Total Knee and Ankle Arthroplasty for Rheumatoid Arthritis with severe Deformities

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Abstract

This is a report of two patients with rheumatoid arthritis who required total knee and ankle arthroplasty because of severe pain in the knee and ankle of the same leg. The conditions were associated with mixed varus and valgus deformities. Patient 1 was a 62-year-old woman who had an FTA of 195° and a 30° valgus deformity of the talus. Patient 2 was a 60-year-old woman with an FTA of 150° and 20° varus deformity of the ankle. In both patients total knee arthroplasty and total ankle arthroplasty were performed using ceramic prostheses. In patient 1, the outcome for the knee was good 12 years postoperatively, but sinking of the prostheses was observed at the ankle, although independent walking was possible. Patient 2 showed a good outcome at 18 months postoperatively.

INTRODUCTION

At present, about 19,000 total knee arthroplasties are performed annually in Japan. The results are very good in patients with stable knees. However, in some patients with rheumatoid arthritis, good walking ability cannot be obtained by total knee arthroplasty alone when no consideration is given to the condition of the other leg joints. We performed total knee arthroplasty and total ankle arthroplasty on one patient who had a varus knee associated with a marked valgus ankle and one patient who had a valgus knee associated with a varus ankle. The outcomes for both cases are reported here.

MATERIALS and METHODS

The two patients were women with rheumatoid arthritis who requested operations on both the knee and ankle because of marked deformity and severe pain in these joints. Conservative treatment was considered ineffective, so total knee arthroplasty and total ankle arthroplasty were performed. Postoperative outcome was assessed based on criteria of pain, range of motion (ROM), quadriceps muscle power, walking ability, ability to climb stairs, varus and valgus deformity, and activities of daily living according to the Japanese Orthopedic Association scoring system.

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Patient 1 was born in 1923 and developed rheumatoid arthritis in 1963. She received drugs and other treatment but joint deformity progressed and walking became difficult. She was referred to the Department of Orthopedic Surgery by the Department of Internal Medicine of this hospital in 1985 at age 62. The right knee showed varus deformity with a standing FTA of 195°, ROM of 0 to 120°, and knee function evaluated at 41 points by the JOA score. Radiographs showed marked bone destruction (Fig. 1-a).

The right ankle showed valgus deformity, and movement was limited to dorsiflexion of 5° and plantar flexion of 22°. Ankle function was evaluated at 36 points by the JOA score. On radiographs, the articular surface of the talus showed a 30° valgus deformity with respect to the axis of the tibia (Fig. 1-b).

On September 1985, the patient underwent operations on both the right knee and right ankle. Total knee arthroplasty using a kinematic stabilizer was performed for the knee, and total ankle arthroplasty using a Kyocera ND was also done. Bone cement was used in both operations.

Patient 2 was born in 1935 and developed rheumatoid arthritis in 1952. In August 1994, she underwent total arthroplasty of the left knee. In December 1995 (age 60 years), deformity and pain in the right knee and right ankle became severe, and she requested an operation. The right knee showed valgus deformity with an FTA of 150°, ROM of 15° to 90°, and JOA score of 38 points. Radiographs showed that the lateral compartment of the knee joint had marked bone destruction (Fig. 2-a).

The right ankle showed varus deformity, and dorsiflexion of 20° and plantar flexion of 15° were possible. The JOA score was 39 points. On X-ray films, the joint space showed marked narrowing and the articular surface of the talus showed a 20° varus deformity with respect to the axis of the tibia (Fig. 2-b). Joint spaces between the tarsal bones had disappeared, and these bones formed a single mass.

On January 1996, she underwent cementless total arthroplasty of the right knee using an Interax of the retention type with preservation of the posterior cruciate ligament.

The iliotibial band was released and the lateral collateral ligament was extended. A bone graft was performed for the lateral defect of the femur. After 4 weeks (on...
February 1990, total ankle arthroplasty using a Kyocera TNK and bone cement was performed on the right ankle.

RESULTS

Patient 1 is now 74 years old. It has been 12 years since the operation. During this period, total arthroplasty was also performed on the opposite left knee. There is rheumatoid involvement of the left ankle without varus or valgus deformity, and no operation has been performed on the ankle. Twelve years postoperatively, there is no pain in the right knee, ROM is 0 to 100° and the JOA score is 78 points.

On radiographs, a radiolucent zone can be observed posterior to the femoral component and around the tibial stem, but there is no loosening (Fig. 3-a). The right ankle is slightly painful initially when walking, but independent walking is possible. ROM is limited to dor-

Fig. 2-a Preoperative knee X-ray film from patient 2 showing lateral bone destruction and marked osteophyte formation.

Fig. 2-b Preoperative ankle X-ray film from patient 2 showing 20° varus deformity of the talus with respect to the tibia, and the tarsal bones fused to from a single mass.

Fig. 3-a An X-ray film of the knee taken 12 years postoperatively in patient 1 showing a radiolucent zone posterior to the femoral component and around the tibial stem.

Fig. 3-b Postoperative X-ray film of the ankle from patient 1 showing sinking of the tibial component in the frontal view and obvious sinking of the talar component in the lateral view.
siflexion of 5° and plantar flexion of 10°, and the JOA score is 61 points. Frontal X-ray films show sinking of the tibial component, and lateral views reveal obvious sinking of the talar component (Fig. 3-b). However, alignment of the leg is good (Fig. 3-c).

Patient 2 is now 62 years old and has done well since the operation 18 months previously. Pain in the knee has resolved, ROM is 0 to 150°, and the JOA score is a high 88 points. No radiolucent zone can be seen on X-ray films (Fig. 4-a). Following total ankle arthroplasty, the ankle pain is also resolved, and there is dorsiflexion of 10° and plantar flexion of 20°. The JOA score is 74 points. The X-ray films show a radiolucent zone in the tibia, but there is no sinking (Fig. 4-b). Leg alignment is good (Fig. 4-c).

**DISCUSSION**

In the treatment of patients with knee destruction due to rheumatoid arthritis and difficulty in walking, total knee arthroplasty is currently performed. The objective of this operation is to regain and maintain walking ability. However, rheumatoid arthritis is a disease characterized by systemic polyarthritis and many problems arise with respect to maintenance of good walking ability. Problems related to the knee itself include late deep infection, component loosening, and patellofemoral joint dysfunction. Among problems related to walking in the other leg joints, if progressive rheumatoid lesions are present in the hip joint, total hip arthroplasty is indicated. However, when ankle lesions are progressive, there are relatively few indications for surgery. Moreover, even if an operation is performed, some physicians recommend arthrodesis rather than total ankle arthroplasty. I have taken part in about 300 total knee arthroplasties but less than 10 total ankle arthroplasties in patients with rheumatoid arthritis. However, patient 1 in this study required an operation on the ankle because the valgus deformity of this joint increased and the lateral border of the foot came into contact with the ground after total arthroplasty of the knee was performed to correct varus deformity. In patient 2, the knee was in valgus and the ankle in varus, conditions opposite those of patient 1.

In determining the appropriate surgical method, another problem is how to decide whether to perform total ankle arthroplasty or arthrodesis. Consideration must be given to various factors, including age of the patient, daily activities, condition of the tarsal bones and toes, period of ankle fixation, and the period of hospitalization \(^5\). In patient 2,
Fig. 4-a An X-ray film of the knee taken 18 months postoperatively in patient 2.

Fig. 4-b An X-ray film of the ankle taken 18 months postoperatively in patient 2 showing a radiolucent zone around the tibial component.

Fig. 4-c Preoperative and postoperative leg alignment in patient 2.

the joint spaces between the tarsal bones had disappeared and these bones formed a single mass, so total ankle arthroplasty was selected over arthrodesis. In patient 1, the valgus deformity of the ankle was severe and arthrodesis was technically difficult.

Stable results can now be obtained with total knee arthroplasty because of the development of better materials\(^2\), advances in prosthesis design, improvement of surgical instruments, and new operating techniques. Many new materials have become available and are widely used. The operating technique is well established for cases such as patient 1 in this study with varus knee\(^6\), or patient 2, with marked valgus deformity of the knee\(^7\).

In recent years, there have been many reports on the operative techniques for revision arthroplasty\(^8\). There have also been reports of good results obtained when total ankle arthroplasty was performed in patients with rheumatoid arthritis\(^9\), but the number of such cases is small when compared with those for hip and knee arthroplasty. Takakura\(^7\) has made improvements to prostheses using ceramics produced by Kyocera in Japan, and at present the TNK type is considered to achieve better results.
than the previous ND type. In the two patients in this study, patient 1 with the ND type showed marked component sinking, but patient 2 with the TNK type had no sinking at 18 months postoperatively. Since Takakura states that total ankle arthroplasty is not indicated for varus or valgus deformities of 15° or more\(^8\), it will be necessary to carefully monitor the future course of these two cases.

**CONCLUSION**

In two patients with rheumatoid arthritis who had varus knee associated with a markedly valgus ankle, and valgus knee associated with varus ankle, total knee arthroplasty and total ankle arthroplasty were performed. Patient 1 underwent total ankle arthroplasty using the Kyocera ND type prosthesis and definite component sinking was seen on subsequent radiographs, but independent walking is possible. The course has been good in patient 2 who underwent total ankle arthroplasty using a Kyocera TNK.

**REFERENCES**