EVALUATION ON RHEUMATOID COXEOARThRITIS
—WITH SPECIAL REFERENCE TO SURGICAL ERRORS AND COMPLICATIONS—

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ABSTRACT

Five cases of rheumatoid arthritis (RA) of hips were presented on this paper, which were treated surgically and gave special problems. Surgical indications and treatments of RA in the hip joints are discussed here in details. Surgery should be determined considering the atrophy of bone and muscle, bleeding tendency and general conditions because RA is the systemic disease.

Generally speaking femoral head prosthesis has a tendency to think into the ilium or pelvis and is rarely indicated.

Cup arthroplasty is indicated in the relatively young patients when the disease is unilateral and other joints are preserved. Resection—Angulation osteotomy is indicated in the inactive elderly patients when the function of other joints are preserved well. But rare cases fit to these indications mentioned above.

Total hip replacement has the wider indications than other procedures. However the history of this operation is too short and many problems have not been solved yet. Therefore we have to be very cautious especially as to its indications and treatments.

INTRODUCTION

Since the first surgical approach of synovectomy of the knee by Swett in 1923, many surgical procedures have been reported on the knee joint, and so have been on hip joint in rheumatoid arthritis (RA).

It is generally accepted that relief of pain, correction of deformity, restora-
tion of mobility, maintenance of walking ability and the improvement of activities of daily living (ADL) are the terminal aims of surgery in the hip joints of RA. The indications for hip surgery of RA are, however, still obscure in individual cases and evaluation standard is not distinctive yet.

We have performed various kinds of surgery for neck fracture of femur in RA, femoral head necrosis and rheumatoid coxaearthritis. As the rheumatoid coxaearthritis is just a manifestation of general affection in RA, the surgery should be performed with prudent precaution in order to avoid the complications derived from systemic involvement. Several characteristic cases which projected various problems on surgery and follow-up, are discussed and commented in this paper for the reference to further improvement of hip surgery in rheumatoid arthritis.

Case No. 1

Patient was a 56 years old house wife with chief complaint of pain in both hips. Patient presented the history of hospitalization for two months because of pain in the multiple joints in 1953, and then she was treated ambulatory at some clinic for two years without relief. She visited a national hospital specialized for rheumatoid arthritis. However the symptoms was aggravated. Disturbance of hip joint motion, decrease of walking ability, joint pain became conspicuous. In 1968 she visited to a certain university hospital where she was diagnosed as rheumatoid arthritis. Cup arthroplasty was performed on the right hip. She had been doing well for two years postoperatively. However, because of increase of pain and decrease of ADL and walking ability, she visited our hospital for the consultation in May of 1970.

Family history revealed nothing in particular.

Physical examination showed slight contracture of bilateral hip joint (flexion 40°(r), 60°(l); adduction (add) & abduction (abd) 30°(r)(l), rotation 0°(r)(l)) and tenderness was elicited on the inguinal region.

X-ray findings revealed distinct sclerosing change on right shelf of pelvis, especially along the region of weight bearing and lateral margin of the reacted shelf projected to the medial side of major trochanter. The inserted cup situated in 70° by horizontal plane. The spur formation of the shelf is marked in it’s marginal region. In the left hip, sclerosing change and spur formation are the same as right side. Narrowing of joint space and cystic degeneration of head of the femur are the other characteristic changes (Fig. 1).

Laboratory findings were not contributory except for moderate elevation of blood sedimentation rate (BSR) (35 mm/h).
By social indication, conservative treatment had been applied for the time being, however, marked joint pain caused loss of walking ability when the inserted cup dislocated vertical to the horizontal plane in X-ray.

On 15th June 1972, total hip prosthesis was performed. At present there is no pain in the right hip and range of motion (ROM) is much improved (Fig. 2).
Case No. 2

Patient was a 68 years house wife with chief complaint of pain in the left hip. For 2 months she had suffered from multiple joint pains and had been treated conservatively with the diagnosis of rheumatoid arthritis in a certain clinic. Because of gradual aggravation of symptoms, she was seen at our university hospital in May 1970. Previous history was negative except for rheumatic fever at the age of 11.

In physical examination, muscle atrophy was elicited in the left thigh. Slight swelling in the left knee joint was noted. Because of severe pain, ROM was highly limited in the left hip joint (flexion 30°, abd & add 10°, rotation 0°). No swelling or induration was observed.

In X-ray findings, the flattening of head of the femur and lateralization towards proximal-lateral were observed in the left hip joint. This lateralization is that much as the half of head of femur and even cystic changes and sclerotic reaction of shelf were noted (Fig. 3).

Laboratory findings were within normal limits except for RA(+) reaction.

On 17th September 1970, the head prosthesis was performed. Rehabilitation exercise was started 2 weeks postoperatively. She had complained of pain on motion regardless careful rehabilitation program. This symptom had gotten worse and instability of the inserted prosthesis was found finally by X-ray follow up (Fig. 4).

On 23rd August 1971, total hip prosthesis was performed (Fig. 5). At present she can walk by herself with the weight bearing by cane and no pain on mo-
tion is elicited. ROM is much improved (flexion 60°; add, abd 20°).

Case No. 3

Patient was a 33 years old house wife with chief complaint of pain and contracture in the multiple joint. She had been suffering from rheumatoid arthritis since her age of 7 and had been treated in many different facilities. Because of the recent evidence of aggravated symptom, she was seen by us in August 1971. Nothing in particular in family history was noted.

Physical examination revealed that both hands and elbows showed typical rheumatoid involvement with flexion deformities. The hip joint was in flexion contracture (flexion 10°; abd & add 10°), thus the function was highly limited. Inactive muscle atrophy in the lower extremities was conspicuous and she could hardly walk.

In X-ray findings, both hip joint revealed profound atrophy of bone tissue and joint space was hard to trace to the extent of dotted line (Fig. 6).

In laboratory findings including blood test, liver function, urinalysis and RA test were all within normal limits.

Total hip prosthesis was performed in September 1971. Postoperatively, slight fever and small induration in the right iliacal region was observed. Shortly
after she was transferred to rehabilitation facility for the improvement of ROM, induration in the right iliacal region had grown up and she had complained of difficulty of walking and limitation of ROM in the right hip. She was readmitted to our hospital for the precise check up of this tumor like induration in December 1971. The induration of 15 cm in size located from the right lower abdominal
quadrant to the inguinal region, was oval in shape, fluctuating to touch, tender and pulsating. On 20th December 1971, 200 cc of coagulated blood was surgically evacuated. The bleeding focus was thought to be capillary oozing from an ilium. Rehabilitation was started from 6 weeks postoperatively because of preventing haemorrhage.

Seven months postoperatively, she was discharged from rehabilitation facility and doing very well with the better ROM (flexion, add, abd, rotation 20°) and painless ADL (Fig. 7).

Case No. 4

Patient is a 63 years old house wife with chief complaint of difficulty to walk. Since 1965 she had been diagnosed as rheumatoid arthritis and treated conservatively at a certain university hospital. In November 1968, she fell down and developed the fracture of neck of femur. Multiple pinning and plaster of Paris was applied. Regardless of rehabilitation program, she remained disturbed walking with contracture of the hip and knee joint. She was seen by us for the consultation of improvement of ADL in May 1970. Nothing revealed particular in family history.

Physical examination revealed typical rheumatoid deformities in both fingers and contracture of the hip and knee joint. In the lower extremities, there was
2 cm difference in length because of contracture. ROM of the hip joint is highly limited in abd, add and rotation. Muscle atrophy in the right lower extremity was also conspicuous.

In X-ray findings, profuse atrophy of bony tissue in the right hip joint was noted. Head of the femur was malunited down medially which produced high standing of major trochanter (Fig. 8).

Laboratory findings was negative except for positive RA reaction. In September 1970, resection of head of femur and valgus osteotomy was performed in the right hip joint. The 18 months postoperative she could walk 200-300 m by the cane, but instable hip joint with shortening of femur and also muscle atrophy produced poor gait. Pain in the opposite extremity seemed to be due to for compensation. In the operated hip there is no pain on motion. ROM is fairly good (flexion 90°; abd add 20°; rotation 20°) but remains instability of the hip joint on motion (Fig. 9).

Case No. 5

Patient was a 58 years old house wife. Since 1948, she had been treated conservatively at a clinic where she was diagnosed as rheumatoid arthritis. In December of 1969, she fell down and was brought to our hospital for the treatment of neck fracture of the left femur. On examination, she could not move at all because of severe pain. Tenderness on the left major trochanter was elicited by lateral rotation of the left lower extremity.

X-ray of the left hip revealed complete fracture of neck and head located free inside the joint and the femur dislocated proximal lateral. There was no apparent bony atrophy in the joint (Fig. 10).

In laboratory findings, BSR was moderately accelerated (49.7 mm/h), and RA positive. Other routine laboratory test was all within normal limits.

In January 1970, head prosthesis was performed. Rehabilitation program started one month post operatively, however pain on motion became conspicuous when the central luxation was noted in X-ray (Fig. 11). In April 1971, total hip prosthesis was performed and followed by rehabilitation one months later.

At present she can walk without cane inside the house but needs cane when she goes out. No apparent pain on motion is elicited. Her ADL is highly improved (flexion 80°; add abd 30°; rotation 30°) (Fig. 12).
Rheumatoid Coxaarthritis

Fig. 10

Fig. 11

Fig. 12
DISCUSSION

(I) Cup Arthroplasty
Case No. 1 is a case of cup arthroplasty.

Pain at rest is one of the most unpleasant distress in rheumatoid arthritis. She has been suffered from pain at rest for long time, especially at night. Pain has disturbed her sleep so often, and directly responded to wet climate and was only cured by administration of steroid hormone. Shortly after cup arthroplasty, she had been quite free from pain at rest and from insomnia. In this point, she was satisfactory in Peterson17 (1968)'s category mentioned.

For about 2 years postoperatively by patient had been fairly free from pain on motion. She had been doing well almost normal with the excellent ROM. ADL has much improved. However, after 2 years postoperatively, she had pain on motion and ROM was aggravated gradually. Her walking ability has decreased down to 1/50 as that of best condition postoperatively. She could walk only in the distance of 10 meters or so 4 years postoperatively when she came to our clinic. As the decrease of ROM and walking ability, pain on motion and disturbance of ADL have much advanced in about 2 years, the effect of cup arthroplasty is unsatisfactory and not long lasting.

Several factors such as indication, operative technique and rehabilitation care should be discussed in case no. 1.

As an indication for cup arthroplasty, the most important factors are that the acetabulum is normal or less degenerated, general condition is good, the focus is localized in head, and the social indication is satisfactory. In this sense, case No. 1 seemed to be out of indication. In our experiences of cup arthroplasty, the size of cup and management of iliopsoas muscle are the key point of success. As for the size of the cup, a large loose cup is required as Peterson (1968)17 and Bickel (1966)7 already mentioned. The transfer of iliopsoas muscle makes decrease of intracapsular pressure and stable the cup mobility.

In case no. 1 decupping occurred because the iliopsoas muscle was not transferred and cup was enough loose but too small, requiring operation twice. Long and large loose cup should be applied in valgus in case no. 1.

In rehabilitation program concerned, she started partial weight bearing one month postoperatively and total weight bearing two months. She was discharged from hospital 3 months postoperatively and thereafter followed up every one month.

In case of cup arthroplasty, we should keep in mind that the cup is a kind of meniscus in function between head and acetabulum and that we must check whether the cup works appropriately both in mechanically and biologically.
X-ray should be taken by dynamic point of view but static, especially during the rehabilitation program.

Though many reporters, such as Clayton (1963), Schwartzmann (1967) and others recommend cup arthroplasty for rheumatoid coxaarthritis, the result seemed to be far satisfactory. In order to make the cup arthroplasty for rheumatoid coxaarthritis permanent treatment, indication should be highly stricted and careful postoperative follow up by specialist is imperative.

(II) Head Prosthesis

In case no. 2, subluxation of head with destruction and deformity, shortening of neck, and normal acetabulum are the criteria of indication for head prosthesis. In the operation, the femur was normal and acetabulum was almost normal with slight loss of glistening of cartilage.

However, two months postoperatively patient had complained of pain on motion and X-ray revealed central luxation of 1 cm into acetabulum. In the femur there was also shortening of inserted prosthesis into the femur stem.

When total hip prosthesis was performed in this case, conspicuous destruction of acetabulum by the pressure of prosthesis was observed.

In case no. 5, head prosthesis was performed in the condition that normal acetabulum, neck fracture of femur and normal femur stem satisfied the indication required. One month postoperatively, patient had complained of pain on motion and X-ray revealed central luxation of inserted prosthesis into the acetabulum as in case no. 2. There was, however, no shortening of prosthesis into the femur stem. On the contrary prosthesis fixed tight in the stem when she was reoperated.

These two cases of head prosthesis give us an instruction that bony atrophy in rheumatoid arthritis in much far advanced than that observed in X-ray. Profuse and invisible atrophy of acetabulum in rheumatoid arthritis can not bear the pressure of weight bearing by inserted prosthesis in femur stem. We therefore presume that the head prosthesis in rheumatoid arthritis is almost out of indication except a few cases.

(III) Total Hip Prosthesis

Total hip prosthesis is the best operative method among the artificial tissue transfer concerned in rheumatoid coxaarthritis.

In case no. 3, resection of head with valgus osteotomy and total hip prosthesis are discussed. She has been in rheumatoid arthritis for past 26 years and had multiple joint involvement. ROM was highly limited with contracture and
muscle atrophy was so marked and diffuse.

As resection of head and valgus osteotomy is, we believe, a final procedure for rheumatoid coxaarthritis, we prefered total hip prosthesis in case no. 3. The case no. 3 gives an important instruction concerning to the complication, especially on fragile blood vessels and bony atrophy due to long administration of steroid hormone. She is 147 cm in height and 42 kg in weight, and is fairly small size of standard Japanese female. Bony atrophy, fragile vessels and small diameter of acetabulum lead to easy haemorrhage of the local tissue on operation. In her operation, acetabulum was scraped off large enough to put total hip prosthesis which consequently produced the thin base iliac bone and partial destruction of inner cortex of ilium. Bleeding was a kind of oozing out from the inner wall of iliac bone and carefully treated to stop bleeding during the operation. However, through the rehabilitation program, she had developed small bleeding which had grown up to 200 cc haematoma in 3 months postoperatively. She was reoperated for evacuation of hematoma and hemostasis and discharged hospital 7 months postoperatively. She is doing well and wishes to have total hip prosthesis in the other side.

As Lipscomb (1968) has already reported, we must keep in mind that fragility of the tissue, easy bleeding and easy infection are the important factors to prevent the unexpected complication on operation in rheumatoid coxaarthritis.

(IV) Resection of Head and Valgus Osteotomy

Case no. 4 is a case of intracapsular neck fracture of femur during the treatment of rheumatoid arthritis. Though multiple pins and long term cast were applied, bone union was not obtained efficiently. Bony atrophy was aggravated with the long term cast, therefore total hip prosthesis seemed to be far indicated. Resection of head and valgus osteotomy was performed. Eighteen months postoperatively, ROM is 20° in abd, add and rotation but 90° in flexion.

She is doing well in sitting life but has trouble to walk with the 3.5 cm difference of leg length though she has brace in the involved foot. Walking ability is 200-300 meters by slow walk with cane. Recently she has complained of pain on motion in the other hip which seemed to be compensatory to weight bearing. End result of resection and osteotomy in this case is less satisfactory.

She has multiple deformity in fingers and elbow joint and muscle and bone atrophy were so conspicuously that it would be of dangerous speculation if we performed total hip prosthesis with great expectation.

This case no. 4 provokes that Girdlestone and Valgus osteotomy is a kind of redemption or salvage procedure for the failure following the prosthesis and is
a kind of final operation in the hip joint.

(V) General Consideration of the Errors and Complications

It is important to remember that in formulating any method of treatment, the patient must be considered as a whole in rheumatoid arthritis. Rheumatoid arthritis is primarily a systemic disease; although the joint manifestation predominate the clinical picture and are usually crippling, they comprise only one facet of the disorder.

Adequate management should measure to improve the patient general physical status, to eradicate the causative agent or at least minimize the destructive and debilitating influence, to prevent deformities and to restore maximum restoration of function in the involved joint.

In the successful execution of any plan of therapy it is highly important to gain the confidence of the patient and to impress upon him the fact that success or failure depends in a large measure upon the cooperation shown and the responsibility that he assumes. Through whole course of the treatment, he must be observed by one specialist and should minimize the misunderstanding of formulation of the treatment among the different scholars. Long administration of steroid hormone provides proteinlytic changes in the tissue such as bony atrophy, fragility of blood vessels and mucous membrane and also easy infected conditions.

Among the surgical errors and complications in rheumatoid arthritis, side effect of steroid hormone should be primarily kept in mind to prevent iatrogenic disorders.

Generally infection, thrombophlebitis, phlebothrombosis, shock, pulmonary embolus and postoperative haematoma are complications common to all operation in hip surgery.

So far as size of the prosthesis concerned, adequate measurement should be performed preoperatively and several size and shape of prosthesis must be on ready during the operation to make the joint function better.

SUMMARY

Several characteristic cases of hip surgery in rheumatoid arthritis are presented with the special reference to the errors and complications on operation. Even under the most meticulous outline of therapy, the end results evaluated in terms of useful function of the affected limbs is far from satisfaction in strict sense. Nevertheless, much can be done to improve the lot of these patients by the indication with adequate caution.
Among the errors and complications of the surgery in rheumatoid arthritis, side effect of steroid hormone such as proteinlytic factor should be primarily kept in mind to prevent iatrogenic disorders. Others are the errors on indication or the complications with procedures especially with the size of prosthesis applied. Total hip prosthesis is so far most expected before redemption or salvage operation of any kind in the rheumatoid coxaarthritis.

REFERENCES