

Influence of early postoperative complication on the operative results in elderly intertrochanteric fractured patients

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Abstract

Objective: Early complications were analyzed in those with Evans III type of intertrochanteric fracture treated with operation or nonoperative approaches. **Methods:** 59 cases with Evans III type of intertrochanteric fracture between June, 1999 to July, 2006 were admitted in our department. 38 patients were complicated with cardiovascular diseases, such as hypertension and arrhythmia. All the cases were operated. **Results:** 58 cases were operated successfully. One died of pulmonary interstitial fibrosis. Grade data of different age brackets indicated that early infective complications had apparent differences between the operation and the control group. Compared with the control group, the operation group had benefits such as fewer complications, especially the infective complications, and incidence of lower extremities venous thrombosis, and the results showed notable differences. **Conclusion:** In elderly patients with Evans III type of intertrochanteric fracture, the incidence of pulmonary infection was the highest. Venous thrombosis in lower extremities was the most serious complication. So it will be helpful to perform the quadriceps femories function exercise. The post-operative effect is also related with the operation approach.

Keywords: elderly; intertrochanteric fracture; complications

INTRODUCTION

Along with the trend of aging population, the percentage of age related hip fracture patients is getting increasingly larger. Most of these hip fractures are intertrochanteric and femoral neck fracture. In this report, 59 senile hip fracture cases between June, 1999 to July, 2006 were retrospectively assessed.

MATERIALS AND METHODS

General data

There were 59 patients, 34 of which were male and 25 were female. All the patients were between 61~90 years old with an average age of 76.5. 19 cases were aged 61~70, 28 cases aged 71~80, 12 cases were aged 81~90. The control group included those cases managed with conservative treatment. All groups included op-

erative and conservative treatment.

Type of fractures

All 59 cases were Evans III type of intertrochanteric fracture. Preoperational physical diseases were found in 38 cases (64%), which were cardiovascular diseases such as hypertension and arrhythmia. All cases suffered from trauma; the preoperational physical diseases were limited to cardiovascular diseases.

Criteria for case selection

All those who were not able to walk before this trauma and endure the operation process were eliminated from the study. The control group included 48 cases treated with conservative treatment in the same period.

The preoperational physical diseases and fracture type were the same with the operation group these patients' having serious cardiovascular diseases or their general condition being too bad to endure the operative process.

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Treatment

In 59 cases with Evans III type of intertrochanteric fractures, 15 received external fixation; 35 were fixated with dynamic hip screws, 9 underwent artificial femoral head replacement. The control group was treated with persistent lower extremity skin traction.

Observation indexes

The incidence of postoperative complications included wound infection, respiratory tract infection, bedsores, urinary system infection and deep venous thrombosis in the lower extremities.

Statistic analysis

Stratification X^2 analysis was performed, and P value < 0.05 was considered having statistical difference.

RESULTS

The operations on 58 patients were successful. The hospital stay ranged from 14 to 20 days, 16 days on average, 1 died during the hospitalization. All complications were observed during the hospitalization. In conservative group, 40 cases were cured; the complications were observed via regular physical examination in clinic department. Compared with the control group, the operation group had advantages such as fewer complications, especially the infective complications ($X^2=19.82, P < 0.05$, shown in **Tab 1**). Stratification analysis(taking different ages into account) indicated that early infective complications showed apparent differences between the operation and the control group (Experimental group : $X^2 = 8.25; P < 0.05$; control group: $X^2 = 6.17, P < 0.05$, shown in **Tab 2**). The difference of the early postoperative complications in the different operation style was not considerable($X^2 = 1.09, P > 0.05$, shown in **Tab 3**).

Tab 1 Early complications in the experimental group and control group

| | Early complications(cases) | Without early complications(cases) |
|--------------------|----------------------------|------------------------------------|
| experimental group | 20 | 39 |
| control group | 37 | 11 |

$X^2 = 19.82; P < 0.005$

Tab 2 Early main complications in Experimental and control group of grade ages

| | Experimental group(cases) | | Control group(cases) | |
|---------|---------------------------|-----|-------------------------|-----|
| | Infective complications | DVT | Infective complications | DVT |
| 61-70 y | 3 | 0 | 6 | 2 |
| 71-80 y | 5 | 1 | 12 | 4 |
| 81-90 y | 12 | 5 | 19 | 8 |

(Experimental group: $X^2 = 8.25; P < 0.05$; Control group: $X^2 = 6.17, P < 0.05$, DVT:Deep venous thrombosis)

Tab 3 Comparison of early postoperative main complications in different method in experimental group

| | Infective complications(cases) | DVT(cases) |
|--------------------------|--------------------------------|------------|
| External fixation | 3 | 1 |
| Dynamic hip screws | 13 | 5 |
| Femoral head replacement | 3 | 0 |

$X^2 = 1.09; P > 0.05$. DVT: Deep venous thrombosis

DISCUSSION

There is no definite data about the incidence of hip fracture in China, but it was reported that 250 000 persons suffer from hip fractures annually, and this figure may double in 2050^[1]. Among these cases, the proportion of intertrochanteric fractures may also get larger. Although the aging population often has some dysfunction in multiple organs, leading to a higher risk of complications during and post operation, this is not an absolute contraindication. The data from other countries indicated that the mortality was 34% in cases with hip fracture treated with the conservative method. Once the operations were performed, the mortality declined to 17.5%. For patients with intertrochanteric fracture in Beijing Hospital, the figure was 3.6% and 0.83% respectively, so an earlier operation is essential^[2-4].

With the aging tendency of our society, the intertrochanteric fracture is becoming such a serious condition that threatens the life and depresses life quality of the elderly. Nowadays, as an effective way to cure hip fracture, an operation is the accepted method and its effect is believed superior to that of conservative methods^[5].

Herbert^[6] revealed that aged patients died mainly from complications of cardiovascular and respiratory system. Thus the cardiopulmonary conditions before operation were correlative with postoperative complications.

From this research it can be concluded that preoperative concomitant diseases as well as serious diseases cardiovascular diseases add the risk of postoperative complications. Thus it is necessary to improve heart-lung conditions before operation, make careful observations and shorten the operation time.

Since the aged are more susceptible to frailty, or complications with cardiac, pulmonary, cerebral and nephritic diseases, it is often risky to perform operations. Traditional conservative treatment may lead to fracture healing, but patients have to stay in bed for a long period, perhaps at least three to six months, so the physical diseases may become more serious and new complications may occur, bringing an observed mortality of 35% to 30%^[7]. This is while the mortality of cases treated by surgical therapy declines remarkably to 0.83%-0.9%^[8].

In our study, the incidence of postoperative pulmonary urinary and wound infection and venous thrombosis in lower extremities was higher in the operation group than that in the conservative group, and the statistical analysis confirmed the results.

The analysis of infective postoperative complications

These reasons may cause pulmonary infection: Pre-operational pulmonary disease such as chronic chondritis can lead to drainage gather in the respiratory tract; Dysfunction general condition may cause the systemic inflammatory reaction syndrome(SIRS). Urinary infection can result from a longer catheter and prostatitis, which may lead to the infection of bladder and kidney (Studies showed the use of longer catheter had a direct proportion with urinary infection). Also an unreasonable selection of antibiotics may bring fungal infection, which is formidable to treat.

Perioperation preparation

38 of the 59 cases had concomitant physical diseases (64%). Documents showed that the mortality of the cases with pulmonary and cardiac diseases was high. Thus it is desirable for doctors to assess patients' physical and spiritual conditions. Firstly, heart-lung function must be evaluated carefully to estimate patients' tolerance to operations. It is believed that the lungs are the first organ to show signs of Systemic Inflammation Reaction Syndrome(SIRS). Against pulmonary diseases, effective measures must be taken in time to prevent this pathological process. If not, ARDS, respiratory failure will happen. In this group, 1 case with pulmonary failure after internal fixation of DHS(dynamic hip screw) showed swelling located at the affected hip on the 4th day after the operation, and pulmonary infection along with irreformable hypoproteinemia on the 10th day. The patient was transferred to the Respiratory Department but finally didn't recover. So prevention and cure of pulmonary incidental diseases and early postoperative pulmonary complications are critical for a successful operation. In addition, consultation is essential to evaluate the tolerance of anesthesia and the operation course. The influence of deep venous thrombosis(DVT).

More vigilance should be paid to DVT. It is believed only a few hospitals in China(such as Hua Shan Hospital of Shang Hai) adopt routine anticoagulation to prevent and cure VTE for hip joint replacement patients. Thus it can be observed that although surgeons who can do artificial hip joint replacement are numerous, many of them still don't realize the dangers of critical complications in such operations, which must be emphasized^[9]. For aged intertrochanteric fracture patients, postoperative thirty-day mortality is above 10% in Eu-

ropean countries. So DVT mostly threatens the patients' prognosis and attention must be given to this.

Lower extremity venous thrombosis(VTE): 6 cases suffered from VTE, who reported experiencing intolerable pain and declined to the do quadriceps femories function. Clinical manifestations of VTE were observed as local swelling(diagnosed by color ultrasonic measurement). The tumidness disappeared after positive function exercises, timely use of anticoagulant and medicine enhancing microcirculation, and no pulmonary embolism occurred.

The main reasons for DVT are that operations and trauma lead to the release of clotting factor, and reduced activity for fear of pain causes a slowing down of the speed of the blood stream and the loss of contraction of the deep veins to lower extremity muscles. Formation of DVT, especially pulmonary embolism resulted in by it, is a very serious complication. Since DVT is caused by many factors including operation methods, obesity, lack of early postoperative exercise, congestive heart failure etc. Keenan^[10] believed that age still can not be confirmed as an isolated cause resulting in thrombosis, and no consensus has been reached on the relationship between age and postoperative DVT. Influence of age on postoperative thrombosis is decided mainly by whether other factors that cause thrombosis exist. In the present study, three cases were diagnosed to have VTE. As a rare complication for the elderly hip fracture, it is fatal. So the most important thing is to remember and adopt effective ways to avoid and treat DVT. It is useful to do quadriceps femories function exercises early after the operations, and to enhance exercises with CPM (consistent passive machine) and when necessary use anticoagulant at appropriate time. So supervising coagulation function is helpful for individual therapy.

The influence of surgical methods on the elderly with hip fractures

Now the surgical methods for Evans III type of intertrochanteric fractures are mature, the success rate of the operation itself can be very high. However, these patients are often complicated with physical diseases, and different prognoses come with different doctors' treatments^[11]. In summary, early diagnosis of pulmonary and cardiac diseases are of great importance.

Selection of different operation methods also directly affect whether it will aggravate original incidental diseases and cause early postoperative complications. For example, the operation methods of intertrochanteric fractures are divided into reduction and internal fixation and artificial hip joint replacement. Different operational methods may lead to new complications and aggravate the original physical disease, which could influence the

operation effects. The deceased patient showed perineum-swelling, hypoproteinemia an unhealed wound and hyponatremia resulting in respiratory failure. A consensus of opinion was reached that when patients above 80 undergo artificial hip joint replacements; For patients of this kind, we should first of all consider avoiding complications in early days caused by fractures and reducing the possibility of death caused by complications, rather than issue of whether artificial joints could loosen.

In this study, the above death suffered from intertrochanteric fracture (Evans III -of an unstable type) and DHS was performed. Whether the unstable fracture became steady after the operation was unknown and how long the period of stay in bed was extended.

Some reporters indicated that postponed surgery can lead to increased complications and mortality. Because of this, some scholars advocate for early operation, even within 24 hours. In our study, operations were performed about three to six days later. According to our experiences, appropriate adjustment in internal medicine may ensure both long-term effects and perioperative security, which is an important issue to be considered in modern medical circumstances.

Earlier operation and early moving around can markedly reduce the incidence of pulmonary complications, deep venous thrombosis in lower extremities and bedsore, and is helpful for rehabilitation^[12-13]. For the aged, whether the operation should be performed or not, age is not a determinating factor.

For those receiving external fixation, they were able to adopt a semi-reclining position early on the bed early because of the smaller wound and less bleeding, and they were also able to exercise the lower extremities and hip joint for gradual recovery of the functions. Therefore, the incidence of complications of bedsore and pulmonary infection was low.

For those receiving dynamic hip screw, they were able to turn over laterally, and exercise with the constant passive machine. The incidence of complications declined markedly.

For those receiving femoral head replacement, they were able to move about early and walk about 3 weeks after the operation, the incident of the complications also decreased.

According to the above data and statistical analysis of **Tab 3**, the difference of early postoperative complications in the three groups was not considerable.

In order to prevent postoperative complications, it was pivotal for us to assess and improve the cases' sys-

temic conditions, especially the pulmonary and cardiac function and earlier detection and treatment was essential. We must do our best to follow these operation principles, including smaller local involvement in surgery, a shorter operation time and less disturbance to body functions for the best therapeutic results. So we should choose appropriate operation plan according to the type of fracture. We advocate the following; for an intertrochanteric fracture, fixing it with the dynamic hip screws. While we regard that femoral head replacement is the right selection for instable fracture. All these patients may benefit by postoperative complications being reduced. For the cases with poor conditions and serious physical diseases, the external fixation method should be selected.

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