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Is cemented total hip arthroplasty for the treatment of active and advanced tuberculosis of the hip always justified?? A retrospective analysis

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Abstract

Background: The dilemma of whether a total hip arthroplasty (THA) should be attempted in a patient with a current or previous tuberculosis infection continues to cause controversy. The goal of this study was to evaluate the clinical result of cemented THA for the treatment of advanced tuberculosis of the hip.

Material methods: Ten patients with advanced tuberculosis of the hip treated by cemented THA were retrospectively analyzed. None of the patients had draining sinus preoperatively. In all the patients with a confirmed preoperative diagnosis of tuberculosis and elevated C-reactive protein and erythrocyte sedimentation rate, antituberculous medication was prescribed for at least 4 weeks preoperatively. Inflamed soft tissues and destroyed bones were completely curetted out intraoperatively and tissue sample sent for culture. All 10 patients received 1-stage cemented THA after thorough debridement. Tissue sample which was sent for culture came out to be positive in 5 cases with secondary bacterial infection. Antituberculous medications were prescribed for all patients for the first 6 months postoperatively.

Results: 4 out of 10 patients developed wound-healing complications and later discharging sinus. Out of these 4 patients 2 suffered hip dislocation. Mean Harris Hip Score was 35 (range, 30-43) preoperatively and 80 (range, 70-88) at last follow-up. At an average 12 month follow-up (range, 10-18months), no reactivation of tuberculosis was detected but reoperation required in 4 cases which had reactivation or secondary bacterial infection with discharging sinus postoperatively.

Conclusion: Cemented THA is a safe and effective procedure for advanced tuberculosis of the hip but it should be always followed after CT guided FNAC of hip joint with negative secondary bacterial culture reports. With thorough debridement followed by a complete course of antituberculous chemotherapy, active tuberculous infection should not be considered a contraindication for THA.

Keywords: Arthroplasty, culture, debridement, discharging sinus, tuberculosis

Introduction

Advanced tuberculosis of the hip can be divided into active and quiescent stages. It is characterized by considerable articular cartilage and bone destruction, deformity of the joint, narrowing of joint space, and ankylosis of the joint, which could lead to severe pain and serious disability of the hip joint. When presenting late, there are permanent changes in the joint with varying disability and there is a dilemma of dealing with this morbid anatomical and pathological changes in the joint. Literature has described various treatment options both nonoperative [1] and operative [2-5]. The surgical options vary from excision arthroplasty to hip replacement. Total hip arthroplasty (THA) is contraindicated in active cases with discharging sinus [3, 4]. For patients with quiescent infection and active cases without discharging sinus, the question of whether a THA should be attempted continues to cause controversy. Other controversial issues include the timing of surgery, the type of prosthesis to be used, and the appropriate treatment strategy. On an average 2-5% of patient's report back with reactivation of the disease within about 20 years after the apparent clinical healing of the first lesion [6].

This article reports 10 cases of advanced tuberculosis of the hip treated by cemented THA and shows how important is to rule out secondary bacterial infection in active tuberculosis of hip.

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Material and methods: We analysed retrospectively From August 2012 to September 2014, ten patients with advanced tuberculosis of the hip were treated by cemented THA. Institution review board approval has been taken. Out of ten patients, 6 were men and 4 women had an average age of 48 years (range, 40-65 years). 5 patients had a history of

synovectomy and joint debridement of the hip, 2 patients had wandering hip, 3 patients had advanced arthritis. All patients were presumptively diagnosed as having tuberculosis of the hip preoperatively after detailed clinical, radiological, and laboratory evaluations (as shown in table 1).

Table 1

Patient demographics							
Preoperative data							
S. no.	Sex/age	Relevant History	ESR	CRP Mg/l	Any Discharging Sinus in past	Preop. ATT 4wks before op.	HHS
1.	41y M	debridement	42	5.2	yes	given	34
2.	47yM	synovectomy	67	6.4	yes	given	40
3.	53yF	debridement	72	7.1	no	given	40
4.	50yM	debridement	66	9.1	no	given	38
5.	63yM	Wandering hip	58	6.6	yes	given	28
6.	42yF	debridement	32	11.1	no	given	42
7.	57yF	Wandering hip	69	7.7	yes	given	34
8.	60yF	-	42	5.0	no	given	38
9.	55yM	-	63	9.1	no	given	42
10.	64yM	-	81	8.3	no	given	38

All procedures were performed using a posterior approach. Caseous and necrotic material was found in the joint for all patients intraoperatively. Inflamed soft tissues and destroyed bones were completely curetted out and sent for staining, culture, and histopathologic examination. All patients received 1-stage cemented THA after thorough debridement. Two patient had acetabular reconstruction due to dislocation of the hip secondary to acetabular destruction (As shown in

fig). All patients were prescribed antituberculous medications with isoniazid, rifampicin, ethambutol, and pyrazinamide for the first 6 months postoperatively. To prevent additional infection, cephalosporins were given to all patients for 5 days postoperatively.

Results

Table 2

Postoperative data after 3 months								
s.no./age /sex	ESR	CRP	Discharging Sinus postop	Intraop. Culture report	ATT course	Harris Hip Score	Hip dislocn	reoperation
1/41y M	62	9.1	yes	E.coli	yes	72	+	Excision arthroplasty
2/47y M	55	17.4	yes	Staph. aureus	yes	78	-	Excision arthroplasty
3/53y F	20	8.8	no	-	yes	90	-	
4/50y M	12	2.0	no	-	yes	92	-	
5/63y M	17	3.4	no	-	yes	88	-	
6/42y F	35	16.8	yes	-	yes	84	-	
7/57y F	53	11.1	yes	Staph. aureus	yes	70	-	Excision arthroplasty
8/60y F	29	3.0	no	-	yes	86	-	
9/55y M	37	1.1	no	-	yes	92	-	
10/64y M	26	5.5	no	-	yes	88	-	

Culture specimens were positive for three patients (2 Staph. aureus and 1 E.coli); histopathologic analysis was positive for mycobacterium in all patients, with typical epithelioid granuloma with or without caseation. Polymerase chain reaction for the MPT 64 gene was positive in 8 out of 10 patients tested [7]. Laboratory parameters of ESR and CRP returned to normal in seven patients by the fifth to sixth month but 3 patients with secondary bacterial infection tends to have high ESR and CRP levels.

Table 3: showing mean ESR and CRP levels of 7 patients without secondary bacterial infection.

Time	ESR (mm/h)	CRP
At diagnosis	69	10.8
Pre-operatively	59	8.04
Post-operatively		
three weeks	30.14	6.3
three months	25	5.8
six months	13	5.2
nine months	9	4.7
12 months	8	4.6

Out of ten patients 4 patient had sinus discharge 2 months postoperatively whom we kept on culture specific antibiotic alongwith ATT. Out of these 4 patients 3 required reoperation in the form of excision arthroplasty and in 1 patient sinus healed by antibiotic coverage only. In one patient hip dislocation occurred postoperatively which was having secondary bacterial infection in which close reduction attempted but failed to achieve stable hip. In that case revision THR done with acetabuloplasty 6 months after first operation (as shown. In fig.1 and fig.2). Mean Harris Hip Score (HHS) was 84 (70-92). Two patients with postoperative low HHS were not satisfied as they have painless hip but unstable. All the patients kept on ATT for 12 months postoperatively. None of our patients experienced changes in liver function, drug intolerance, or hypersensitivity reactions.

Discussion: THA in patients with active TB is controversial [8-14]. However studies showing favorable microbiologic properties of mycobacterium after ATT, and clinical success after implant use in patients with spinal TB with hip arthritis, prompted us to perform THA in patients with active TB and

study their reactivation, laboratory findings, and clinical results [5, 11-17].

The study limitations were that this is a small series with short-term follow up and the retrospective design means diagnostic criteria, surgical approaches, and medical management were not standardized. All patients in this study were diagnosed on the basis of clinical, biochemical, and radiographic findings, which are quite accurate in places endemic for TB, and the microbiologic diagnosis was established after study of the tissue obtained at surgery. However in the emergence of drug-resistant TB, we now routinely perform preoperative CT-guided biopsy, with specimens undergoing culture and sensitivity testing.

In the majority of patients with TB of the hip, the treatment comprising drug therapy, traction, and supervised mobilization produces good results, especially during the early stages of the disease. In patients who do not respond favorably to nonoperative treatment, joint clearance surgery (a combination of synovectomy and joint débridement) should be performed before the hip is destroyed and the hip should be immobilized in a functional position in a spica cast for 6 to 8 weeks followed by rehabilitation [18]. If unacceptable functional results are seen after adequate treatment, then depending on the amount of destruction and extent of fibrous ankylosis, resection arthroplasty or THA performed [19].

Sidhu *et al.* [4] showed declining trend in postoperative ESR and CRP which is also shown in our study except for few cases with persistent high levels because of secondary bacterial infection.

In two small case series reporting THA in patients with active TB, the patients had no recurrences, and the authors emphasized adequate surgical débridement and ATT for a successful outcome [11, 17]. Several authors recommend preoperative chemotherapy from 1 to 4 weeks to as much as 3 months before any surgery in the presence of active infection [11, 14], and we empirically treated all patients a minimum of 4 weeks before surgery. This period allows stabilization of the lesion, improvement in soft tissue contractures with traction, and better planning of the reconstructive procedure. Similarly in our study 8 out of 10 patients had good HHS but HHS was low in two patients because of secondary bacterial infection.

Babhulkar and Pande insisted that the joint replacement in patients with the active stage of the disease is contraindicated because of a probable high reactivation rate [18]. They observed a few patients with persistent sinuses and continued activity of infection after THA. The implants were removed in four patients. The disease healed and the excision arthroplasty was done. In healed TB with subluxation/dislocation of long duration, where replacement surgery is not advisable, the stability can be provided by tectoplasty an acetabuloplasty, which aims to provide an extra-articular weight-bearing surface in cases of dysplastic acetabulum, hip subluxation or dislocation with a false acetabulum [20]. After raising the outer table of the iliac bone at the lateral edge of the affected acetabulum, as a proximally-based flap, bone grafts are inserted in the space to provide a congruous, nonabsorbable roof for the femoral head. Tectoplasty was done in one of our patient with good results.

Our experience with these patients allows us to believe THA is a safe procedure in active TB providing symptomatic relief, functional improvement, and early return to activity but in TB hips with discharging sinuses previously, in those cases its wise to perform CT guided FNAC. Larger group with longer follow up is required to consolidate above statement.



Fig 1: Showing preoperative advanced TB hip with wandering acetabulum



Fig 2: Postoperative x-ray showing THR with acetabular reconstruction

Conclusion: We recommend preoperative culture and sensitivity and, in the absence of secondary bacterial infection, to proceed with a single-stage procedure accompanied by thorough débridement to decrease the disease load in patients with advanced disease, followed by a complete course of ATT alongwith culture specific antibiotics. Patient counseling regarding compliance with the ATT regimen and postoperative protocol is very important in ensuring success.

Footnotes

Each author certifies that he or she has no commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article.

Each author certifies that his or her institution has approved the human protocol for this investigation that all investigations were conducted in conformity with ethical principles of research, and that informed consent for participation in the study was obtained.

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