Mod Rheumatol (2001) 11:344–347

CASE REPORT

Katsumitsu Arai · Tadamasa Hanyu · Takehiro Murai
Naoaki Onda · Toshihiro Kanda

Total knee arthroplasty in a patient with rheumatoid arthritis and spontaneous fusion of the right hip

Received: January 9, 2001 / Accepted: April 11, 2001

Abstract Bilateral total knee arthroplasty for a painful stiff knee was performed in a 50-year-old woman with rheumatoid arthritis who had spontaneous fusion of the right hip. Despite several manipulations, the range of motion of the right knee worsened. After total hip arthroplasty and ipsilateral knee revision, the right knee had a stable range motion of −15° to 75°. This case suggests that even if the ankylosed hip is in a good position, ipsilateral knee arthroplasty with a fused hip may result in a poorer range of motion than that after total hip arthroplasty.

Key words Hip fusion · Rheumatoid arthritis (RA) · Stiff knee · Total hip arthroplasty · Total knee arthroplasty

Introduction

In patients with a fused hip, degenerative arthritis often develops in the contralateral hip or ipsilateral knee.[1–4] Some authors have recommended converting the fused hip to an arthroplasty to relieve pain in the back, contralateral hip, or ipsilateral knee.[5–7] Even though this procedure may relieve the abnormal stresses, it cannot alter the course of an already severely arthritic contralateral hip or ipsilateral knee. Thus, some patients require reconstructive procedures on arthritic joints. Romness and Morrey[8] have shown that knee replacement without "fusion takedown" (converting the fused hip to an arthroplasty) is acceptable if the hip fusion is in a good position. In patients with a long-standing fusion of the hip, the long-term results of contralateral total hip arthroplasty were worse than in another study from same institution, but those of ipsilateral total knee arthroplasty were acceptable.[9] Thus, total knee arthroplasty can be attempted without fusion takedown. The purpose of this report is to discuss the preferred sequence of procedures in a patient with rheumatoid arthritis (RA), spontaneous hip fusion in a good position, and painful stiffness in both knees.

K. Arai (✉) · T. Hanyu · T. Murai · N. Onda · T. Kanda
Division of Orthopedic Surgery, Department of Regenerative and Transplant Medicine, Niigata University, Graduate School of Medical and Dental Sciences, 1 Asahimachi-dori, Niigata 951-8510, Japan
Tel. +81-25-227-2272; Fax +81-25-227-0782
e-mail: katsu@med.niigata-u.ac.jp

Case report

A 50-year-old woman with RA diagnosed at age 24 presented with bilateral knee pain. She was a housewife with a sister who also had RA. At age 34, she complained of severe pain in the right hip joint. About 2 years later, the right hip spontaneously fused in an acceptable position (25° of flexion, 5° of abduction, and no rotation), and pain on walking disappeared. At age 42, she complained of pain in the left hip joint. Joint destruction was present. Total hip arthroplasty was performed at a different institution about 1 year later (Fig. 1). About 4 years after the hip arthroplasty, pain developed in both knee joints. The range of motion continued to worsen. At 50 years of age, she presented to our hospital with painful, stiff knees. The range of motion of the right knee was −22° to 30°. The range of motion of the left knee was −30° to 45°. Radiographs revealed the almost complete disappearance of the joint spaces and irregularity of joint surfaces (Fig. 2). The range of motion of the left hip was limited despite total hip arthroplasty (−15° of extension, 40° of flexion, 20° of abduction, 20° of adduction, and no rotation). The patient was unable to walk. Her systemic RA activity was controlled with low-dose methotrexate and D-penicillamine, and her C-reactive protein concentration was 0.9 mg/dl.

A cemented left total knee arthroplasty was performed using the Kinemax-plus system (Howmedica, Rutherford, NJ, USA) (Fig. 3). The rectus snip procedure was also used to gain good flexion.[10] Immediately after surgery, the range of motion was 0° to 90°. Continuous passive motion (CPM) was used to maintain the range of motion. After 2 weeks, the left knee flexion had decreased from 90° to 55°. After

manipulation under spinal anesthesia, the range of motion was −5° to 90°.

A cemented right total knee arthroplasty was performed using the Kinemax plus system 1 month later (Fig. 3). The rectus snip and tibial tubercle osteotomy procedures were also used for good exposure.[11,12] Maximum flexion of the right knee was difficult to obtain on the table because of the ankylosed hip. Thus the patient was placed in the left semilateral position. There was a plan to use a posterior stabilizer of the type needed for this knee system if the posterior cruciate ligament had to be cut to increase the range of motion. However, it was not used, because neither an extension nor a flexion gap was found by partial release of the posterior cruciate ligament. Immediately after surgery, the range of motion in the right knee was 0° to 90°. Because the CPM machine was not working, passive and assisted exercise was performed at the patient's bedside by physical therapists. One month after the right knee operation, the range of motion in both knees was −15° to 75°. After 4 months it was −15° to 50°, and after 1 year it was −15° to 30° in the right knee.

We thought that it would be difficult for the patient's right knee to achieve a good stable range of motion without the fused hip being converted to an arthroplasty. The fused hip was converted to a cementless arthroplasty using the S-ROM system (Depuy, Warsaw, IN, USA) (Fig. 4). At the same time, closed manipulation of the right knee was attempted. However, this failed due to its severe stiffness. Retinacular release and quadricepsplasty of the right knee was performed 1 month after the hip arthroplasty. Severe

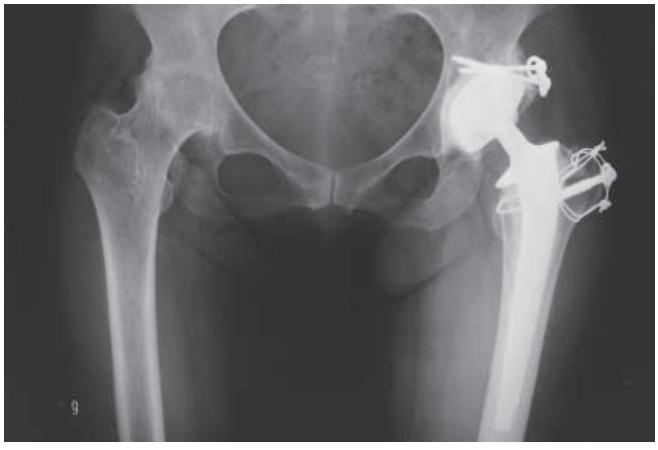

Fig. 1. Preoperative radiographs of the hip joints. At age 36, the right hip spontaneously fused in an acceptable position (25° of flexion, 5° of abduction, and no rotation) and gait pain disappeared. At age 42, the patient complained of pain in the left hip joint. Joint destruction was present. Total hip arthroplasty was performed at another institution about 1 year later

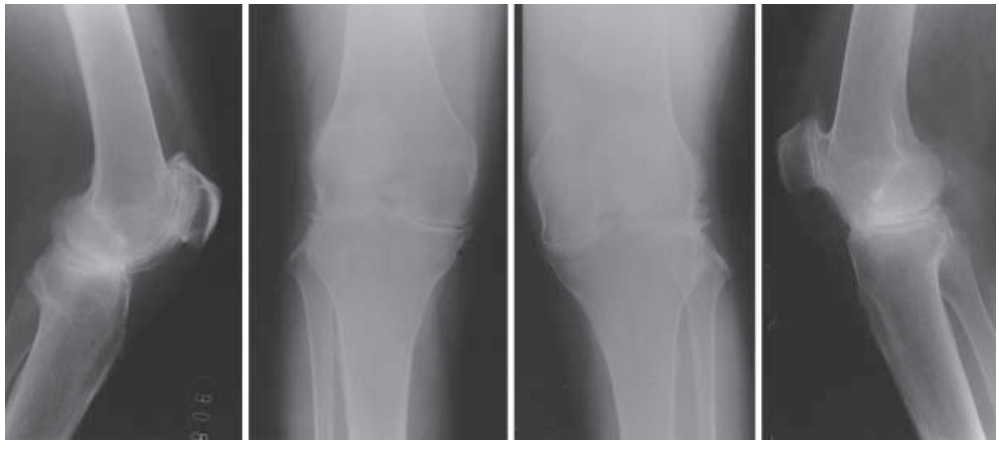

Fig. 2. Preoperative radiographs of the knee joints. These revealed the near disappearance of the joint spaces and the irregularity of the joint surfaces. The range of motion of the right knee was −22° to 30°. The range of motion of the left knee was −30° to 45°

Fig. 3. Radiographs 2 years after surgery. A cemented left total knee arthroplasty had been performed using the Kinemax-plus system. The rectus snip procedure was also used to gain good flexion. A cemented right total knee arthroplasty was also performed using the Kinemax-plus system. The rectus snip and tibial tubercle osteotomy procedures were also used for good exposure. The stainless steel wire has already been removed because union has been achieved

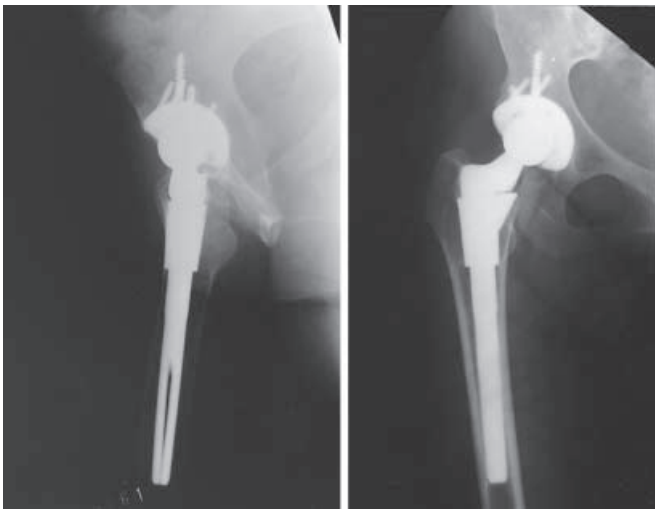

Fig. 4. Radiographs of the right hip 1 year after surgery. The fused hip was converted to a cementless arthroplasty using the S-ROM system. The radiographs show no loosening or clear zones around the hip

adhesions were found, with fibrous tissue surrounding the knee prosthesis. After the release procedure, the range of motion in the knee was −15° to 90°. The patient was able to perform postoperative exercises with the CPM machine because of her mobile hip.

The range of motion in the right hip joint 1 year after hip arthroplasty was 0° of extension, 70° of flexion, 30° of abduction, 20° of adduction, and 5° of internal and external rotation. The range of motion was −15° to 75° in the right knee and −15° to 70° in the left knee. The patient had no pain in these joints. Radiographs showed no loosening or clear zones surrounding the knees or the right hip. She is able to walk for 30 min with a cane and drive a car for the first time in many years.

Discussion

Romness and Morrey[8] have reported on 5.5 years of follow-up of 16 total knee arthroplasties in 13 patients with a prior ipsilateral hip arthrodesis or ankylosis. Prior to knee replacement, 12 of the 16 underwent fusion takedown and total hip arthroplasty. The position of the fusion was malaligned in 15 hips. The remaining four patients underwent total knee arthroplasty without fusion takedown. Comparisons between these two groups with respect to range of motion and the Hospital for Special Surgery knee score revealed no differences. They reported that if the hip fusion is in a good position, knee replacement without fusion takedown is acceptable. Garvin et al.[9] have reported on arthroplasty of the ipsilateral knee without fusion takedown in nine patients with long-standing fusion of the hip. These hips were fused in an acceptable position (average, 37° of flexion, 1° of adduction, and 8° of external rotation). At an average follow-up of 7 years, the rates of failure and of the development of radiolucent lines were comparable with those in previous studies of total knee arthroplasty in patients without arthrodesis of the hip. However, seven of the nine knees were manipulated a total 15 times because of stiffness. Despite these manipulations, their range of motion was limited. The authors emphasized that these factors should be considered when deciding whether to perform an arthroplasty of the ipsilateral knee in a patient who has a fused hip.

In our case, the patient had knee joint pain, stiffness, and progressive arthritis. These symptoms were likely to have been caused by the fused hip, as well as progressive rheumatoid disease. However, she did not want to undergo hip arthroplasty because she had no pain in the hip, which is why total knee arthroplasty was performed without fusion takedown. The operative indications given by Garvin et al.[9] only included elderly patients with osteoarthrosis, not RA. The study by Romness and Morrey[8] included four cases of hip fusion due to RA. However, the hip position in all cases was poor (average 50° of flexion, 10° of adduction, and 10° of external rotation). These patients underwent fusion takedown and total hip arthroplasty before knee replacement. The mean range of motion after knee arthroplasty was −3° to 64° at last follow-up. The long-term success of this strategy has not been adequately studied. On the other hand, Strathy and Fitzgerald[13] have reported the results of a 10-year follow-up of 80 total hip arthroplasties performed in 74 patients in the same institution. Their study showed an extremely high failure rate (48.3%) after 10 years in the patients who had a previous surgical attempt at ankylosis, compared with a failure rate of only 5% in patients whose hip had ankylosed spontaneously.

In our case, severe adhesion surrounding the knee prosthesis was the major cause of the poor range of motion after total knee arthroplasty. This was improved by effective rehabilitation with the mobile hip using a CPM machine. This case may suggest that converting the fused hip to an arthroplasty prior to total knee arthroplasty should lead to good results of total knee arthroplasty. However, postoperative surveillance may need to be more frequent than usual to monitor joint motion. For future cases, we should warn that despite several manipulations, the range of motion was limited in the ipsilateral knee arthroplasty without fusion takedown, even when the hip fusion was in a good position. The decision to attempt to achieve a poor but painless range of motion or a good range of motion after major hip surgery should only be taken after consultation and with the informed consent of each patient with RA.

References

1. Callaghan JJ, Brand RA, Pederson DR. Hip arthrodesis: a long-term follow-up. J Bone Joint Surg 1985;67A:1328–35.
2. Hauge MF. The knee in patients with hip joint ankylosis: clinical survey and biomechanical aspects. Acta Orthop Scand 1973;44: 485–95.
3. Lipscomp PR, McCaslin FE. Arthrodesis of the hip: review of 371 cases. J Bone Joint Surg 1961;43A:923–38.

4. Sponseller PD, McBeath AA, Perpich M. Hip arthrodesis in young patients: a long-term follow-up study. J Bone Joint Surg 1984;66A: 853–9.
5. Amstutz HC, Sakai DN. Total joint replacement for ankylosed hips: indications, technique, and preliminary results. J Bone Joint Surg 1975;57A:619–25.
6. Brewster RC, Conventry MB, Johnson EW Jr. Conversion of the arthrodesed hip to a total hip arthroplasty. J Bone Joint Surg 1975;57A:27–30.
7. Lubahn JD, Evarts CM, Feltener JB. Conversion of ankylosed hips to total hip arthroplasty. Clin Orthop 1980;153:146–52.
8. Romness DW, Morrey BF. Total knee arthroplasty in patients with prior ipsilateral hip fusion. J Arthroplasty 1992;7:63–70.
9. Garvin KL, Pellicci PM, Windsor RE, Conrad EU, Insall JN, Salvati EA. Contralateral total hip arthroplasty or ipsilateral total knee arthroplasty in patients who have a long-standing fusion of the hip. J Bone Joint Surg 1989;71A:1355–62.
10. Scott RD, Siliski JM. The use of a modified V–Y quadricepsplasty during total knee replacement to gain exposure and improve flexion in the ankylosed knee. Orthopedics 1985;8:45–8.
11. Whiteside LA, Ohl MD. Tibial tubercle osteotomy for exposure of the difficult total knee arthroplasty. Clin Orthop 1990;260:6–9.
12. Whiteside LA. Exposure in difficult total knee arthroplasty using tibial tubercle osteotomy. Clin Orthop 1995;321:32–6.
13. Strathy GM, Fitzgerald RH Jr. Total hip arthroplasty in the ankylosed hip: a ten-year follow-up. J Bone Joint Surg 1988;70A: 963–6.