

Clinical Study of Internal Fixation with Different Approaches for Calcaneal Fracture

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Abstract: Objective: To observe the effect of internal fixation according to different approaches in the surgical treatment of calcaneal fracture. **Methods:** According to the method of comparative surgery, 74 patients with calcaneal fracture were selected from May 2020 to October 2022. They were randomly divided into control group (37 cases, conventional L-shaped incision) and observation group (37 cases, eight-shaped incision). The surgical effects of the two groups were analyzed. **Results:** Compared with the operation time, hospital stay, fracture healing time, intraoperative bleeding volume, postoperative Gissane angle and calcaneal height of the two groups, the observation group had advantages ($P < 0.05$). **Conclusion:** In the treatment of patients with calcaneal fracture, the operation according to the splayed incision approach can effectively reduce the trauma caused to the patients during the operation and help the patients recover as soon as possible.

Keywords: Internal Fixation with Different Approaches; Calcaneal Fracture

Introduction

Among the common clinical fracture diseases, calcaneal fracture is the most common fracture type with a high incidence, which has maintained a high incidence in young and middle-aged people. The inducing factors are relatively complex. From the clinical diagnosis, it can be seen that most patients present as comminuted fracture or burst fracture, which causes great damage to patients^[1]. During the clinical treatment, the internal fixation operation can promote the rapid restoration of the anatomical layer of the fracture site. This study mainly analyzes the specific clinical application value of internal fixation surgery through different approaches.

1. Data and methods

1.1 General information

The study was carried out according to the method of comparative surgical treatment. 74 patients with calcaneal fracture were selected from May 2020 to October 2022. They were randomly divided into the control group (37 cases, conventional L-shaped incision) and the observation group (37 cases, eight-shaped incision). The basic data of the two groups of patients were analyzed. There were 20 males and 17 females in the control group, aged from 28 to 52 years, with an average of (38.84 ± 1.74) . In the observation group, there were 19 males and 18 females, aged from 27 to 51 years, with an average of (37.84 ± 1.83) . Compare the basic data of the two groups, $P > 0.05$.

1.2 Method

The control group was operated according to the conventional "L" shaped approach. The patients were routinely disinfected and anesthetized, and "L" shaped incision was performed. The Kirschner wire was inserted into the lateral ankle tip, talus and cuboid of the patients, and the lower joint and fracture end were exposed, and the fracture site was treated.

Then insert 4mm Kirschner wire into the calcaneal joint, adjust the height of the force line and the height of the calcaneus, temporarily fix the medial wall of the calcaneus after accurate reduction, and observe all aspects of the force line under the effect of fluoroscopy to avoid the occurrence of calcaneus varus. The observation group was treated with internal fixation according to the splay approach. Routine disinfection and anesthesia were carried out, and the splayed incision was made, and the patient's calcaneal joint was pulled with 4mm Kirschner wire, and the internal and external sides of the calcaneus were squeezed to restore the original width and flatten the bone block. Make a 3cm incision under the lateral ankle of the patient, pull the lateral fracture wall of the calcaneus and the tendon sheath of the peroneal long and short muscles, remove the soft tissue in the periosteal sinus, expose the subtalar joint surface, recover the height of the posterior articular process under direct vision, and fix it with Kirschner wire after ensuring satisfactory reduction. After the completion of internal fixation, the patients in both groups sutured the surgical orifice in a conventional way and received postoperative anti-infection treatment.

1.3 Observation indicators

In the study, the operation time, hospital stay, fracture healing time, intraoperative bleeding volume, and postoperative Gissane angle and calcaneal height of the two groups need to be counted.

1.4 Statistical methods

The data related to the two groups were processed according to SPSS20.0, and the mean \pm standard deviation was the measurement data. The difference was statistically significant ($P < 0.05$) in t test.

2. Results

2.1 Comparison of operation time, hospital stay, fracture healing time and intraoperative bleeding between the two groups

For the operation time, hospital stay, fracture healing time and intraoperative bleeding volume of patients in the two groups, the observation group has advantages ($P < 0.05$), as shown in Table 1 below.

Table 1 Comparison of operation time, hospital stay, fracture healing time and intraoperative bleeding between the two groups ($\bar{x} \pm s$)

Groups	Number of cases	Operation time (min)	Hospital stay (d)	Fracture healing time (week)	Intraoperative bleeding volume (ml)
Observation group	37	51.54 \pm 1.34	7.62 \pm 1.24	10.12 \pm 2.14	36.32 \pm 7.11
Control group	37	59.56 \pm 1.22	11.21 \pm 1.13	12.51 \pm 1.13	68.12 \pm 10.12
<i>t</i>	-	10.425	11.785	7.252	13.425
P	-	0.001	0.001	0.001	0.001

2.2 Comparison of Gissane angle and calcaneal height between the two groups

For the Gissane angle and calcaneal height of the two groups of patients after operation, the observation group has

advantages ($P < 0.05$), as shown in Table 2 below.

Table 2 Comparison of Gissane angle and calcaneal height between the two groups ($\bar{x} \pm s$)

Groups	Number of cases	Gissane angle ($^{\circ}$)		Calcaneal height (mm)	
		1 month after operation	3 months after operation	1 month after operation	3 months after operation
Observation group	37	28.54±2.67	33.13±2.75	41.41±2.13	44.42±2.05
Control group	37	20.02±2.17	27.65±2.42	37.05±2.42	40.68±1.88
<i>t</i>	-	10.425	11.258	6.425	9.858
P	-	0.001	0.001	0.001	0.001

3. Discussion

Calcaneal fracture is the most common type of tarsal bone fracture, which is mainly caused by sudden external exposure. According to clinical diagnosis, this type of fracture usually involves multiple joint surfaces. If the treatment is not timely, it is easy to lead to the increase of heel width and height loss of patients, resulting in the collapse of foot arch, increasing the incidence of traumatic arthritis, and affecting the foot function^[2].

In the conventional internal fixation surgery, the treatment is mainly carried out in the way of L-shaped internal fixation, which can promote the full exposure of the fracture site of the patient, and under the left and right fixation of Kirschner wire, promote the reduction of the fracture site, and maintain the stability of the joint. However, this operation has a great impact on the soft tissue of the injured part of the patient, and will affect the local blood circulation, which is not conducive to the rapid recovery of the patient after the operation. The treatment was carried out according to the internal fixation of the splay approach^[3-4]. It can effectively reduce the injury caused to patients during the operation, improve the efficiency of the soft tissue peeling range at the fracture site, and maximize the microcirculation at the fracture site. On the basis of the reduction of the fracture site, it can reduce the amount of intraoperative bleeding, help the patients recover in a short time after the operation, and also reduce the incidence of postoperative complications^[5-6]. In this study, the patients in the observation group were treated according to the internal fixation operation of the splay approach during the internal fixation operation. Compared with the conventional L-shaped approach operation, the splay approach operation scheme caused less trauma to the patients, and the injured part of the Gissane angle and the height of the calcaneus were improved more rapidly after the operation, which can effectively improve the clinical treatment effect on the patients with calcaneal fracture.

Based on this study, the patients with calcaneal fracture can be treated according to the internal fixation operation through the eight-word approach, which effectively guarantees the clinical treatment efficiency of this part of patients and promotes the patients to recover as soon as possible after surgery.

References

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