Radiographic Manifestation of Hip Dislocation after Total Hip Arthroplasty

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Objective: *The authors hypothesized that a patient who has posterior hip dislocation after total hip replacement does not have the same clinical manifestations of malposition as with a natural hip. The present study aimed to study clinical manifestation of hip dislocation after total hip arthroplasty.*
Material and Method: *Thirty-five cases of posterior dislocation after total hip replacement were retrospectively studied by medical records and radiographic evaluation. The study included leg position after hip dislocation, leg length, and leg abduction/adduction angles.*
Results: *External rotation of the patient's leg was found in 13 cases (37.1%), neutral position in six cases (17.2%), and internal rotation in 16 cases (45.7%). Measurements of the femoral shaft-vertical axis angle found adduction in 17 cases (average 17.4 degrees, range 1-25 degrees), abduction in 15 cases (average 6 degrees, range 1-15 degrees), and 0 degrees in three cases. Average leg shortening was 3.55 cm (range 0.6-13.5 cm).*
Conclusion: *The present study shows that patients with hip dislocation after hip replacement can manifest many signs of limb deformity in rotation (internal, external, and neutral) and abduction/adduction positions.*

Keywords: *Total hip replacement, Dislocation, Clinical manifestation, Leg position*

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Total hip replacement is a procedure that is highly successful in relieving pain and improving function[1,2]. However, the incidence of hip dislocation after total hip replacement was reported 0.3 to 10%[3-13]. A patient who has a dislocated hip usually has pain and leg position deformity. After a patient has a posterior dislocated hip in a natural hip, the affected limb usually experiences shortening and malposition (flexion, adduction, and internal rotation)[14]. However, the authors observed that patients who had posterior hip dislocation after total hip replacement did not have clinical manifestations in malposition the same as a natural hip dislocation.

The primary study goal was to evaluate patients who had posterior hip dislocation after total hip replacement, to determine the clinical manifestations that followed hip dislocation. The secondary goal was to study the details of the activity that produced a dislocated hip, onset of hip dislocation after index operation, successfulness of closed reduction for initial treatment and the rate of redislocate.

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Material and Method

The present study was approved by the Siriraj Institutional Review Board, Faculty of Medicine, Siriraj Hospital, Mahidol University. Patients who presented to Siriraj hospital with a diagnosis of the first time posterior hip dislocation between January 1, 2004 and December 31, 2010 with a history of total hip replacement were included in the present study. Thirty-five cases were retrospectively studied.

The diagnosis was confirmed with AP and Lateral cross table x-ray of the dislocated hip. The retrospective series included 20 men (57.1%) and 15 women (42.9%) with a mean age of 62.8 years old (range 24-82). The average body mass index was 27.2 (range 18.2-34.1). Twenty-five cases (71.4%) were dislocated after primary hip arthroplasty and 10 cases (28.6%) were dislocated after revision hip arthroplasty.

The main indication for total hip replacement was primary osteoarthritis in seven cases (20%), avascular necrosis in six cases (17.1%), developmental hip dysplasia in five cases (14.3%), aseptic loosening in four cases (11.4%), post traumatic osteoarthritis in

three cases (8.6%), post infective osteoarthritis in three cases (8.6%), carcinoma metastasis in two cases (5.7%), periprosthetic fracture in one case (2.9%), rheumatoid arthritis in one case (2.9%), and protrusio acetabuli in one case (2.9%). All arthroplasties were performed by the posterior approach.

All patients were retrospectively studied by medical record and radiographic evaluation. The authors analyzed the activity of the patients when they experienced hip dislocation, time of dislocation after surgery, initial treatment, redislocation rate after initial closed reduction, and leg position of the patients after hip dislocation.

The radiographic evaluations were done by reviewing a standard AP and lateral cross table X-ray of the hip. The differences of leg length were measured from the before and after films of the dislocations by measuring the vertical distance from the inter-ischial line to the lesser trochanter. Leg abduction/adduction angles were measured by comparing the femoral shaft axis to the midline vertical axis (Fig. 1).

Statistical analysis

Descriptive analysis (number, percentage, mean, range) was performed for data analysis.

Results

The present study shows that 17 cases (48.6%) were dislocated when changing position lying in bed, nine cases (25.7%) were dislocated after fell down, five cases (14.3%) were dislocated when stand up from a chair, four cases (11.4%) were dislocated when bend forward while standing.

Data showed that 10 cases (28.6%) had dislocated hip within the first two weeks after total hip replacement, six cases (17.1%) from the second through the fourth week after the operation, two cases (5.7%) from the fourth through the sixth week, two cases (5.7%) from the sixth week through the third month, five cases (14.3%) from the third month through the sixth month, two cases (5.7%) from the sixth month to the end of the first year, three cases (8.6%) from the end of the first year to the end of the second year, and five cases (14.3%) after the second year (Fig. 2).

In 13 cases (37.1%), the patient's leg position was found radiographically in the external rotation position, six cases (17.2%) were in the neutral position, and 16 cases (45.7%) were in the internal rotation. Adduction in the femoral shaft-vertical axis angle was found in 17 cases (average 17.4 degrees, range 1-25 degrees), abduction in 15 cases (average 6 degrees, range 1-15 degrees), and 0 degrees in three cases. The average leg shortening compared to prior dislocated X-rays was 3.55 cm (range 0.6-13.5 cm).

Thirty-two cases (91.4%) had successful initial closed reduction and three cases (8.6%) needed open reduction. However, 17 cases (53.1%) of the successful closed reduction had recurrent dislocated hip within the average 2-years follow-up.

Discussion

Posterior hip dislocation after total hip replacement with devastating complications has become the second highest cause of revision surgery after aseptic loosening[6,7,15]. The onset of dislocation after total hip replacement was reported in many previous studies. They found that 85% of dislocations occurred in two months after the operation and 60% of the dislocations occurred within five weeks after the operation[4,16-18]. The present study found that 51.4%

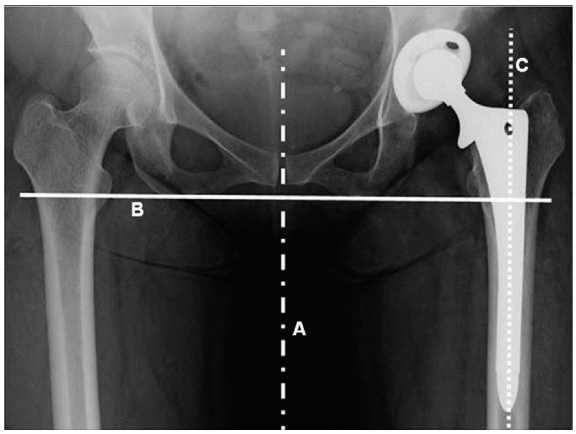

Fig. 1 Hip AP x-ray (A) midline vertical axis, (B) inter-ischial line, (C) femoral shaft axis.

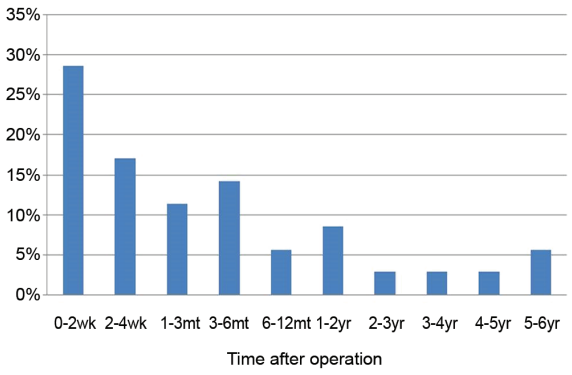

Fig. 2 Onset of hip dislocation after operation.

of dislocations occurred within six weeks post operation, which is not much different from the previous study. The present study showed that most dislocations occurred during normal daily activities such as changing position lying in bed and stand up from a chair instead of trauma which is the same as a previous report[19].

The present study reports the details of the position of the patient's limb after dislocation occurred. The authors found that the position of the patient's limb after a dislocated hip was different between the total hip replacement patient and the natural hip.

The patient with a hip dislocation who has not had a hip replacement usually has classic limb deformity in flexion, internal rotation, and adduction position[14]. However, the present study shows that patients with hip dislocation who had a replacement hip can manifest many signs of limb deformity in rotation (internal, external, and neutral), and abduction/adduction position. This may be from the size of the head and neck prosthesis, which is smaller than the natural femoral head and neck. Therefore, the head and neck prosthesis in dislocated hip has more space to move when went out of the acetabulum. In contrast, in a natural hip the femoral head and neck usually impinge on the posterior part of the acetabulum.

The recurrent rate following successful closed reduction after dislocation was reported in 22-33% of patients in previous studies[19,20]. The authors found a higher rate of redislocation (53.1%) after closed reduction was performed compared to the previous studies.

In conclusion, the patient with hip dislocation after hip replacement can manifest many signs of limb deformities. Good history taking, physical examination and radiographic evaluation are important steps for diagnosis hip dislocation after hip replacement.

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What is already known on this topic?

The present study found that more than half of dislocations occurred within six weeks after the operation and most dislocations occurred during normal daily activities such as changing position lying in bed and stand up from a chair.

The clinical manifestation of posterior hip dislocation in a normal hip was reported. The classic clinical sign is leg position deformity (shortening, flexion, adduction, and internal rotation).

What this study adds?

The present study shows that the position of the patient's limb after a dislocated hip was not same as classic limb deformity of posterior hip dislocation in a natural hip.

The patient with hip dislocation who had a total hip arthroplasty can manifest many signs of limb deformity in rotation (internal, external, and neutral), and abduction/adduction position.

Potential conflicts of interest

None.

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อาการแสดงในผู้ป่วยที่มีภาวะข้อสะโพกหลุดหลังการผ่าตัดเปลี่ยนข้อสะโพกเทียม

วราห์ ยืนยงวิวัฒน์, คณินทร์ เอี่ยมธนาภรณ์, ทศศาสตร์ หาญรุ่งโรจน์

วัตถุประสงค์: *คณะผู้นิพนธ์มีสมมติฐานว่าผู้ป่วยที่มีภาวะข้อสะโพกหลุดหลังการผ่าตัดเปลี่ยนข้อสะโพกเทียมมีอาการแสดงที่แตกต่างจากการหลุดในผู้ป่วยข้อสะโพกปกติ การศึกษานี้ทำเพื่อศึกษาอาการแสดงของผู้ป่วยที่มีภาวะข้อสะโพกหลุดหลังการผ่าตัดเปลี่ยนข้อสะโพกเทียม*

วัสดุและวิธีการ: *ผู้ป่วย 35 ราย ที่มีประวัติข้อสะโพกหลุดหลังการผ่าตัดเปลี่ยนข้อสะโพกเทียม ได้ทำการศึกษาย้อนหลังโดยการเก็บข้อมูลจากเวชระเบียนและภาพถ่ายรังสี โดยทำการเก็บข้อมูลตำแหน่งของขา ระยะความยาวขา การศึกษามุมการเคลื่อนของขาเข้าหาและออกจากแกนกลางของร่างกาย*

ผลการศึกษา: *พบการหมุนออกของขาผู้ป่วย 13 ราย (37.1%), ท่าปกติ 6 ราย (17.2%) และการหมุนเข้าของขาผู้ป่วย 16 ราย (45.7%) ผลจากการวัด femoral shaft-vertical axis angle ในภาพถ่ายรังสี พบมีการเคลื่อนของขาเข้ามาหาแกนกลางของร่างกาย 17 ราย (เฉลี่ย 17.4 องศา, ระยะ 1-25 องศา) พบมีการเคลื่อนของขาออกจากแกนกลางของร่างกาย 15 ราย (เฉลี่ย 6 องศา, ระยะ 1-15 องศา) และทำมุมศูนย์องศา 3 ราย พบค่าเฉลี่ยระยะความสั้นของขา 3.55 ซม. (ระยะ 0.6-13.5 ซม.)*

สรุป: *การศึกษานี้แสดงให้ทราบว่าผู้ป่วยที่มีภาวะข้อสะโพกหลุดหลังการผ่าตัดเปลี่ยนข้อสะโพกเทียมมีอาการแสดงของการผิดรูปของขาได้หลายลักษณะในการหมุนของขา (มีการหมุนเข้า, หมุนออก หรืออยู่ในท่าปกติ) และการเคลื่อนของขาเข้าหาหรือกางออกจากแกนกลางของร่างกาย*
