

# Osteoporotic hip fracture: Comparison on various treatments of metal implants\*

Zhang Shou, Kong Chang-geng, Chen Wen-yuan, Ding Xiao-li

Orthopaedic Centre,  
Haikou People's  
Hospital, Xiangya  
Medical College,  
Central South  
University, Haikou  
570208, Hainan  
Province, China

Zhang Shou,  
Professor, Master's  
supervisor,  
Orthopaedic Centre,  
Haikou People's  
Hospital, Xiangya  
Medical College,  
Central South  
University, Haikou  
570208, Hainan  
Province, China  
bb3855@yahoo.  
com.cn

Supported by: the  
Natural Science  
Foundation of Hainan  
Province, No.30323\*

Received: 2009-12-29  
Accepted: 2010-04-22  
(20091229021/GW)

Zhang S, Kong CG,  
Chen WY, Ding XL.  
Osteoporotic hip  
fracture: Comparison  
on various  
treatments of metal  
implants.  
Zhongguo Zuzhi  
Gongcheng Yanjiu yu  
Linchuang Kangfu.  
2010;14(22):  
4176-4180.

[http://www.crter.cn  
http://en.zglckf.com]

## Abstract

**BACKGROUND:** The metal implant internal fixation exhibits good effect for femoral neck fractures of young patients, but few studies report the metal implant treatment for femoral neck fracture in the aged patients.

**OBJECTIVE:** To compare different implant treatments for osteoporotic hip fractures in senile patients.

**METHODS:** A total of 237 aged patients with osteoporotic hip fracture, aged from 60 to 96 years old, were recruited from the hospital between January 1998 and December 2008. There were 32 cases treated by cannulated screw internal fixation, 23 cases by anatomical plate internal fixation, 41 cases by dynamic hip screw internal fixation, 111 cases by bipolar femoral head replacement, and 30 cases by total hip replacement. Comparison of the incidence of complications and the recovery of hip function were performed in each group.

**RESULTS AND CONCLUSION:** Cannulated screws, anatomical plates, dynamic hip screw internal fixation showed a higher complication rate significantly than bipolar femoral head replacement and total hip arthroplasty ( $P < 0.01$ ); the good and excellent effect rate in cannulated screw, femoral end plate, and dynamic hip screw fixation was significantly lower than that in bipolar femoral head replacement and total hip arthroplasty ( $P < 0.001$ ,  $P < 0.01$ ). The results suggested that artificial joint replacement (bipolar femoral head replacement or total hip replacement) is the optimal choice for aged osteoporotic femoral neck fracture, cannulated screw fixation is suitable for Garden I, dynamic hip screw fixation and proximal femoral anatomical plate fixation fit for intertrochanteric fractures of Jensen-Evans I-II; Jensen-Evans II-III osteoporotic intertrochanteric fractures joint replacement is the ideal choice.

## INTRODUCTION

In 2006, Liu<sup>[1]</sup> reported 9 060 million people in China have been suffering from osteoporosis, accounting for 7.01% of total population. Osteoporosis is a kind of systemic disease characterized by low bone mass and bone micro-structure destruction, leading to reduced bone strength, increased bone fragility and easy to cause fracture, the most harm is the fracture, especially hip fractures, whose incidence rate, mortality and morbidity are very high. Previously, conservative treatment is commonly used, but it induces many bedridden complications, also the morbidity and mortality are increased (35%); while surgical treatment can avoid a long series of problems caused by bed rest and decrease mortality because patients can get out of bed at early stage, thus its functional recovery is better than conservative treatment. Early surgical treatment has become the main approach of hip fractures<sup>[2-3]</sup>. Therefore, the choice and clinical evaluation of metal implants have a major significance. This study retrospectively analyzes metal implant internal fixation for osteoporotic hip fracture in aged patients.

## SUBJECTS AND METHODS

**Design:** Retrospective comparative analysis.

**Time and setting:** All hip fracture patients who were scheduled for surgical treatment in our hospital between January 1998 and December 2008 were involved.

### Participants

#### Inclusion criteria

Patients all aged  $\geq 60$  years old, and can take care

of themselves before injury.

#### Exclusion criteria

Bilateral hip fracture, nonunion or pathological fracture, mental illness, previous history of ipsilateral hip fracture or surgical history. Totally 237 cases were followed up for 1-8 years postoperation, the metal implant treatment are given as follows: ① 32 patients with femoral neck fractures, including 12 males and 20 females, aged 61-90 (78±8) years, are all fall injuries of Garden classification (Table 1). They were treated by cannulated screw internal fixation. ② 23 patients with intertrochanteric fractures, including 10 males and 13 females, aged 62-86 (75±5) years, comprised fall injury in 20 cases, traffic accidents in 2 cases, and other in 1 case; Evans-Jensen classification is shown in Table 1. They were treated by femoral proximal anatomical plate internal fixation. ③ 41 cases with intertrochanteric fractures, including 21 males and 20 females, aged 60-96 (76±8) years, comprised fall injury in 37 cases, traffic accidents in 2 cases, and other in 2 cases; Evans-Jensen classification is shown in Table 1. They were treated by dynamic hip screw internal fixation. ④ 16 cases with intertrochanteric fractures, 3 males and 13 females, aged 60-96 (80±9) years, suffered from fall injuries; 95 cases suffered from femoral neck fracture, 32 males and 63 females, aged 60-94 (80±9) years old. Evans-Jensen classification is shown in Table 1. They were treated with bipolar femoral placement. ⑤ 30 cases with intertrochanteric fractures, including 13 males and 17 females, aged 62-94 (80±7) years, suffered from fall injury in 28 cases and traffic accident in 2 cases, Evans-Jensen classification is shown in Table 1. They were treated by total hip arthroplasty.

Table 1 Hip fracture type and metal implant approach in 237 hip fracture patients

Group	n	Fracture type (Garden or Evans-Jensen)	
		I + II	III+IV
Cannulated screw internal fixation	32	20	12
Anatomical plate internal fixation	23	1	22
Dynamic hip screw internal fixation	41	7	34
Bipolar femoral placement	111	54	57
Total hip arthroplasty	30	21	9
Total	237	103	134

### Surgical methods

#### Cannulated screw and anatomical plate interventions

An incision was given from greater trochanter apex to the distal on lateral femoral proximal, then orthophoria reduction, under the perspective of C-arm X-ray machine, the collodiaphyseal angle was ensured as 130° and anteversion angle as 10°–15°:

① Cannulated screw group, a parallel or “品” shaped probe was inserted at 2.0–3.0 cm below the greater trochanter apex, through femoral neck, then achieved a satisfactory position by C-arm X-ray and measured the length of screw, 2–3 hollow screws were used for fixation. ② Anatomical plate group, anatomical plate was inserted with the plate top screwed 3 cancellous bone screws and the plate bottom fixed by cortical screws and femoral shaft. Tensile screw was used to fix greater and lesser trochanter, as well as bone mass.

#### Dynamic hip screw intervention

An incision was given from greater trochanter apex to the distal on lateral femur, under the perspective of C-arm X-ray machine, the compression screw probe was inserted into femoral neck, then measured the length and implanted screw, and lateral plate was also implanted, the cortical screw was used to fix plate and femoral shaft. To prevent rotation deformity of femoral head, an anti-rotation screw was inserted into the top of the compression screw.

#### Bipolar femoral head replacement and total hip replacement interventions

An incision, 6–10 cm long, was performed at lateral hip, keeping gluteus medius muscle in the femoral trochanter top, removing femoral head and bone fragments at 1.0–1.5 cm of joint capsule away from lesser trochanter, protecting the bone fracture mass of the greater and lesser trochanter, temporary fixation with Kirschner wire was given for fracture reduction to achieve anatomic reduction: ① Bipolar femoral head replacement, osteoporosis patients do not need forced reaming to prevent intraoperative femoral fractures, femoral pedicle with appropriate length was suggested, pedicle was 2–3 cm longer than distal fracture line, then fixed with bone cement in marrow cavity, the severely crushing bone mass of greater trochanter was tied using wire. ② Total hip replacement group, acetabular bone sclerosis was wore off using burr and the surrounding inflammatory granulation tissues were cleared until the bone surface was fresh, other

steps were same with bipolar femoral head replacement.

#### Postoperative management

Postoperative antibiotics were used to prevent infection and the drainage tube was removed within postoperative 24 hours to reduce retrograde infection. Prevention of deep vein thrombosis: the prevention of deep vein thrombosis twice per day was given using manual or cycle therapeutic apparatus, low molecular heparin anticoagulation to prevent thrombus. Began on postoperative 1 day, the patients were guided to do activities in bed, also informed of the limits of motion range. Hip joint activities are not allowed in patients underwent hip fracture fixation; hip flexion should restrict to 90° within six weeks for patients with prosthetic replacement. The posterior prosthesis replacement patients were also required to forbid hip joint adduction and rotation within six weeks. A pillow under legs can keep affected limbs abduction. From postoperative 1 day, they exercised in an order of active aid → active → anti-resistance. Patients received prosthetic replacement were rechecked at 6 weeks postoperation and began weight-bearing activities with the aid of crutches, internal fixation patients were rechecked the photos at 8–12 weeks and began weight-bearing activities with crutches. Anti-osteoporosis treatment after surgery, basic programs: Calcium 800–1 000 mg per day + calcitriol capsules 0.25 µg per day + Alendronate Tablets 70 mg per week (after getting out of bed), oral administration for 2 consecutive years and continue to take 6 months a year as long-term treatment. After 6 to 12 months of anti-osteoporosis treatment, bone mineral density or personalization features was measured once to provide the best treatment.

#### Modified Harris hip function score to evaluate treatment effects

Total score was 100 points, 90–100 excellent, 80–89 good, 70 fine, below 70 poor.

#### Design, enforcement and evaluation

All authors were responsible for design, enforcement and evaluation.

#### Statistical analysis

Using SPSS13.0 software, measurement data were expressed as Mean±SD, the mean operative time, mean hospital stay, and mean intraoperative blood volume were subjected to analysis of variance and SNK-q, all data were tested by homogeneity of variance, numeration data were compared using Chi-square test and multiple comparisons between several sample rates. A level of  $P < 0.05$  was considered statistically significant.

## RESULTS

#### Quantitative analysis of participants

A total of 237 patients were involved in the result analysis.

#### Comparison on the operation conditions

① Operation time: There were no significant difference between cannulated screw group and bipolar femoral head replacement group ( $P > 0.05$ ), but difference was statistically significant in cannulated screw group compared with total hip replacement group ( $P < 0.01$ ); no significant differences were

observe between any two groups of anatomical plate, dynamic hip screw, bipolar femoral head replacement, total hip replacement groups ( $P > 0.05$ ), bipolar femoral head replacement took the shortest operation time. ② Bleeding: There were extremely significant differences in cannulated screw group compared with bipolar femoral head replacement and total hip replacement groups ( $P < 0.01$ ); No difference was significant between any two groups of anatomical plate, dynamic hip screw, bipolar femoral head replacement, and total hip replacement ( $P > 0.05$ ); The length of stay was not significantly different among 5 groups ( $P > 0.05$ ) (Table 2).

Group	Operative time (min)	Blood loss (mL)	Hospital stay (d)
Cannulated screw internal fixation	60±27	100±15	34±26
Anatomical plate internal fixation	95±35	200±20	29±16
Dynamic hip screw internal fixation	96±33	200±125	30±20
Bipolar femoral placement	58±20	200±120 <sup>a</sup>	34±22
Total hip arthroplasty	100±28 <sup>a</sup>	210±50 <sup>a</sup>	34±24

<sup>a</sup> $P < 0.01$ , vs. cannulated screw internal fixation group

**Comparison of the complications in each group (Table 3)**

Complications	Cannulated screw internal fixation	Anatomical plate internal fixation
Internal fixation cutting	1	0
Intraoperative fracture	0	0
Internal fixation and prosthetic loosen	3	4
Postoperative fracture	0	0
Avascular necrosis of femoral head	3	0
Coxa vara	2	4
Legs shorten	5	3
Delayed fracture healing	3	1
Total	17	14
Incidence (%)	53.0	52.0

  

Complications	Dynamic hip screw internal fixation	Bipolar femoral placement	Total hip arthroplasty
Internal fixation cutting	8	0	0
Intraoperative fracture	0	1	0
Internal fixation and prosthetic loosen	0	5	1
Postoperative fracture	1	2	0
Avascular necrosis of femoral head	0	0	0
Coxa vara	5	3	0
Legs shorten	2	0	0
Delayed fracture healing	1	0	0
Total	17	11	1
Incidence (%)	41.5	10.0	3.3

The differences were extremely significant in cannulated screw group, anatomical plate group, and dynamic hip screw group compared with bipolar femoral head replacement group

and total hip replacement group ( $P < 0.001$ ); The difference was not significant between anatomical plate group and dynamic hip screw group ( $P = 0.14$ ), between bipolar femoral head replacement group and total hip replacement group ( $P = 0.25$ ); the overall complication rate of internal fixation groups was significantly higher than the artificial joint replacement groups

**Comparison on the treatment effect**

The differences were extremely significant in cannulated screw group, anatomical plate group, and dynamic hip screw group compared with bipolar femoral head replacement group and total hip replacement group ( $P < 0.001$ ); The difference was not significant between anatomical plate group and dynamic hip screw group ( $P = 0.80$ ), between bipolar femoral head replacement group and total hip replacement group ( $P = 0.44$ ); the overall excellent and good rate of bipolar femoral head replacement and total hip replacement was significantly higher than other groups (Table 4).

Group	Excellent	Good	Fair	Poor	Total	Good rate (%)
Cannulated screw internal fixation	12	8	5	7	32	62.5
Anatomical plate internal fixation	9	6	4	4	23	65.2
Dynamic hip screw internal fixation	18	10	9	4	41	68.3
Bipolar femoral placement	87	16	5	3	111	92.8
Total hip arthroplasty	28	1	1	0	30	96.7

**DISCUSSION**

**Related knowledge**

The femoral neck fracture includes internal fixation and joint replacement, the traditional fixation are pedicle screw and cannulated screw fixation, cannulated screw fixation has satisfactory effect for the hip femoral neck fractures in young patients without intracapsular displacement<sup>[4]</sup>. The internal fixation have a high failure rate in aged osteoporotic femoral neck fractures, Leonardsson *et al*<sup>[5]</sup> reported the failure rate of internal fixation for femoral neck fracture treatment was 45.6% within 10 years, while joint replacement only 8.8%. 10-year mortality rate was as high as 75%. Frihagen *et al*<sup>[6]</sup> reported complication rate of internal fixation for displaced aged femoral neck fracture treatment within 2 years was 50%, while joint replacement 15%, due to the high failure rate of the internal fixation, it has been currently abandoned.

**Analysis results of this study**

In recent years, joint replacement is the optimal choice for aged femoral neck fracture with osteoporosis Garden II, III, IV type, Garden I type used cannulated screw fixation, according to the statistical results, the complications incidence of cannulated screw fixation was 53%, Harris score good rate was 62.5%. Authors though that age is an important factor for assessment, but bone mineral density and basic situation are more important than age, because femoral neck fracture of Garden II, III, IV type in elderly osteoporotic patients

underwent cannulated screw fixation can lead to fracture displacement and then a higher probability of avascular necrosis, higher incidence of secondary surgery and more complications, which all bring patients great psychological and economic waste, joint replacement can contribute to early activity in patients, reduce bedding time, early bear weight and reduce long-term mortality, prevent nonunion, avascular necrosis and articular surface collapse. Bilateral femoral head replacement is suggested for osteoporosis patients with short life expectancy, it can reduce hip varus, acetabular wear and pain, as for the use of total hip replacement, a majority of current scholars the current study found that for the most unstable of osteoporosis in patients with femoral neck fracture significantly better than total hip replacement double femoral head replacement and internal fixation. Keating *et al*<sup>[7]</sup> investigated the internal fixation, bilateral femoral head replacement, total hip replacement for displaced femoral neck fracture treatment in aged patients, found that secondary surgery was the maximal in internal fixation group (internal fixation 39%, bilateral femoral head replacement 5%, total hip replacement 9%), 2 years later hip function score of total hip replacement was significantly higher than bilateral femoral head replacement and internal fixation. In this study, cannulated screws and joint replacement were used in the treatment of osteoporotic femoral neck fractures in the aged patients, results showed low complication rates, early activities, and good joint function of joint placement, thus joint placement becomes the optimal choice for the treatment of osteoporotic femoral neck fracture of Garden II, III, IV fractures.

Now dynamic hip screw treatment has become a gold standard of intertrochanteric fracture. With its increasingly wide range of applications, minimally invasive surgical procedures are emerging in recent years, dynamic hip screw fixation into bone intertrochanteric fractures by using minimally invasive technique costs a short time, induces less bleeding, and shorter hospital stay, indicating good results<sup>[8-9]</sup>. However, dynamic hip screw is an extramedullary fixation system, requirement high integrity of the lateral cortex of the greater trochanter, and their plate was loaded in the lateral bearing line, any defects of medial cortical bone caused varus stress may add to internal fixation devices, leading to cut femoral head, broken junction between nails and plates, or screw sliding plate. As for osteoporosis patients with severe crushing, excessive compression may induce nail head piercing femoral head, internal fixation is always failed. Also inward displacement of the distal femoral shaft results in limb shortening and varus deformity, affecting future functions. Chen *et al*<sup>[10]</sup> compared dynamic hip screw and proximal femoral nail for the treatment of intertrochanteric fractures in elderly patients. The results showed that the good rate of hip joint function in dynamic hip screw group at 1 year postoperation was significantly lower than that of proximal femoral nail group, femoral neck shortening was significantly higher than that of proximal femoral nail group, the incidence of coxa varus was also significant higher than that of proximal femoral nail group. In this study, 41 patients of osteoporotic fracture were treated with dynamic hip screw, I + II type (stable) in 7 cases, III + IV type (unstable) in 34 cases, Harris score good rate was 68.3% and there was no significant difference compared with femoral proximal anatomical plate (65.2%,  $P > 0.05$ ), but was

statistically significant with the joint replacement group ( $P < 0.05$ ), the complication incidence was 41.5% in dynamic hip screw group, showing no statistically significant difference with the proximal femur anatomical plate group (52%,  $P > 0.05$ ), but 10% statistical significance with bipolar femoral head replacement ( $P < 0.01$ ), dynamic hip screw complications are mainly Evans-Jensen III + IV type. With the increasing failure of dynamic hip screw for treatment of intertrochanteric fractures of aged patients, many scholars do not promote the use of dynamic hip screw for the unstable intertrochanteric fracture<sup>[11-13]</sup>. LCP will gradually replace it because of few compression to fracture and periosteum, reduced operation time and low probability of nail breakage, LCP is more suggested for osteoporotic or unstable hip fracture in patients<sup>[14]</sup>. Proximal femoral anatomical plate, similar with dynamic hip screw plate, is extramedullary fixation system, proximal femoral anatomical plate includes steel plate and many common screws designed according to the lateral anatomical plate, the integrity of outer cortex of the greater trochanter does not require more as dynamic hip screw, but any defects of medial cortical bone easily lead to increase varus incidence, poor anti-strength of osteoporotic fracture screws can not achieve firm fixation, easily causes internal fixation loose and limb shorten, the statistical results of this study showed that 23 osteoporotic intertrochanteric fracture patients treated by proximal femoral anatomical plate only account for only a small quantity of hip fractures, Harris score rate was 62.5% and complication rate was up to 52%, of which implant loosening in 4 cases, hip varus in 4 cases, lower limb shortening in 3 cases, nonunion in 1 case, higher than 41.5% of dynamic hip screw group. The authors believed that proximal femoral anatomical bone plate is not suitable for treatment of elderly osteoporotic unstable intertrochanteric fractures. Whether to choose joint replacement therapy in the treatment of intertrochanteric fractures are controversial in China<sup>[15-16]</sup>, the opponents argue that femoral intertrochanteric basilar part is rich in blood supply, contributing to a rapid fracture healing and few nonunion and non-healing of internal fixation, while Guan *et al*<sup>[17]</sup> compared artificial femoral head replacement ( $n = 78$ ) and internal fixation ( $n = 80$ ) for treating unstable intertrochanteric fractures in elderly patients, they found that the patient underwent artificial femoral head replacement can get out of bed and load at early stage, while intertrochanteric prosthesis can fix greater trochanter which is different to dynamic hip screw and proximal femoral nail fixation system to fix, reduce postoperative pain, correspondingly increase muscle contraction, decrease venous thrombosis, showing the advantages of artificial joint replacement in the treatment of unstable intertrochanteric fractures in elderly patients. Now many researchers support the use of artificial joint replacement for treatment of unstable intertrochanter fracture<sup>[18-20]</sup>, success rate was 75%–95%, the patients could early bear weight with no pain, the greatest advantage of artificial joint replacement is a low complication, also it is an effective remedy treatment for intertrochanteric fracture fixation failure<sup>[19]</sup>. From 2003 to 2008, our research group have carried out artificial joint replacement in treatment of osteoporotic intertrochanteric fractures patients, and compared with the studies of Gu and Wang *et al*<sup>[20]</sup> who applied bone cemented bipolar femoral head replacement and new metal wire cerclage in the treatment of elderly patients with unstable or pathological

intertrochanteric fracture, they found that patients starting weight bearing is too conservative, and their average operating time is 1.5 hours, but the patients could sit 3 days after surgery, load at 5 days, and walk at 10 days. At 30 days postoperation, FRS score for functional recovery is 78.7 points, no patients died up to more than 1 year follow-ups, they further believe that the greater trochanter has a very important anatomical and biomechanical significance, firm fixation of the greater trochanter could significantly reduce postoperative pain and prevent the femoral pedicle loose. Author believes that: bipolar femoral head replacement should select patients with average age > 70 years old, unstable fractures of Jensen II-III type, greater and less trochanter fragments should be protected during surgery as far as possible to achieve anatomical reduction, severely comminuted greater trochanter is suggested to be firmly fixed using a wire, protecting the greater trochanter fascia, severe osteoporotic patients should be given gentle movements, do not force reamed, to avoid intraoperative fracture.

## REFERENCES

- [1] Liu ZH. Bone mineral and clinical M. Beijing: China Science and Technology Press. 2006:446-460.
- [2] Al-Ani AN, Samuelsson B, Tidermark J, et al. Early operation on patients with a hip fracture improved the ability to return to independent living: A prospective study of 850 patients. J Bone Joint Surg Am. 2008;90(7):1436-1442.
- [3] Siegmeth AW, Gurusamy K, Parker MJ. Delay to surgery prolongs hospital stay in patients with fractures of the proximal femur. J Bone Joint Surg Br. 2005;87(8):1123-1126.
- [4] Parker MJ, White A, Boyle A. Fixation versus hemiarthroplasty for undisplaced intracapsular hip fractures. Injury. 2008;39(7):791-795.
- [5] Leonardsson O, Sernbo I, Carlsson A, et al. Long-term follow-up of replacement compared with internal fixation for displaced femoral neck fractures: results at ten years in a randomised study of 450 patients. J Bone Joint Surg Br. 2010;92(3):406-412.
- [6] Frihagen F, Nordsletten L, Madsen JE. Hemiarthroplasty or internal fixation for intracapsular displaced femoral neck fractures: randomised controlled trial. BMJ. 2007;335(7632):1251-1254.
- [7] Keating JF, Grant A, Masson M, et al. Randomized comparison of reduction and fixation, bipolar hemiarthroplasty, and total hip arthroplasty - Treatment of displaced intracapsular hip fractures in healthy older patients. J Bone Joint Surg Am. 2006;88(2):249-260.
- [8] Alobaid A, Harvey EJ, Elder GM, et al. Minimally invasive dynamic hip screw: prospective randomized trial of two techniques of insertion of a standard dynamic fixation device. J Orthop Trauma. 2004;18(4):207-212.
- [9] Ho M, Garau G, Walley G, et al. Minimally invasive dynamic hip screw for fixation of hip fractures. Int Orthop. 2009;33(2):555-560.
- [10] Chen JS, Zheng Q, Li H. Comparison of dynamic hip screw and proximal femoral nail for treating intertrochanteric fractures in elderly patients. J Zhejiang Medical. 2008;30(1):49-51.
- [11] Hammad A, Abdel-Aal A, Said HG, et al. Total hip arthroplasty following failure of dynamic hip screw fixation of fractures of the proximal femur. Acta Orthop Belg. 2008;74(6):788-792.
- [12] Said GZ, Farouk O, El-Sayed A, et al. Salvage of failed dynamic hip screw fixation of intertrochanteric fractures. Injury. 2006;37(2):194-202.
- [13] Zhang C, Wang PJ, Ruan DK, et al. Complications of surgical treatment for femoral intertrochanteric fractures using dynamic hip screw. Zhongguo Gu Shang. 2009;22(8):624-626.
- [14] Jewell DP, Gheduzzi S, Mitchell MS, et al. Locking plates increase the strength of dynamic hip screws. Injury. 2008;39(2):209-212.
- [15] Zhu TY. Femoral head replacement should not be expanded indications for intertrochanteric fractures J. Clinical Orthopaedics. 1999;2(1):78.
- [16] Gao H. Clinical outcome of femoral head replacement for femoral intertrochanteric fractures or femoral neck fractures in patient over 70 years old. Zhongguo Zuzhi Gongcheng Yanjiu yu Linchuang Kangfu. 2008;12(35):6879-6882.
- [17] Guan CY, Chang Q, Ma YZ, et al. Treatment of senile patients with unstable femoral intertrochanteric fracture: comparison between hemiprosthesis arthroplasty and internal fixation. Zhongguo Gu yu Guanjie Sunshang Zazhi. 2008;23(12):975.
- [18] Faldini G, Grandi G, Romagnoli M, et al. Surgical treatment of unstable intertrochanteric fractures by bipolar hip replacement or total hip replacement in elderly osteoporotic patients. J Orthop Trauma. 2006;7(3):117-121.
- [19] Hsu CJ, Chou WY, Chiou CP, et al. Hemi-arthroplasty with supplemental fixation of greater trochanter to treat failed hip screws of femoral intertrochanteric fracture. Arch Orthop Trauma Surg. 2008;128(8):841-845.
- [20] Gu GS, Wang G, Sun DH, et al. Cemented bipolar hemiarthroplasty with a novel cerclage cable technique for unstable intertrochanteric hip fractures in senile patients Chin J Traumatol. 2008;11(1):13-17.

## 骨质疏松性髋部骨折：不同金属植入物治疗的比较\*

张 寿, 孔长庚, 陈文远, 丁晓莉(中南大学湘雅医学院附属海口医院骨科中心, 海南省海口市 570208)

张 寿, 男, 1955 年生, 教授, 硕士生导师, 主要从事骨质疏松性髋部骨折的治疗研究。

### 摘要

背景: 金属植入物内固定治疗年轻股骨颈骨折患者效果较好, 但有关金属植入物治疗老年股骨颈骨折患者的效果较少见报道。

目的: 比较采用不同金属植入物治疗老年骨质疏松性髋部骨折的效果。

方法: 选择本院 1998-01/2008-12 老年骨质疏松性髋部骨折患者 237 例, 年龄 60~96 岁。采用空心加压螺钉置入内固定治疗 32 例, 解剖钢板置入内固定 23 例, 动力髋螺钉置入内固定 41 例, 双极股骨头置换 111 例, 人工全髋关节置换 30 例。比较各组并发症发生率及髋关节功能恢复情况。

结果与结论: 空心加压螺钉、解剖钢板、动

力髋螺钉置入内固定治疗并发症发生率均明显高于双极股骨头置换、全髋关节置换治疗 ( $P < 0.01$ ); 空心螺钉组、股骨近端解剖钢板、动力髋螺钉置入内固定治疗优良率明显低于双极股骨头置换及全髋关节置换治疗 ( $P < 0.001$ ,  $P < 0.01$ )。结果提示老年骨质疏松性股骨颈骨折应首选人工关节置换(双极股骨头置换或全髋置换), 对 Garden I 型可选用空心螺钉固定, 转子间骨折 Jensen-Evans I ~ II 型可选用动力髋螺钉及股骨近端解剖型钢板置入内固定; Jensen-Evans II ~ III 型骨质疏松性转子间骨折关节置换是理想的选择。

关键词: 老年; 骨质疏松; 髋部骨折; 金属置入物; 医学植入物

doi:10.3969/j.issn.1673-8225.2010.22.046

中图分类号: R318 文献标识码: B

文章编号: 1673-8225(2010)22-04176-05

张寿, 孔长庚, 陈文远, 丁晓莉. 骨质疏松性髋部骨折: 不同金属植入物治疗的比较[J]. 中国组织工程研究与临床康复, 2010, 14(22):4176-4180.

[http://www.crter.org http://cn.zglckf.com]

(Edited by Yang Y/Wang L)

### 来自本文课题的更多信息--

基金资助: 海南省自然科学基金资助项目(30323)。

利益冲突: 无利益冲突。