Treatment of Severe Valgus Knee Deformity in Patients with Ipsilateral Coxarthrosis: A Report of Five Cases

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Objective: Adjacent joints including hip joints and knee joints mutually affect each other due to leg length discrepancy and extremity malposition, and severe deformity of these joints may progress. Coxitis knee is the name applied to the particular form of osteoarthritis associated with ankylosis or fixation of the hip joint. Rotational limitations of hip joint and leg length discrepancy cause severe stress to the coxitis knee during walking, resulting in external rotation of the tibia and valgus deformity of the knees, which increase the load on the knee.

Materials: In this paper, we describe five cases of total knee arthroplasty performed for severe valgus deformity in patients with ipsilateral coxarthrosis. We investigated the conditions and issues of concern in these patients and report the outcomes.

Conclusions: Since the condition of the hip joints is significantly related to valgus knee, it is necessary to carry out comprehensive investigation of the alignment of the legs including not only knee joints but also hip joints. If there is no other option but surgical treatment of the knee joints, then this approach must be prioritized and various efforts must be made.

Key words: valgus knee deformity, coxarthrosis, coxitis knee, total knee arthroplasty

Introduction

Relationships are often found between osteoarthritis and rheumatoid arthritis of the hip and valgus knee deformity1)−4). This is due to the fact that adjacent joints including hip joints and knee joints mutually affect each other due to leg length discrepancy and malposition of the extremity, and severe deformity of these joints may progress.

In the present study, we describe five cases of total knee arthroplasty (TKA) performed for severe valgus deformity in patients with ipsilateral coxarthrosis. We investigated the conditions and issues of concern in these patients and the outcomes are reported in the present study.

Case 1

A 70 year old female. Main complaints included pain in the left knee, valgus deformity of the left leg and impairment in walking. When she was 12 years old, she suffered from osteomyelitis at the proximal part of left tibia and required bed rest in the hospital for 3 months. Since then, movement of the left and right hip joints deteriorated and stayed in almost an ankylosis. Thereafter, valgus deformity of the left knee advanced and pain was reported. Duration of her walking capacity lasted for about 15 min. even with use of a walker. There was no pain in the left hip joint. Range of motion (ROM) of the left knee was $-10^\circ$ in extension, $55^\circ$ in flexion, a femoro–tibial angle (FTA) of left leg was $154^\circ$. Although priority of the treatment for the left hip joint was explained, no consent was obtained. Thus, TKA was chosen for the left knee exhibiting the greater pain. In the operation, the adductor muscle of the left hip joint was initially separated. Subsequently, TKA was performed for the left knee. Since the medial collateral ligament was strongly loosened and instability was unable to be controlled, a semi-constrained type of TKA was needed. After the operation, no pain was reported and the patient was capable of walking without a
cane, but mild knee valgus instability remained. In the future, treatment for the hip joint seems to be necessary (Figure-1a, b).

**Case 2**

A 58 year old female. Main complaints included left knee pain, valgus deformity and abnormal valgus instability of the left knee. Congenital dislocation of the left hip joint was surgically treated when she was young, but the details were unknown. Recently, left knee pain slowly worsened and after the left knee was sprained when she fell down two months ago, an abnormal instability was detected at the left knee. There was no pain in the left hip joint. The ROM of left knee joint had 0° in extension, 100° in flexion. FTA of left leg was 155°, exhibited a marked valgus deformity of the left leg. Since no pain was reported despite advanced deformation of the left hip joint, the patient herself did not wish surgical treatment for the hip joint. Because of marked instability of the left knee as well as necessity of the stability, left knee TKA was performed. Using a semi-constrained type of TKA, instability could be controlled as much as possible. Although up and down movement of the body was observed due to limitation of the hip joint mobility, there was no pain in the left knee joint and the patient could walk without use of a cane (Figure-2a, b).

**Case 3**

A 74-year-old female suffering from osteoarthritis received total hip arthroplasty in another hospital in 1987 for the left hip joint and in 2001 for right hip joint. After the right THA, valgus deformity of the right knee and pain were intensified and gradually walking became difficult. The ROM at the right knee joint was 0° in extension, 80° in flexion. There was no pain in either hip joint. FTA of the right leg was 155° exhibiting serious valgus deformity. A leg length discrepancy was detected showing that the right leg was longer by 3 cm. In surgery, a posterior stabilizer type of TKA was applied. Due to strong tension of lateral side of the knee, the iliotibial tract was partially

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**Figure-1** Case 1: Radiographs showing (a) severe valgus deformity of the left knee and severe ankylosis of the left hip in excessive adduction; (b) The knee was replaced to improve alignment of the left leg.

**Figure-2** Case 2: Radiographs showed (a) marked valgus deformity of the lower extremity with left coxarthrosis; (b) TKA was performed using semi-constrained type of TKA.
separated and finally alignment was obtained (Figure-3a, b).

**Case 4**

A 75 year old female. The present medical history indicated the onset of rheumatoid arthritis at the age of 14. Right THA was performed 15 years ago and left THA was also performed 12 years ago. Subsequently, loosening appeared at the acetabulum side of the right hip joint recently and valgus deformity of the right knee and pain were also reported. The ROM of the right knee had $-30^\circ$ in extension, $45^\circ$ in flexion. The FTA was revealed $152^\circ$, exhibited marked valgus deformity. As for treatments, initially revision surgery of hip joints was performed using a Kerboull cross and polyethylene cup. Two months later, a right TKA was performed. Knee pain disappeared postoperatively and ROM became $0-80^\circ$, but due to instability of the knee, a knee supporting device is used while walking (Figure-4a, b).

**Case 5**

The patient was an 82-year-old female with left knee pain and valgus deformity of the left lower limb. In 2005, she underwent left THA. After the operation, the left hip joint was painless and presented no problems. However, deformation and high dislocation of the right hip joint gradually progressed. The left lower limb became functionally long due to marked pelvic inclination, and severe claudication was observed. There was no pain in the right hip joint. The ROM of the left knee was $-35^\circ$ in extension and $90^\circ$ in flexion. The FTA was $165^\circ$. Although there was no pain in the right hip joint, we recommended surgery for leg length correction to achieve balance, but she refused it and eagerly desired surgery for the painful left knee. For surgery, TKA using the posterior stabilizer type was performed. Considering the strong varus/valgus force imposed on the implant, stems were used for both the femoral and tibial implants. At present, the ROM of the left knee is slightly restricted ($-10$ to $95^\circ$), but she can walk using a T cane without
pain (Figure-5a, b).

**Discussion**

Subjects selected were five patients including 2 cases of treatment performed for knees due to the presence of severe deformity in the ipsilateral hip joints exhibiting no pain and 3 other cases of the presence of severe valgus knee deformity of the ipsilateral knees after the total hip arthroplasty of the hip joints. All cases exhibited severe valgus deformity and pain and claudication while walking were present so that this activity of daily life was severely impaired. Since various kinds of conservation treatments were invalid, TKA was performed.

Complications of hip joint deformity with valgus deformity of the coxitis knee are characteristic. The coxitis knee\(^5\) is a deformity found when the screw-home movement is limited while walking due to fixation of the hip joints and adduction contracture so that a stress is applied to the coxitis knee to cause abduction of the tibia and valgus deformity of the knees. This corresponds to Cases 1 and 2 in the present study. Also, as long leg arthropathy\(^6\), shortening of legs in advanced dislocation of the hip joints is compensated by genu valgum and knee flexion at the long leg side, but in this case, arthrosis of hip joint may be associated. In addition, inclination of the pelvis may occur due to pain and muscle impairment in the coxarthritis which may functionally result in adduction of the hip joint and relative long leg arthropathy. As in Case 3 of the present study, leg length discrepancy may occur iatrogenically to induce valgus deformity of the legs. Further, as in the Case 4 of the present study, knee valgus deformity was found in RA and the deformity may be complicated with deformity of the hip joints. As therapeutic measures, according to Romness et al.\(^7\), the group with TKA after release of ankylosis in THA and the group with TKA alone were compared in 16 cases of ankylosis of hip joints. Although there were no differences in the results, it was reported that if the position of the ankylosis is bad, THA of the hip joints should proceed. According to Rittermeister et al.\(^8\), THA

![Figure-5 Case 5: Radiographs showed (a) deformation and high dislocation of the right hip joint. (b) The left lower limb became functionally long due to marked pelvic inclination and showed valgus deformity.](image-url)
was performed in 18 patients with hip joint contracture and the group with TKA and the TKA without THA group were compared. It was reported that the TKA group after THA indicated better knee scores. Thus, it was concluded that the treatment of hip joints should be prioritized. However, in the case when it is difficult to obtain patient agreement for an operation of the hip joints without pain and in the case when it is necessary to acquire walking ability earlier due to strong instability of the knees, there are cases when the treatment of the knee joints must proceed. In the surgery prioritizing knees, some effort must be made. If flexion of the knees cannot be obtained sufficiently due to the limitation of the ROM of the hip joints, a method using an femoral intramedullary rod by simultaneously lifting both thighs and pelvis while making flexibility of the hip joints at the opposite side possible and an operation table where the lower thigh can be descended must be provided. In addition, use of navigation is also another choice. Further, if functional failure of the ligament is prominent, it is difficult to adjust the amount of the bone cutting and ligament balance, and selection of a constricted type device becomes necessary. In addition, a method for regaining tension of the loosened ligament and ligament reconstruction may be needed. Since early training of the mobile area is necessary in the case of elderly patients, application of soft tissue reconstruction must be done carefully.

Conclusions

1. We investigated five cases of performance of TKA for the severe coxitis valgus knee in association with hip joint arthritis with respect to the mechanisms of onset, therapeutic methods and the points of concern.

2. Since the conditions of the hip joints are significantly related to the valgus knee, it is necessary to carry out comprehensive investigation of the alignment of the legs including not only knee joints but also hip joints.

3. If there is no other way but that the surgical treatment of knee joints must be prioritized, various efforts must be made.

References