmed as fracture healing.

Functional recovery score: Adopting a knee joint function scoring system, including multiple indicators such as pain score, joint range of motion evaluation, and muscle strength recovery. The commonly used scoring system includes the Knee Society score, and the functional recovery score is usually based on a specific scale to comprehensively evaluate the patient's pain sensation, daily activity ability, and motor function, in order to objectively reflect the patient's rehabilitation status.

Complication incidence rate: refers to adverse events that occur after surgery, including but not limited to infection, bleeding, thrombosis, nerve damage, etc. Through clinical examination and necessary imaging examinations, the specific types and occurrence of postoperative complications can be clearly diagnosed. The evaluation of the incidence of complications is usually presented in percentage form, and the calculation formula is (number of cases with complications/total number of cases) \times 100%.

2.4 Statistical methods

The data was entered using the Epidata database and analyzed using SPSS 25.0 software. Measurement data and counting data were expressed using mean \pm standard ($\bar{x} \pm s$) and [n (%)], respectively. Group t-tests and paired t-tests were used for inter group comparisons, with $P < 0.05$ indicating statistically significant differences.

3. Result

3.1 Comparison of fracture healing time and functional recovery scores between two groups

The average fracture healing time of the observation group patients was lower than that of the control group, and the average functional recovery score was higher than that of the control group ($p < 0.05$). See Table 1.

Table 1: Fracture healing time and functional recovery score ($\bar{x} \pm s$)

	Number of cases	Fracture healing time (weeks)	Functional recovery score (points)
Observation group	sixty	6.77 \pm 0.45	85.88 \pm 3.87
control group	sixty	8.52 \pm 0.61	79.56 \pm 4.43
<i>T</i>		seventeen point eight eight two	eight point three two two
<i>P</i>		zero	zero

3.2 Comparison of the incidence of complications between the two groups

The incidence of complications in the observation group was significantly lower than that in the control group ($p < 0.05$), as shown in Table 2.

Table 2: Complication incidence rate [n (%)]

group	Number of cases	infect	hemorrhage	Thrombosis	Total occurrence rate
Observation group	sixty	3 (5.00)	2 (3.33)	1 (1.67)	6 (10.00)
control group	sixty	5 (8.33)	6 (10.00)	5 (8.33)	16 (26.67)
X ²					five point five six six
P					zero point zero one eight

4. Discussion

Patellar fracture is a common knee joint injury, and its treatment has always been of great concern. The results of this study indicate that the use of arthroscopic assisted closed reduction guided internal fixation can significantly improve the treatment efficiency and rehabilitation quality of patients with patellar fractures [4]. Compared with traditional open surgery, arthroscopic assisted therapy has shown significant advantages in multiple aspects.

Firstly, arthroscopic assisted treatment can significantly shorten the healing time of fractures. In this study, the average fracture healing time of the observation group was significantly shorter than that of the control group, which may be attributed to the minimally invasive nature of arthroscopy technology and its precise guiding effect on closed reduction of fractures. Through refined surgical procedures, it helps to reduce soft tissue damage and postoperative inflammatory reactions, thereby promoting fracture healing. Secondly, arthroscopic assisted treatment can significantly reduce the incidence of complications. The incidence of complications in the observation group was significantly lower than that in the control group, which is related to the minimally invasive nature of arthroscopy technology, precise guidance, and less damage to surrounding tissues. Fewer complications can help reduce postoperative pain and recovery time for patients, and improve the safety and reliability of surgical treatment. In addition, the functional recovery score of the observation group patients was significantly better than that of the control group. Arthroscopic assisted treatment can better restore joint function and muscle strength of patients while protecting surrounding soft tissues, and help improve their quality of daily life. The improvement of functional recovery score means that patients can better participate in daily activities and work after surgery, which has positive significance for improving the quality of life of patients.

The results of this study indicate that arthroscopic assisted closed reduction guided internal fixation has significant clinical advantages in the treatment of patellar fractures. This treatment plan can significantly shorten the fracture healing time, reduce the incidence of complications, and promote patient functional recovery.

References

- [1] Huang Bo, Wang Pingxi, Ren Hong, etc. Clinical efficacy of arthroscopic assisted closed reduction guided internal fixation for the treatment of patellar fractures [J]. *Journal of Trauma Surgery*, 2021,23 (6): 457-460
- [2] Su Mingcheng. The effect of arthroscopic assisted closed reduction guide guided internal fixation in the treatment of patellar fracture patients [J]. *China Minkang Medicine*, 2021,33 (15): 51-53
- [3] Zhu Shaoyang. The effect of arthroscopic assisted closed reduction guided internal fixation on postoperative knee joint function in patients with patellar fractures [J]. *Clinical Research*, 2021,29 (6): 68-70
- [4] Wang Lei, Wei Zengbo, Yang Jianlei, et al. Comparison of therapeutic effects between arthroscopic assisted closed reduction guided internal fixation and open reduction for the treatment of patellar fractures [J]. *Tianjin Pharmaceutical*, 2019,47 (9): 943-947