

Arthrodesis for tuberculous coxarthrosis

Good outcome in 32 adolescents

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Submitted 03-04-27. Accepted 03-10-02

Background There is no consensus on best treatment of advanced tuberculous coxarthrosis in young patients.

Patients and methods We report our results concerning hip arthrodesis for advanced tuberculous arthritis of the hip in 32 adolescents. The operation was preceded by standard antituberculous chemotherapy for 4 weeks, which was continued for 12 months after surgery. At the last follow-up, clinical and radiographic examinations of the ipsilateral knee, contralateral hip and lower back were done. We evaluated function, limitations, and presence of pain with our usual questions.

Results Their average age at the time of operation was 16 (12–18) years and the average duration of follow-up 12 (10–18) years. Solid bony fusion occurred in all patients after mean 5 months and no complications developed in the postoperative period. 28 patients were satisfied with the fused hip. No patients had reactivation of tuberculosis in any part of their body. The results were comparable to those of arthrodesis performed for other causes.

Interpretation Hip arthrodesis is an alternative method of treatment for advanced stages of tuberculous coxarthrosis in the adolescent.

At present, about 30 million people in the world have tuberculosis and, of these, 1% to 3% involvement of the skeletal system (Iobst and Stanitski 2001, Babhulkar and Pande 2002, Tuli 2002). Tuberculosis of the hip constitutes about 15% of all cases of osteoarticular tuberculosis (Tuli 2002).

Total hip replacement has been reported to be successful for healed or quiescent tuberculous disease (McLaughlin and Allen 1977, Chandler et al. 1981, Dorr et al. 1983, Kim et al. 1987, 2001, Roberts and Fetto 1990), but, it is not recommended for young patients (Chandler et al. 1981, Dorr et al. 1983). After joint replacement, many cases of old tuberculosis are activated in the operated joint, so that anti-tuberculostatic prophylaxis is mandatory (Eskola et al. 1988a, b). In the middle East and Far East, patients are prepared to accept excisional arthroplasty to obtain a mobile and painless hip despite the handicap of shortening and instability (Babhulkar and Pande 2002). Arthrodesis for advanced disease of the hip is an accepted procedure, but, the patient's satisfaction depends on his or her occupation and sociocultural environment (Schneider 1974, Sponseller et al. 1984, Callaghan et al. 1985, Barnhardt and Stiehl 1996, Benaroch et al. 1996, Duncan et al. 1997, Schoenecker et al. 1997, Klemme et al. 1998, Iobst and Stanitski 2001).

The results of intraarticular arthrodesis of the hip with Schneider's method in patients with tuberculous coxarthrosis alone have not been studied before, but reported together with other etiologies (Schneider 1974, Callaghan et al. 1985, Barnhardt and Stiehl 1996, Benaroch et al. 1996, Duncan et al. 1997, Klemme et al. 1998). In this paper, we studied the long-term results of arthrodesis of the hip in adolescent patients with advanced painful tuberculous arthritis.

Patients and methods

We reviewed the medical records of 32 adolescent patients (18 girls) with tuberculous arthritis of the hip, who had undergone an arthrodesis using Schneider's (1974) method in our university hospital, and had a minimum of 10 years of follow-up (Figure 1). Their average age at the time of operation was 16 (12-18) years, and the average duration of follow-up was 12 (10-8) years. The average age at the latest follow-up was 28 (22-33) years. The known duration of quiescent tuberculous coxarthrosis before the operation averaged 5 (4-7) years and, apart from fibrous ankylosis, active infection and caseous material were not seen intraoperatively. The indication for arthrodesis of the hip was pain associated with serious disability. Standard anti-tuberculous chemotherapy with isoniazid, rifampicin and pyrazinamide was started 4 weeks before the index procedure and continued postoperatively for 12 months. The surgical technique was identical in all patients, and consisted of an intraarticular arthrodesis with the hip in 30 degrees of flexion, neutral abduction and external rotation, and fixation with a Cobra-head plate (Figure 2). The position of the hip was verified by direct visualization fluoroscopy, and the diagnosis was confirmed by histopathologic examination and culture of the biopsy specimens. No postoperative cast or brace immobilization was used. We recommended bed rest for the uncooperative patients and non-weight bearing mobilization for the remaining 8 weeks, followed by partial weight bearing for all, until solid union was seen on the radiographs. The patients were examined every 6 weeks during the first 6 months, every 3 months for 1 year, and every year thereafter.

The limb length discrepancy was measured on a scanogram before and after the operation, and at the last follow-up. On the latter examination, the ipsilateral knee, contralateral hip and lower back were evaluated, and the following radiographs were taken: a standing anteroposterior of the knees, and of the pelvis and anteroposterior, and dynamic flexion and extension radiographs of the lumbosacral spine.

Function, limitations, and freedom from pain were evaluated with our usual questions. A subjectively satisfactory result was defined as one in



Figure 1. Preoperative radiograph of right hip of an 18-year-old boy with advanced proximal femoral and acetabular involvement with severe narrowing of the joint space.

which the patient had no pain or significant limitations of activity. We obtained Iowa hip and knee ratings on all patients. The Kellgren-Lawrence radiologic grading system was used to evaluate osteoarthritis of the knee and hip.

Results

Solid bony fusion was achieved in all patients after mean 5 (4-7) months, and no complications occurred in the postoperative period (Figure 3).

None developed reactivation of tuberculosis in any part of the body. 28 patients were satisfied with the operation. The hip fusion relieved the preoperative pain, and all the patients were free of pain at the time of final follow-up. Only 2 patients stated that the hip arthrodesis had not limited their function. They all had trouble putting on their trousers and shoes, and needed an instrument to put on socks. None of them complained of difficulty in their daily activities, but 16 patients had problems in sitting. Their ability to walk was unaffected and they could all walk without pain for



Figure 2. The same patient who underwent hip arthrodesis with the Cobra plate using Schneider's method 2 years after surgery.



Figure 3. 12 years postoperatively after removal of the Cobra plate, excellent bony fusion. No degenerative changes can be seen in the contralateral hip.

2 km. 18 patients had discomfort going up stairs. 8 patients took part in non-competitive sports and 4 of them bicycled. 18 patients could drive a car. 12 of 18 women reported problems during sexual intercourse, but none of the men did. All of the women were married and conceived children after the arthrodesis. Only 4 of 18 women had a normal vaginal delivery. 17 were employed outside the home. 8 patients did heavy work. 20 patients had no low back pain, but 12 developed such pain after walking 2 km or taking part in strenuous activities, but it did not require treatment. Degenerative changes in the lower lumbar region were found in all patients, but no instability was present on dynamic radiographs.

6 patients had had knee pain for an average duration of 3 years. Their standing radiographs showed grade 1 or 2 arthrosis. Mediolateral laxity of the ipsilateral knee was present in 18 patients, and anteroposterior laxity in 13, as compared to the contralateral knee. The Iowa rating of the ipsilateral knee averaged 87 (80-95) points, and of the contralateral knee 93 (90-99) points. 4 patients who complained of pain in the contralateral hip

had grade 1 or 2 arthrosis. Shortening of the ipsilateral lower extremity averaged 3 (1-6) cm. One patient with a 6 cm required lengthening with of the extremity with a circular external fixator.

Discussion

Tuberculous coxarthrosis usually occurs during the first three decades of life. Conservative measures, including antituberculous therapy, leads to complete recovery with normal functions in 90-95% of cases (Tuli 2002). However, advanced stages of arthritis of the hip with residual pain warrant surgery. Recently, cementless total hip arthroplasty has become an established method of treatment in young patients with advanced arthritis (Chandler et al. 1981, Dorr et al. 1983, Kim et al. 1987, 2001, Roberts and Fetto 1990). However, aseptic loosening and revision rates ranging between 11% and 57% have been reported in patients with total hip arthroplasty especially before the age of 35 years (Chandler et al. 1981, Dorr et al. 1983). Orthopedic surgeons from the middle East and Far East recommended resection arthroplasty instead of arthrodesis, since their patients prefer a mobile hip so that they can squat, sit cross-legged and kneel (Babhulkar and Pande 2002). Arthrodesis is another type of treatment for advanced, unilateral tuberculous coxarthrosis, unresponsive to non-surgical measures in an adolescent. It results in a hip

joint that is painless, but moves poorly. Most surgical techniques for arthrodesis aim at union within a reasonable time by avoidance of postoperative casting, minimal inequality of leg length, preservation of knee motion, proper position of the fused hip, and facilitation of potential future conversion to total hip arthroplasty by retaining the hip abductors (Iobst and Stanitski 2001). The introduction of Schneider's method of hip arthrodesis, using the Cobra-head plate, results in a more secure and reliable arthrodesis that requires minimal external support, permits earlier mobilization and has non-union rates of only 0-10% (Murrell and Fitch 1994). The Schneider arthrodesis permits conversion to THR, and preserves the abductor muscles. Klemme et al. (1998), stated that hip arthrodesis with the Cobra-head plate in adolescents at or above the 90th percentile weight-for-age is associated with an unacceptably high rate of pseudarthrosis (4 of 11 patients). However, our patients were all under-weight due to chronic disease. Sponseller et al. (1984) performed hip arthrodesis in 10 patients with hip tuberculosis, less than 10 years of age. They all had degenerative changes in the adjacent joints at the end of 33 to 58 years of follow-up. In our patients, the degenerative changes had started, and the pain was mild, possibly because of their relatively young age. Callaghan et al. (1985) and Sponseller et al. (1984) reported that 60% of their patients had low back pain, which is the commonest complaint after hip fusion in long-term follow-ups. The knee pain is the second commonest problem after hip arthrodesis with a prevalence of 8-57%, and the incidence of contralateral hip pain has been reported to be 25% (Chandler et al. 1981). Laxity of collateral ligaments does not significantly affect function. These data concerning the literature on hip arthrodesis, including the patient satisfaction rates of about 80%, accord well with our findings in adolescent patients having tuberculous coxarthrosis. Reactivation of tuberculosis has been reported in 2% to 5% of patients as late as 20 or more years after apparent healing (Tuli 2002). The average of 5 years of quiescent tuberculosis before our patients were operated on may have played a role in preventing reactivation in our patients.

No competing interests declared.

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