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A Case of Simultaneous Total Knee Arthroplasty in Congenital Dislocation of the Patella

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Abstract

The gonarthrosis with congenital dislocation of the patella is rare condition. This paper will report about total knee arthroplasty (TKA) for the valgus knee with bilateral congenital dislocation of the patella. A 52-year-old woman presented to our hospital with progressive pain in bilateral knees. Both knee showed severe valgus deformity and lateral dislocation of the patella. Anteroposterior weight-bearing radiographs showed osteoarthritic changes in the lateral compartment with 7˚ valgus deformity at the right and 15˚ at the left. A bilateral TKA with cruciate retained components (NAKASHIMA FINE) was performed. Good tracking of the patella was achieved by using a lateral parapatellar approach and vastus medialis plication. There are no normative guidelines of operative procedure about TKA for osteoarthritis of valgus knee with congenital dislocation of the patella. With some referencing to current literature, strategies to acquire good patella tracking are discussed.

Keywords

Total Knee Arthroplasty, Congenital Dislocation of the Patella, Chronic Patellar Dislocation

1. Introduction

Total knee arthroplasty (TKA) for osteoarthritis of the knee with congenital dislocation of the patella is rare. The patellar dislocation causes an increasing of Q-angle, hypoplasia of femoral trochlear surface, abnormal rotation of the femoral and tibia bone, all of which may lead to secondary osteoarthritis of the valgus knee [1]. TKA is one of the useful treatment for such patients and various surgical techniques have been reported [2]-[8]. This paper will report the detail

about the surgical procedure of TKA for the valgus knee with bilateral congenital dislocation of the patella.

2. Case Presentation

A 52-year-old woman presented to our hospital with progressive pain in bilateral knees. She had a history of dislocation of the left knee as an elementary student and of the right knee at the age of 41, but no treatment was undertaken. Though she had pain and instability when standing straight, she could walk for long hours without a stick. Both knee showed severe valgus deformity and lateral dislocation of the patella. The passive range of flexion was between 10˚ and 95˚ on the right side and between 10˚ and 120˚ on the left side. There was an extension lag of 50˚ at the left knee and no extension lag at the right. She had no other significant medical problems.

Anteroposterior weight-bearing radiographs showed osteoarthritic changes in the lateral compartment with 7˚ valgus deformity at the right and 15˚ at the left. The left and right skyline radiographs demonstrated complete dislocation of the patella through the entire range of motion (Figure 1).

3. Surgical Procedure

Abilateral TKA with cruciate retained components (NAKASHIMA FINE) was performed.

Lateral longitudinal skin incisions were made. As a result of the lateral dislocation of the patella, the vastus medial is muscle was located on the anterior aspect of the distal femur.

Bilaterally, there was an absence of the femoral sulcus and hypoplasia of the lateral condyle, and the patella was separated from lateral musculotendinous

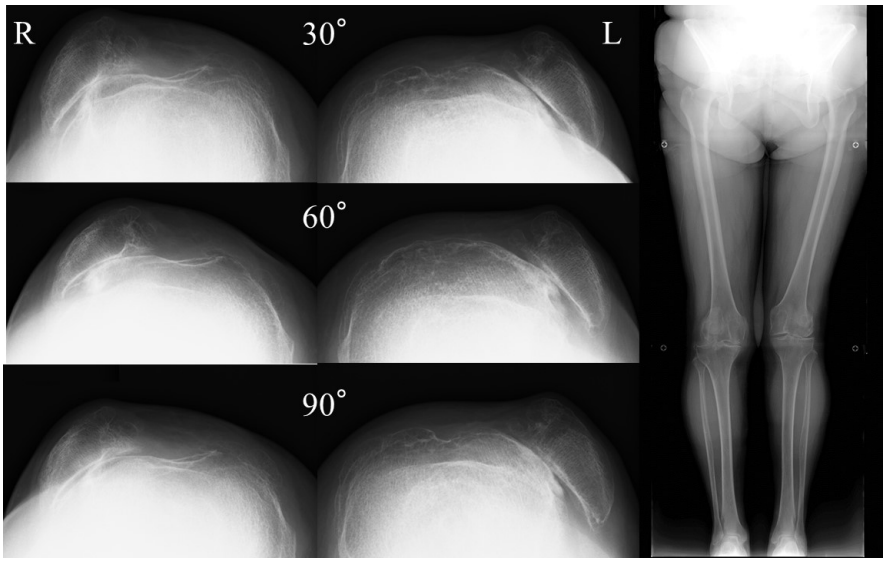
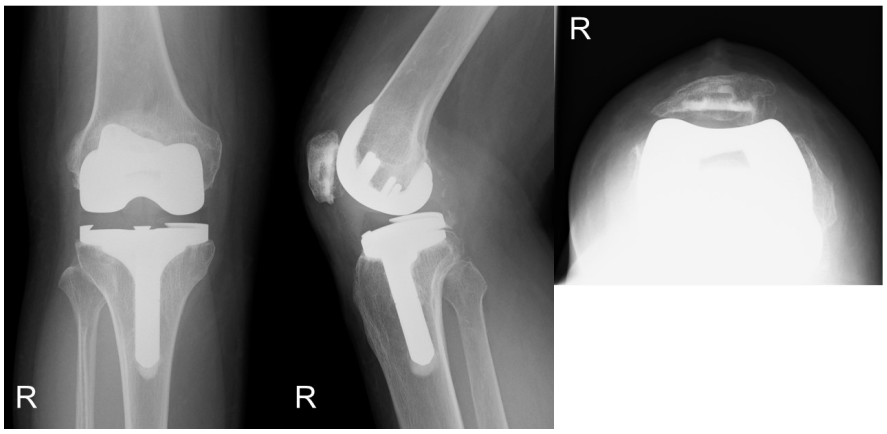


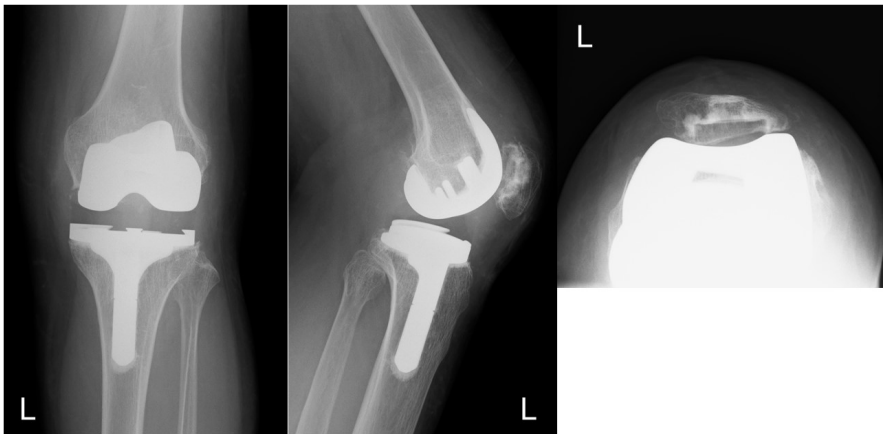
Figure 1. Preoperative radiographs: Skyline radiographs demonstrated complete dislocation of the patella. Anteroposterior weight-bearing radiographs showed 7˚ valgus deformity at the right and 15˚ at the left.

retinaculum. Femoral bone cutting and cementing of the implant was aligned with the clinical epicondylar axis. The tibial component was aligned with the tibial tuberosity. The patella could not be repositioned in the patellar groove only with the lateral releasing of musculotendinous retinaculum, so the vastus medialis muscle was sutured to the lateral edge of the quadriceps tendon. Then, the patella tracking could be confirmed to be in a good position. However, due to the use of the lateral retinaculum section method, there was a defect of the joint capsule which was generated by the patellar reduction in the region. Covering with the infrapatellar fat pad alone was difficult, therefore the excess joint capsule generated when plication was applied to the medial joint capsule and infrapatellar fat pad was used. In addition, as the quadriceps femoris muscles were contracted in both knees, both vastus intermedius muscles were releasedto improve flection of the knees (**Figure 2(a)** & **Figure 2(b)**).

The patient commenced postoperative rehabilitation with continuous passive motion unit two days after surgery. Patient was allowed to weight-bear walk with knee brace two weeks after. Six months postoperatively, she could walk with a stick and the flexion of the knee became 90˚ one the right and 95˚ on the left. To



(a)



(b)

Figure 2. (a) Postoperative radiographs of right knee; (b) postoperative radiographs of left knee.

improve flexion, both knees were mobilized again under anesthesia, which brought her 115˚ flexion on both knees. At the two-year follow-up, range of motion of both knees was 0˚ to 120˚, and the Japanese orthopedic association score (JOA) had improved from 40 to 90 at the right knee and 45˚ to 90˚ at the left.

4. Discussion

Congenital dislocation of the patella is uncommon compared with addictive or recurrent dislocation of the patella. It is well known that this dislocation causes an increasing of Q-angle, hypoplasia of femoral trochlear surface, abnormalrotation of the femoral and tibia bone, all of which may lead to secondary osteoarthritis of valgus knee if it would not treat accordingly. However, there are no normative guidelines of operative procedure about TKA for osteoarthritis of valgus knee with congenital dislocation of the patella. Therefore, it is important to make strategies which keep a good patella tracking. First, an approach must be decided upon, and the additional procedure to correct patella tracking must be chosen. Either a medial or lateral approach may be used to access the joint. The method of approaching intraarticular to a skin incision is classified roughly into medial or lateral parapatellar approach. Some of the procedure could improve patellar tracking, such as correction of distal or proximal alignment [2], proper external rotation of the femoral or tibial2) 3) component, and reconstruction of medial patellofemoralligament [5]. Marmor reported a case treated by TKA without reduction of the dislocated patella which produced good results [6]. Dao *et al.* successfully relocated and stabilized a dislocation of the patella by TKA combined with V-W quadricepsplasty, but it was not completely successful in resolving a preoperative extensor lag [7].

The lateral approach for this patient was selected because the lateral retinaculum section method could be applied while simultaneously exposing the region, and vastus medialis plication was selected for additional treatment. Since the left femoral anteversion angle was 32.5˚ on preoperative CT, showing excess anteversion, external rotation of the femoral component was investigated. However, it was considered to promote medial instability because the medial collateral ligament was flaccid due to the valgus knee. Moreover, if the tibial component has been set with external rotation, the femur would have rotated internally relative to the tibia, making it non anatomical and difficult to acquire favorable patellar tracking, hence this method was not adopted. Displacement of the tibial tuberosity is a useful method because it facilitates favorable exposure and enables extension of the shortened extension system. However, when treatment is combined with TKA, the surgical procedure becomes complex, delays initiation of range of motion training after surgery, and increases the risks of pseudarthrosis formation in the osteotomized region and intra- and post-operative fracture [7] [8]. Thus, this method of displacement of the tibial tuberosity was not selected. Vastus medialis plication is effective to acquire patellar tracking, but it may impair blood flow due to damage of the vascular circle supplying the patella. Ogata

et al. reported an animal experiment using monkeys in which patellar blood flow decreased to 65% when lateral parapatellar incision was applied, 53% when the lateral retinaculum section method was also applied, and decreased further to 17% when the infrapatellar fat pad was also resected [9]. Suzuki *et al.* reported an animal experiment using rabbits in which hemostasis of the upper pole of the patella did not decrease blood flow in the bone, but hemostasis of the lower pole including the infrapatellar fat pad markedly decreased the patellar blood flow [10]. In the present patient, medial retinaculum section was added to lateral parapatellar incision, but approximately 50% of blood flow was retained likely due to conservation of the entire infrapatellar fat pad.

There was a defect of the lateral joint capsule which was formed due to patellar reduction. Since it was difficult to cover with the infrapatellar fat pad alone, by the infrapatellar fat pad-joint capsule-lateral meniscus flap method proposed by Keblish *et al.* [11], the excess joint capsule plication generated in medial side and the infrapatellar fat pad were both used to cover the defect. These procedures may have reduced the risk of skin problems and enabled acquisition of patellar stability.

In conclusion, TKA with lateral parapatellar incision and medial retinaculum section is a useful method as it makes possible to establish components in anatomical position and acquire good tracking of the patella.

5. Conclusion

Total knee arthroplasty in congenital dislocation of the patella was performed by lateral approach and vastus medialis plication and good tracking of the patella was acquired. It is important to conserve the infrapatellar fat pad to retain blood flow of the patella.

Conflicts of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

Consent

The patient gave informed consent to submit this case study for publication.

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