

Closed Reduction and Internal Fixation with Hollow Needle for High-Risk Aged Trochanter Fracture

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ABSTRACT Objective: To discuss the therapeutic efficacy of closed reduction and internal fixation with hollow needle for high-risk aged trochanter fracture. **Methods:** 60 patients with high-risk aged trochanter fracture, who received treatment in our hospital from February 2012 to August 2014, were selected, 40 cases underwent closed reduction and internal fixation with hollow needle, as the treatment group. 20 cases received DHS internal fixation, as the control group. follow-up was made for six months to two years to observe the therapeutic efficacy. **Results:** 59 cases were cured successfully, 1 case had infection and bone exposure, which was cured through changing medicine, there was no cases of death, hip varus deformity, fixation loosening and other complications. **Conclusion:** The closed reduction and internal fixation with hollow needle for high-risk aged trochanter fracture has the advantages of being relatively easy to use, reliable to fix, minimal trauma, less bleeding, less complication, high cure rate, etc, worthy of extensive promotion and application in clinical.

KEYWORDS

Closed reduction
Internal fixation
Hollow needle
Trochanteric fracture

1. Introduction

With the more and more severity of aging, elderly intertrochanteric fracture has a gradually increasing trend. With the development of surgical instruments and technology, treatments are also constantly improving. However, because of high fatality rate of conservative treatment, surgical treatment is the best option for aged trochanter fracture [1]. From February 2012 to August

2014, our hospital used closed reduction and internal fixation with hollow needle, the therapeutic efficacy was obvious, now report it as follows.

2. Clinical data and methods

2.1. Research object

This study chose 60 patients with high-risk aged trochanter fracture as research objects from February 2012 to August 2014. There were 38 cases of men and 22 cases of women, aged of 46–87, with an average of 63.7 ± 6.5 . The causes of fracture were traffic injuries (31 cases), high falling injuries (13 cases), falling injuries (9 cases) and pressure injuries (7 cases). There were 5 cases of patients with diabetes mellitus, 11 cases of chronic bronchitis and 3 cases of emphysema. The clinical manifestation of patients were hip pain, inability to stand, hip restrictions, limb shortening and buckling, extorsion deformity, upper thigh swelling, local tenderness and taps pain, touchable bone friction feeling. Using X-ray and Evan's

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improved Classification standard, there were 18 cases of Type III, 34 cases of Type IV and 8 cases of Type V. The patients were randomly divided into two groups, the control group of 20 cases and the treatment group of 40 cases. The difference of two groups in age, typing and other aspects was not statistically significant ($p > 0.05$), it was comparable. Patients signed the consent forms and voluntarily accept the surgery.

2.2. Treatment

2.2.1. Preoperative Preparation

All patients were given leg holster traction after admission. Meanwhile, comprehensive inspection was made on each indicator in order to ensure smooth conduction of subsequent operation. Before surgery, anesthesiologist will consult with physicians about every patient's conditions to determine their tolerance of surgery. If a medical disease had the potential to affect the operation, physicians must treat the internal disease first, then turn to the operative treatment after they are stable. Patients with high blood pressure and heart disease should be given depressurization drug and cardiac function therapy, patients with lung dysfunction should be given timely expectorant and anti-infection treatment to strengthen lung function, and patients with diabetes should undergo relevant measures to control their blood sugar within about 9 mmol/L. Before surgery, physicians should as far as possible make sure the patients have stable emotion to avoid adverse emotional factors affecting normal operation.

2.2.2. Operation Method

The 40 patients in the treatment group were treated with rigid waist joint anesthesia in supine position, under the monitor of the C-shaped arm X-ray machine, conducted lower limb traction and reposition by outreach and intorsion of affected limbs, fixed, and fracture achieved anatomical reduction effect. The hip of patient was blocked up about 20°, the surgeon must strictly follow the principle of aseptic operation, choose the proper front rake and neck stem angle at the lateral under the greater trochanter about 2.0 cm, insert 2–3 guide needles in the direction of femoral head by percutaneous method. The needle tip reaches about 0.5–1.0 cm under the cartilage of femoral head, after obtaining satisfactory needle position under perspective, the surgeon will make a small skin incision along the direction of the guide needle to broach hole, twist hollow needle with appropriate length until reaching to 0.5–1.0 cm under the femoral head, then tighten the screw, pull the needle out, suture for 1–3 stitches. The operation time would be about 45 min and blood loss about 50–100 mL. The control group used dynamic hip screw (DHS) internal fixation-related operation method for treatment.

2.2.3. Postoperative Treatment

The patients should be given a routine postoperative application of 3–5 days antibiotics to prevent infection, their legs were raised up, apply low molecular heparin

calcium to prevent deep vein thrombosis of the lower limbs. Patients were fixed with “ding” shoes to maintain outreach neutral position, the second day after surgery, the isometric contraction function exercise of the quadriceps muscle was started. After three days, the patients can sit up, and the wound stitches can be removed after 2 weeks. Patients should not lie on the side, cross legs and bear weight. After 3 months, the fracture healing degree was inspected using x-ray to determine the full load time.

2.3. Evaluation Criteria of therapeutic efficiency

This study assessed the therapeutic efficiency of patients according to Dong Jiyuan standard of evaluation [2], Excellent: Patients fracture were completely cured, there was no pain of hip, osteoarticular activity returned to normal; Good: Patients fracture were cured, there was occasional pain of hip, osteoarticular activity returned to normal; Better: Fracture was cured, there was mild coxa vara, osteoarticular activity was limited to some extent, there was pain sometimes; Poor: fracture was not cured or malformed cured, hip pain, joint mobility was limited, unable to walk.

2.4. Statistical Methods

In this study, the data were analyzed by SPSS 13.0 software, measurement data were analyzed by $\chi \pm S$, t test; count data were expressed as rate and analyzed by χ^2 test. Acceptance standards was $\alpha = 0.05$, $p < \alpha$ referred to a statistically significant difference.

3. Results

Follow-up was made for 6 months to 2 years. The average follow-up time was 9.6 ± 2.4 months and there was no patient loss to follow-up. From Table 1, we concluded that fracture healing rate in treatment group was better than the control group ($p < 0.05$). The control group had one patient with infection and bone exposure, cured after changing medicine. There was no death, hip varus deformity, fixation loosening and other complications.

Table 1. Patients' fracture healing (case%).

Group	Excellent	Good	Better	Poor
treatment group	35 (87.50)	3 (7.50)	2 (5.00)	0 (0.00)
Control group	11 (55.00)	3 (15.00)	5 (25.00)	1 (5.00)
χ^2 Value	6.61	0.21	3.42	/
P Value	<0.05	>0.05	>0.05	/

4. Discussions

Elderly intertrochanteric femoral fractures are common skeletal injuries in clinical, and the high-risk population is concentrated in the elderly population. According to literatures, there are about 300,000 cases of hip fracture patients each year in the United States, of which more than 90% of patients are over 65 years old [3]. Meanwhile, the majority of elderly patients who have intertrochanteric femoral fractures

always have varying degree of osteoporosis, high blood pressure, heart disease, diabetes and other internal medical disorders. Intertrochanteric femoral fracture is a common fracture among the old patients, and the probability of elderly intertrochanteric fractures has a gradual upward trend in China with growing of elderly population. With the continuous development of surgical instruments and technology, the treatment methods are constantly improving. Due to the higher death rate of long-term bed conservative treatment, the best treatment for intertrochanteric femoral fractures is surgical treatment.

Elderly intertrochanteric femoral fractures refer to fractures between femoral neck bases and the above level of the lesser trochanter. It is the traumatic disease affecting elderly patients' health. According to relevant statistical study, intertrochanteric femoral fractures account for about 2.53% of body fractures. Since the problem of aging population gets worse and worse in China, activity increase, the number of fractures also increases, and the incidence is growing year by year.

Normally, due to sufficient blood flow in intertrochanteric femoral, the fracture is easy to cure [4,5]. However, because elderly patients with intertrochanteric femoral fractures are deficient in vital energy and blood and have varying degrees of internal diseases such as cardiovascular and cerebrovascular diseases, respiratory diseases, neurological diseases, organ dysfunction, etc., if we only adopt conservative treatment, long-term bed will cause complications or even aggravate medical condition. In contrast, the benefit of surgical treatment for elderly intertrochanteric femoral fractures is that the patient can return to normal in early fracture state, avoiding problems caused by long-term bed [6]. However, there are also risks of surgery, due to low tolerance of the elderly for surgery, their surgery risk is significantly higher than normal ages. At present, most surgeons agree to only restore the dry anatomical relationship of femoral neck for unstable fractures, and that it is not necessary to require anatomic reduction because forced anatomic reduction will lead to increased surgical trauma, particularly unfavorable to elderly patients. Therefore, additional damage caused by surgery should be minimized or avoided [7].

Currently, clinical treatments mainly include conservative treatment and surgical treatment. The main measure of conservative treatment is traction therapy. There are some effects of traction therapy for various types of fractures, but patients need long-term bed rest and the elderly patients may encounter a variety of serious complications, the death rate of intertrochanteric fracture is higher, it is 34.6% according to Horowitz report. Therefore, this treatment method has been abandoned now. Elderly patients often associate with high blood pressure, diabetes, coronary heart disease and other medical disorders, have poor physical condition, cannot tolerate surgery and the death rate is related to comorbidities and complications. According to statistics, about 85% of patients will develop

related complications and the treatments of these diseases are extremely difficult. If such patients are treated by conservative treatment, the mortality rate is 30%. Today, the preferred treatment of such disease is surgery. It can promote patients' early activity and patients can sit up in bed. The progression of disease complication due to long-term bed can be reduced and the mortality rate is effectively decreased. Dynamic hip screw (DHS), proximal femoral nail (PFN) and locking plate and others are usually used in clinical, which can achieve a therapeutic effect of rigid internal fixation and early functional exercise, but it is a complicated surgery with large surgical trauma, long operation time and large bleeding, increases the surgical risk. Therefore, a closed reduction combined with hollow needle is found to be more suitable for high-risk intertrochanteric femoral fractures in old people, and the treatment has the advantages of easy manipulation, less surgical trauma, less blood loss, early functional exercise, reduced or avoided complications, safety and rapidity. It is a minimally invasive treatment method with significant effect, recognized by clinicians and patients.

The results of this study showed that only 1 case of 60 patients developed infection, there was no other serious complications, the treatment has a significant effect. Thus, I believe that closed reduction has the advantages of easy manipulation, minimally invasive and excellent fixed effects and others for aged trochanter fracture, and it is worth promoting.

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