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นิพนธ์ต้นฉบับ Original Article

Unipolar Hemiarthroplasty for Displaced Fracture of Femoral Neck in the Elderly at Prachuapkirikhan Hospital

การรักษาคอกระดูกต้นขาหักโดยใช้มัวร์พรอสธีสีส ในผู้ป่วยสูงอายุ โรงพยาบาลประจวบคีรีขันธ์

วรวิทย์ ลิมปิวรรณ พ.บ.
กลุ่มงานศัลยกรรม โรงพยาบาลประจวบคีรีขันธ์

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ABSTRACT

Between 2002-2006, 48 cases of displaced fracture of femoral neck were treated by Moore prosthesis on the basis of limited life expectancy and didn't expect high functional quality. Immediately post operative complications e.g. death, pneumonia or bedsore were not found. The average age was 74 years old (56-91 years) and the length of follow up was from 1 month to 1 year, Three cases were loss of follow up and the other 2 cases had superficial infection and 1 case had dislocation. There was no acetabulum erosion. Forty cases of them could regain functional activity as before surgery. In this study we found that these cases had low body weight with average of 54.96 kgs. (range 50-65 kgs.) We concluded that Moore hemiarthroplasty had a place in the treatment of displaced fracture of femoral neck of the elderly especially in cost-benefit implication.

บทคัดย่อ

ในระหว่างปี พ.ศ. 2545-2549 ได้ทำการรักษาผู้ป่วย 48 ราย ที่มีกระดูกต้นขาหัก โดยการใช้ Moore prosthesis ในผู้ป่วยที่คาดว่าจะมีอายุไม่ยืนยาวต่อไปนัก และไม่คาดหวังการใช้งานสูง ไม่พบภาวะแทรกซ้อนหลังการผ่าตัด เช่น ตาย ปอดบวม หรือแผลกดทับ อายุเฉลี่ย 74 ปี (56-91 ปี) และเวลาในการติดตามผลการรักษาจาก 1 เดือน - 1 ปี ขาดหายจากการติดตามผลการรักษา 3 ราย และที่เหลือ 45 รายนั้น พบว่า มีการติดเชื้อในชั้นตื้น 2 ราย และสะโพกที่ผ่าตัดหลุด 1 ราย ไม่พบว่ามีการผุกร่อนของ Acetabulum ผู้ป่วย 40 ใน 45 ราย สามารถมีการฟื้นกลับของการทำงานของร่างกายส่วนล่างได้เท่ากับก่อนผ่าตัด ในการศึกษานี้ พบว่าผู้ป่วยไทยเหล่านี้ค่อนข้างจะมีน้ำหนักตัวน้อย คือ เฉลี่ย 54.96 กิโลกรัม (50-65 กิโลกรัม) สรุปได้ว่า การเปลี่ยนข้อสะโพกโดยใส่ Moore prosthesis ยังมีใช้ในการรักษาการหักของกระดูกต้นขาบริเวณคอกระดูกในผู้ป่วยสูงอายุ และเมื่อเทียบกับราคาวัสดุและผลที่ได้นับว่าคุ้มค่า

Introduction

In 1948, the Judet brothers designed a vitallium prosthesis to serve as a replacement of proximal femur with giant cell tumor. This prosthesis served as prototype of Moore self locking prosthesis.[1] Eicher introduced a stainless steel endoprosthesis in 1950 and Thompson developed a vitallium prosthesis in 1954. Bateman[2] and Gilberty[3] reported on the development of a bipolar femoral head prosthesis to reduce the rate of acetabular erosion and dislocation. Nowadays total hip replacement gain increasing popularity because many authors found that those treated with unipolar hemiarthroplasty had problems of acetabulum erosion and stem loosening

The management of fractures of femoral neck remains major challenge to the orthopaedics surgeon. Despite greater knowledge about biomechanics, equipment, vascular supply of the hip joint, no universally accepted treatment currently exists. The choice are :

1. Internal fixation and preservation of the femoral head
2. Unipolar hemiarthroplasty or bipolar hemiarthroplasty
3. Primary total hip arthroplasty

Kwok and Cruess[4] reviewed 599 cases of Moore & Thompson hemiarthroplasty in 1982 and concluded that meticulous surgical technique was the key to the success of procedure. These important points are :

1. Proper head size
2. Proper neck length
3. Prosthesis stem shaft angle
4. Calcar seating of the prosthesis

We would like to study the efficacy of Moore unipolar hemiarthroplasty in selected group of patients in Prachuapkirikhan area.

Materials and Methods

Forty-eight cases of displaced fracture of femoral neck treated by Moore prosthesis were reviewed. These cases were operated between 2002-2006. There were 16 men and 32 women, with an average age of 74 years (range 56-91 years). The shortest follow up was 1 month and the longest was 1 year. Only those patients who returned to follow up, both clinical and radiographic evaluation were participated in this study. 42 out of 48 patients were typical displaced femoral fracture, and were caused by fall from a height with only 6 cases from road accident.

One aspect that we paid attention to was relatively low body weight in these patients (average 54.96 kg.) compared with high body weight found in the study of Gilbert.[5] The main medical illnesses

Fig. 1 Preoperative film of displaced fracture of femoral neck.

found in these 48 patients were 8 with hypertension, 6 with myocardial disease and 4 with diabetes.

After the assessment and resuscitation of these patients was performed, a planning to do hemiarthroplasty with Moore type within 2-5 days after admission. Every cases received cefazolin 1 gram for prophylaxis, followed by 1 gram every 6 hours for 3 days after operation.

Operative Technique

With the patients lying on lateral position, we used the posterior approach advocated by Osborne[7] in every cases. Piriformis muscle was identified and act as a landmark to approach the posterior part of the hip capsule. With staysuture, the external rotators were incised and retracted medially to protect sciatic nerve from injury. After exposure of posterior capsule without resection of greater trochanter, displace the femoral neck posteriorly. Remove the head from the acetabulum with the trial to preserve the acetabular cartilage, and isolate the stump of the femoral neck into the wound. With a rasp, open and reshape the medullary canal for the stem to be in 10 degrees anteversion and press fit. Preserve the calcar (posteromedial cortex of the neck) and obtain correct neck length of about one-haft to three-quarters of an inch. A flat weight bearing surface without bone spike protruding superiorly and proper prosthetic stem-shaft angle was necessary. A difference of greater than 5 degrees results in a varus position. These things were recommended by Kwok.[4] Now measure the femoral head using the caliper and trial fit into the acetabulum was usually attempted prior to insertion into the femoral shaft. Cementing or non-cementing of the stem is controversary. In our series, about 4 cases need cementing and the remaining cases used acrylic cement for firm fixation.

After reducing the prosthesis into the acetabulum, we had firm suturing of the posterior capsule with suture of external rotator muscle as a reinforcement and closed the wound as usual manner. The average operating time was 45 minutes.

Postopreative Care

Skin traction of the limb in abduction and external rotation was recommended in the first 3 days. Early motion was started when general condition permitted.

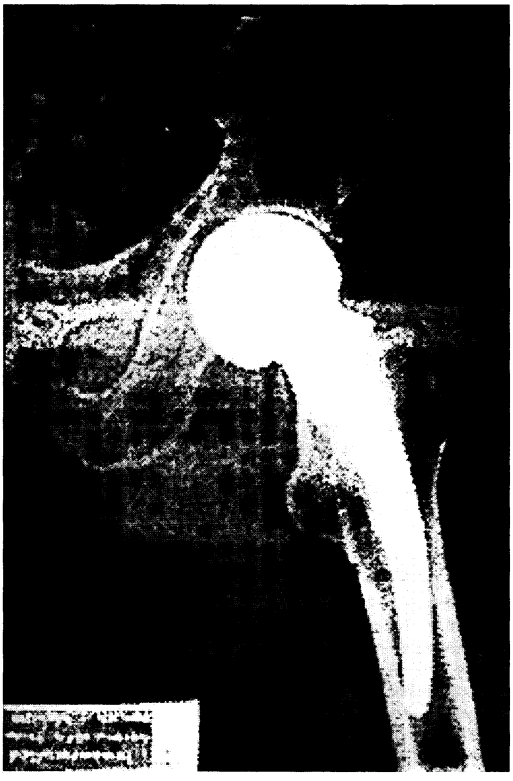

Fig. 2 Postoperative film showed displace fracture of femoral neck after insertion of Moore prosthesis.

Result

After discharged from hospital, we had a follow up program at 1, 3, 6 and 12 months post-operatively. All 45 cases were evaluated by both physical and radiographic examination. An arbitrary rating system was estrablished consisting of pain, degree of joint mobility and ambulating compared to preinjury level, and the last was radiographic result.

After 3 months, 40 patients (88.87 percent) rated as good had no pain, moderate joint mobility and could maintain their previous activity level. Only 5 patients rated as fair in our study had mild discomfort and used assistive devices eg. Canes and walker which they had not needed before.

As for the complication, two cases of superficial wound infection were revealed and responsed well to antibiotic therapy. One case of dislocation was found on the 4th postoperative day and could be reduced by closed method under general anesthesia without stem breakage. No case of acetabular erosion and deep wound infection was found.

Discussion

The displaced fracture of femoral neck continues to be difficult to manage. Successful union of fracture by internal fixation without avascular necrosis achieves the best goal. Here are some factors concerning the complicated treatment of those fracture.

Vascular Anatomy

Trueta and Harrison[8] by using injection technique studied the vascular anatomy of the proximal aspect of the femur and conclude that :

A. Lateral epiphyseal artery (branch of medial femoral circumflex) supplies most of femoral head.

B. Inferior metaphyseal vessel (terminal artery of the ascending branch of lateral femoral circumflex) supplies more distal metaphyseal bone anteriorly and inferiorly.

C. Artery of ligamentum teres from obturator system is the third source of blood supply.

Fracture of the femoral neck diminishes the blood supply to the femoral head and correlates with the severity of the displacement of the bones. Some vessels may be torn or intracapsular hematoma may elevate the pressure enough to occlude the venous system or limit arteriolar flow in reticular reflection of femoral neck.

Classification

The two most common classifications of displaced femoral neck patients are those of Pauwels (fig.3) and Garden (fig. 4)

Choices of Treatment

Swiontkowski[9] recommended that patients who are less than 65 years old and do not have a chronic illness should be managed with immediate reduction and internal fixation. Patients who are more than 75 years old should be managed with prosthetic replacement. But in this study, we used the criteria of old physiologic age which was arbitrary selected at 60 years old.

Bipolar hemiarthroplasty was designed to produce less acetabular erosion and dislocation but it has not been proved conclusively. Although dis-

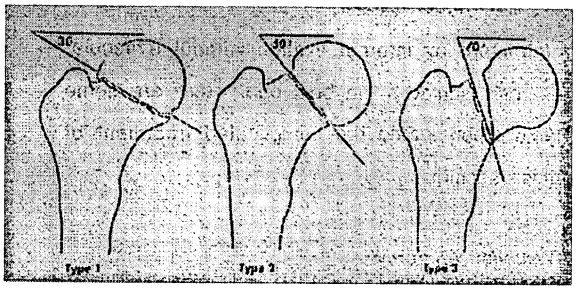

Fig. 3 Pauwels, classification of fracture of Neck of femur according to angle of Inclination.

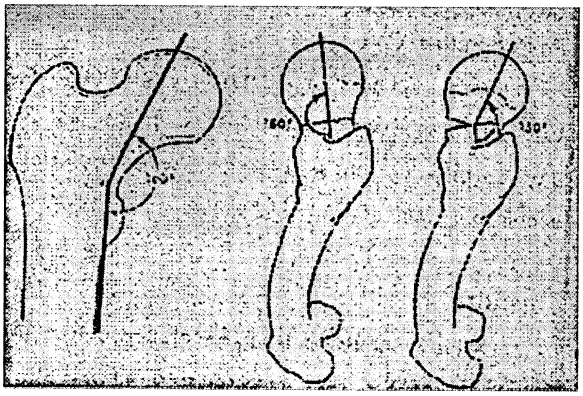

Fig. 4 Garden's alignment index. (From DeLee JC : Fracture and Dislocation of the hip. In : Rockwood CA, Jr, Green DP, eds. Fracture in adults. 2 nd ed. Philadaphia : JB Lippincott, 1984.)

locations of bipolar prosthesis are less frequent than unipolar devices, most dislocation of bipolar prosthesis have to be treated with an open reduction. So bipolar procedure is suitable for the elderly but moderately active patient.

Prosthetic Replacement Compared with Internal Fixation

There has been much controversy about whether prosthetic replacement or internal fixation is preferable for patients who are more than 65 years old. Hunter[10] reviewed the literature on prosthetic replacement and reported that the rate of clinically poor results was 28 percent ; dislocation 0.3 to 11 percent ; infection 2-42 percent ; and six month mortality rate was 14-39 percent. All of those percentage were substantially higher than those after internal fixation. But Holmbergs reported that the rate of complications was lower after prosthetic replacement (15 percent) than after internal fixation (37 percent).[11]

However the finding of the most carefully analysed case series revealed that :

1. At 6 months, 16 percent with internal fixation had failure of fixation but only 2-3 percent of those with hemiarthroplasty had a dislocation of the prosthesis.

2. At an average of two year follow up, 32 percent with internal fixation had a non-union and 16 percent had avascular necrosis

The need for reoperation after internal fixation was 35 percent at two years ; that was higher than after unipolar hemiarthroplasty at 3-6 years postoperatively (16 percent).

Cemented Versus Non-cemented Prosthesis

6.1 percent of cemented prosthesis became loose as compared with 11.7 percent of those without cement. Gingras[12] concluded that methylmethacrylate was helpful in anchoring intramedullary stem prosthesis but its use should not be routinely.

Four major objections to the routinely use of

cement are :

1. Increased acetabular wear.
2. Infection : cement would complicate eradication of infection.
3. Fracture below prosthetic stem.
4. Reoperation : cement would make revision more difficult.

Contraindication for the Use of Moore Hemiarthroplasty

1. Active hip infection
2. Advanced osteoarthritis involving acetabulum
3. Rheumatoid arthritis
4. Young patients

We found Moore Unipolar Hemiarthroplasty very useful in the treatment of displaced fracture of femoral neck in the eldery at Prachuapkirikhan hospital in properly selected group of patients. With meticulous surgical technique and probably low body weight in our patients make the use of Moore had fewer complications and even better in cost-benefit implication.

Summary

A retrospective study of Unipolar Hemiarthroplasty was done in 48 cases of displaced fracture of femoral neck in the elderly at Prachuapkirikhan hospital. They were groups of people with limited life expectancy and had not high demand of function level. No serious postoperative complication was found and 86.67 percent of these patients could regain ambulation as before surgery. With meticulous surgery technique, we found that Unipolar Hemiarthroplasty had a place in the treatment of displaced fracture of femoral neck in the elderly especially in cost-benefit implication.

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