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Jaspal Singh
Professor, Department of
Orthopaedics, GMC Amritsar,
Punjab, India

Basant Rai
Assistant Professor, Department
of Orthopaedics, GMC Amritsar,
Punjab, India

Rohit Bhagat
Junior resident, Department of
Orthopaedics, GMC Amritsar,
Punjab, India

Surinder Kumar
Senior resident, Department of
Orthopaedics, GMC Amritsar,
Punjab, India

Retrospective study of 25 cases of cemented total hip replacement

Jaspal Singh, Basant Rai, Rohit Bhagat and Surinder Kumar

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Abstract

Background: Total hip arthroplasty (THA) has completely revolutionized the nature in which the arthritic hip is treated. This study was conducted to evaluate the results of cemented total hip replacement, their complications and causes of failure to achieve the ideal results.

Materials & Methods: This study consisted of follow up of a total of 25 cases (male- 20, female- 5). Patients with various hip diseases treated with cemented total hip replacement were studied. Antero-posterior radiographs of bilateral hips and proximal shaft distal to tip of prosthesis and lateral radiographs were taken. In all patients, Pain, limp, absence of deformity and range of motion was recorded. Total Harris Hip Score, grading of the Harris hip score and Successful result was recorded as poor, fair, good and excellent.

Results: The most common indication was idiopathic avascular necrosis of head femur 16 (64%) patients, followed by fracture neck of femur 6 (24%) patients, followed by posttraumatic osteoarthritis of hip 2 (8%) patients, followed by Post traumatic AVN of hip 1 (4%) patient. Harris hip score before surgery was in the range of 41-50 had maximum number of patients i.e. 10 (40%) patients and the mean preoperative Harris Hip Score was 44 ranging from 23-56 which following poor category as per told by the patient on follow up visits. The mean follow up was 36 months ranging from 7-76 months. The mean range of flexion at final follow up was 123.8 degrees (range 100 degrees to 140 degrees) at 1-5 years of follow up.

Conclusion: Cemented total hip replacement is a safe, reproducible and excellent surgical procedure for and stage painful hip diseases. It improves the functional handicap of patients dramatically.

Keywords: Cemented total hip replacement, Head femur, Osteoarthritis

Introduction

Total hip arthroplasty (THA) has completely revolutionized the nature in which the arthritic hip is treated, and is considered to be one of the most successful orthopaedic interventions of its generation. The credit for putting arthroplasty of the hip firmly on the surgical map goes to Smith-Petersen, of Boston. With concern about dislocations, authors returned to implants with normal-sized heads, looking to better polyethylene cups, newer modular components, and larger femoral stem sizes^[1]. Protocols also were being developed in prophylactic treatment for thromboembolic disease and infection. Titanium alloy was being experimented with as well as the use of noncemented prostheses that had porous surfaces for bone ingrowth. By the early 1990s, despite great advances, loosening continued to occur and hybrid designs were being introduced, however, not always with uniformly good results^[2].

The primary function of the hip joint is to weight-bear. There are a number of factors that act to increase stability of the joint. The first structure is the acetabulum. It is deep, and encompasses nearly all of the head of the femur. This decreases the probability of the head slipping out of the acetabulum (dislocation). There is a horseshoe shaped fibrocartilaginous ring around the acetabulum which increases its depth, known as the acetabular labrum. The increase in depth provides a larger articular surface, further improving the stability of the joint^[3].

Conventional cemented total hip replacement dramatically improves a patients function and quality of life. An important cause of clinical failure leading to surgical revision in cemented total hip arthroplasty is biological loosening by osteolysis due to aggressive osteolysis. The clinical failure such as symptomatic aseptic loosening leading to revision of arthroplasty, occur

Corresponding Author:
Rohit Bhagat
Junior resident, Department of
Orthopaedics, GMC Amritsar,
Punjab, India

At a rate of 1% per year of follow up [4]. This study was conducted to evaluate the results of cemented total hip replacement, their complications and causes of failure to achieve the ideal results.

Materials & Methods

This study consisted of follow up of a total of 25 cases (male-20, female- 5). Patients with various hip diseases treated with cemented total hip replacement were studied. Those patients were included who have completed minimum of 6 months follow up. Approval of study was taken from Institutional Ethics Committee, Govt. Medical College, Amritsar. An adult patient of either sex treated with cemented total hip replacement in the department of Orthopaedics of Government Medical College, Amritsar were selected for this study after taking their written informed consent.

Clinical history, general physical examination and local examination were recorded. The follow up was carried out using interviews and physical examination. Antero-posterior radiographs of bilateral hips and proximal shaft distal to tip of prosthesis and lateral radiographs were taken. Latest sets of radiographs were compared with previous radiographs for any evidence of loosening or heterotopic ossification. Clinical evaluation was based on pre-operative and post-operative Harris hip criteria and clinico-radiological evaluation of the patients.

Pain was recorded as none, slight, mild pain, moderate pain, marked pain and totally disabled. Limp was recorded as none, slight, moderate and severe. Support as none, Cane for long walks, Cane most of time, one crutch, two canes and two crutches or not able to walk. Other parameters recorded were distance walk, sitting, public transportation, stairs, put on shoes and socks, absence of deformity and range of motion was recorded. Total Harris Hip Score, grading of the Harris hip score and Successful result was recorded as poor, fair, good and excellent. Results were statistically analyzed.

Results

Table 1: Age distribution

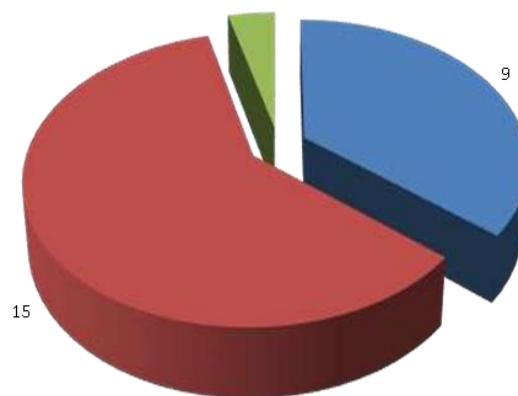
Age in years	No. of Patients	Percentage
31-40	2	8%
41-50	4	16%
51-60	8	32%
61-70	8	32%
71-80	3	12%
Total	25	100.00%

Table I shows that most of the patients were between age 31-80 mean age of the patients 58.1 years.

Table 2: Distribution of patients based on diagnosis

Diagnosis	No. of Patients	Percentage
Idiopathic Avascular Necrosis of HIP	16	64.00%
Post traumatic osteoarthritis of HIP	2	8.00%
Post traumatic AVN of HIP	1	4.00%
Fracture Neck of Femur	6	24.00%
Total	25	100.00%

Table II shows that most common indication was idiopathic avascular necrosis of head femur 16 (64%) patients, followed by fracture neck of femur 6 (24%) patients, followed by posttraumatic osteoarthritis of hip 2 (8%) patients, followed by Post traumatic AVN of hip 1 (4%) patient.



Graph 1: Side of injury

Graph 1 shows that 9 (36%) patients operated on right side, in 15 (60%) patients left side was involved and only 1 (4%) patient in which both the hips were involved.

Table 3: Preoperative HARRIS Hip score

Preoperative Harris Hip Score	No. of Patients	Percentage
21-30	1	4.00%
31-40	8	32.00%
41-50	10	40.00%
51-60	6	24.00%
Total	25	100.00%

Table III shows that Harris hip score before surgery was in the range of 41-50 had maximum number of patients i.e. 10 (40%) patients and the mean preoperative Harris Hip Score was 44 ranging from 23-56 which following poor category as per told by the patient on follow up visits.

Table 4: HARRIS Hip score at final follow up

Harris Hip Score at final follow up	No. of Patients	Percentage
61-70 (Poor)	1	4.00%
71-80 (Fair)	0	0.00%
81-90 (Good)	7	28.00%
91-100 (Excellent)	17	68.00%
Total	25	100.00%

Table IV shows that Harris Hip Score at final follow up ranging from 65-98 was found with mean Harris hip score at final follow up of 91 points. 24 patients were in the range of good to excellent at 1 - 5 years follow up.

Table 5: Duration of follow up

Duration of follow up in months	No. of Patients	Percentage
≤ 20	5	20.00
21-40	11	44.00
41-60	6	24.00
61-80	3	12.00
Total	25	100.00%

Table V shows that mean follow up was 36 months ranging from 7-76 months.

Table 6: Range of flexion at final follow up

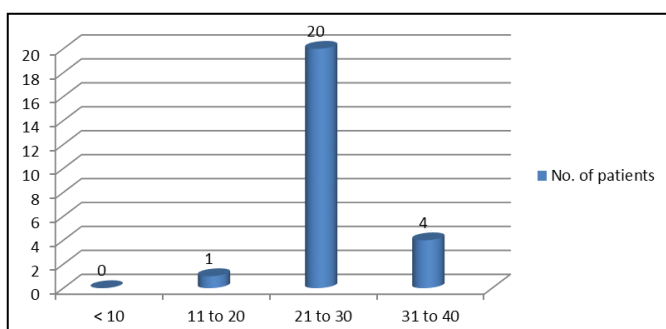
Range of flexion at final follow up	No. of patients	Percentage
< 100	0	0.0%
100 to 110	9	36.0%
111 to 120	1	4.0%
121 to 130	7	28.0%
131 to 140	8	32.0%
Total	25	100.0%

Table VI shows that mean range of flexion at final follow up was 123.8 degrees (range 100 degrees to 140 degrees) at 1-5 years of follow up.

Table 7: Range of abduction at final follow up

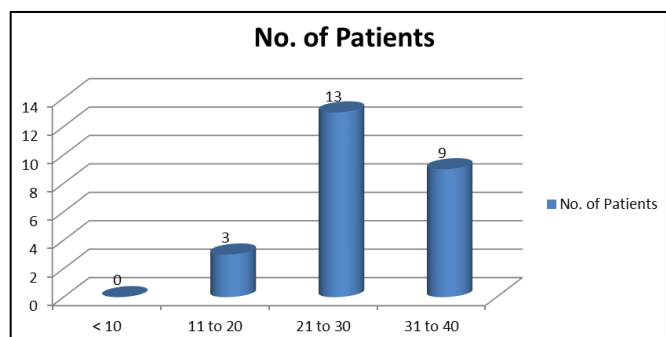
Range of Abduction at Final Follow up	No. of patients	Percentage
< 10	0	0.0%
11 to 20	0	0.0%
21 to 30	19	76.0%
31 to 40	6	24.0%
Total	25	100.0

Table VII shows that mean range of abduction at final follow up was 31.4 degrees (range 25 degrees to 40 degrees) at 1-5 years of follow up.



Graph 2: Range of abduction at final follow up

Graph II shows that mean range of adduction at final follow up was 29 degrees (range 20 degrees to 40 degrees) at 1-5 years follow up.



Graph 3: Range of external rotation at final follow up

Graph III shows that mean range of external at final follow up was 30 degrees (Range 20 degrees to 40 degrees) at 1-5 years follow up.

Table 8: Range of internal rotation at final follow up

Range of Internal rotation at final follow up	No. of patients	Percentage
< 10	0	0
11 to 20	14	56.0
21 to 30	11	44.0
31 to 40	0	0.0
Total	25	100

Table VIII shows that mean range of internal rotation at final follow up was 23.4 degrees (range 15 degrees to 30 degrees) at 1-5 years follow up.

Table 9: Complications

Complications	No. of Patients	Percentage
Infection	2	8.0%
Anterior thigh pain	1	4.0%
Prosthesis Dislocation	1	4.0%
Prosthesis Loosening	4	16.0%
Periprosthetic fracture	1	4.0%

Table IX shows that infection was seen in 2 (8%) patients, anterior thigh pain was seen in 1 (4%) patients, Prosthesis dislocation was reported in 1 (4%) patients, prosthesis loosening was reported in 4 (16%), peri-prosthetic fracture was seen in 1 (4%) patient.

Discussion

Total hip replacement has revolutionized the treatment of various hip pathologies with advancing knowledge of hip bio mechanics total hip replacement has evolved with new prosthesis design operative technique and better material for prosthesis. In present retrospective study, 25 patients of various hip pathologies treated with cemented total hip replacement were followed for an average period of 36 months ranging from 7-76 months. In our series we have found cemented total hip replacement was performed mainly in 5th and 6th decade of life with a mean age of 58.1 years ranging from 37 to 75 years. Similar observation were made in various studies conducted by Inmann MM *et al.* [5].

In our study males were predominantly operated for total hip replacement 80% (20 patients) while 20% i.e. 5 patients were females. Similar male predominance has been reported in studies by Markmiller *et al.*, [6] (82%) males. As the incidence of idiopathic avascular necrosis of femoral head is higher in males compared to females.

The common indication for total hip replacement in our study was idiopathic avascular necrosis of head of femur were 72% (18 patients) and osteoarthritis of hip 16% (4 patients) and fracture neck of femur 12% (3 patients). Studies done by Kim YH *et al.*, [7] AVN of femur head in 39.65% neglected fracture neck of femur is 23.27% osteoarthritis, 20.68% has been reported.

In our study 9 (36%) patients had right hip involvement while 15 (60%) patients had left side involved and 4 patient had both the hips involved. Studies have shown no clinical significance. We used Harris hip score for follow-up of functional outcome of patients Söderman P *et al.*, [8] also used Harris hip score for evaluation of functional outcome. This shows that for functional assessment of hip Harris Hip score is widely accepted.

The mean preoperative Harris Hip Score in our study was 44 points ranging from 23 to 56 points. Studies conducted by Kim YH *et al.*, [7] had (mean preoperative Harris hip score 55), and Garellick G *et al.*, [9] had preoperative Harris hip score 48 points. It implies that total hip replacement is indicated in end stage painful hip diseases which significantly disables the patient.

The mean postoperative Harris hip score at final follow up in our study was 91 points ranging from 65 to 96 points. Similar results were reported in studies conducted by Kim YH *et al.*, [7] (average Harris hip score 91 points). Most of the patients in our study, at final follow up had good to excellent results. 17 patients (68%) had excellent function outcome at 1-5 years follow up (Harris Hip Score >90), 7 patients (28%) had good functional outcome (Harris Hip Score 80-89) and rest of the

Patients had poor to fair results (Harris Hip Score <80 points). Ring *et al.*,^[10] after 5 years follow-up reported excellent result in 70% patients, 20% good and poor to fair in rest 10% cases.

In our study anterior thigh pain was reported in 1 (4%) cases. In our study abduction improved from 16.6 degrees to 31.4 degrees adduction from 12.4 degrees to 29 degrees external rotation from 14 degrees to 29 degrees internal rotation from 8 degrees to 24 degrees, average flexion from 80 degrees to 125 degrees at final follow-up. Kim *et al*⁷ reported improvement of flexion from 84 to 112, internal rotation from 15 to 34, external rotation from 28 to 40 degrees, abduction from 30 to 50 degrees and adduction from 21 degrees to 37 degrees at final follow-up.

In our series only 2 patients reported infections which were superficial and responded to intravenous antibiotics. A study conducted by Junilla *et al.*,^[11] which show the incidence of loose components at five years was 6.5 per cent for the acetabular component and 24 per cent for the femoral component. At ten years the incidence of loosening had increased to 11.3 per cent for the acetabular component and 29.9 per cent for the femoral component. Therefore, between five and ten years postoperatively the rate of femoral loosening decreased, while the rate of acetabular loosening remained about the same.

Periprosthetic fracture was seen in 1 (4%) patient which was managed with plating. Gwan *et al.*,^[12] in a study concluded the current overall incidence of periprosthetic femur fracture to be approximately 4.1%, with higher rates for uncemented and revision THA. Late periprosthetic fractures account for approximately 6% of revision cases and are the third most common reason, after aseptic loosening and infection, for revision surgery. In our study prosthesis dislocation was noted in 1 (4%) patients while in the study of Ali Khan MA *et al.*,^[13] incidence of dislocation was 2.1%. Patients with neuromuscular disorder, those in a confused mental state, and those undergoing revision operations are at special risk. The commonest surgical error, present in nearly half the patients, was placing the acetabular cup (open type) too vertically or too anteverted. A less common fault was placing the femoral component too anteverted. Neither the original pathology nor the approach to the hip appeared to affect the likelihood of dislocation.

Conclusion

It can be said safely that cemented total hip replacement is a safe, reproducible and excellent surgical procedure for and stage painful hip diseases. It improves the functional handicap of patients dramatically. Complication rate is very low if proper technique is used with strict aseptic techniques. Hence, cemented total hip replacement is highly recommended surgery for end stage painful hip diseases.

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