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FUNCTIONAL OUTCOMES OF UNCEMENTED TOTAL HIP REPLACEMENT ARTHROPLASTY

Orthopaedics

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ABSTRACT

Background & Objectives: Total hip arthroplasty is a well documented surgical procedure. It relieves pain and functional disability experienced by patients with moderate to severe arthritis of the hip, improving their quality of life. The success of Total Hip Replacement arthroplasty is its ability to relieve the pain associated with hip joint pathology, while maintaining the mobility and stability of the hip joint. The most common condition for which total hip arthroplasty is done is severe osteoarthritis of the hip, accounting for 70% of cases. The primary indication for this procedure is severe pain and the limitation in activities of daily living that it causes. To warrant doing total hip replacement, pain must be refractory to conservative measures such as oral

nonsteroidal anti-inflammatory medication, weight reduction, activity restriction, and the use of supports such as a cane.

The purpose of this study was to evaluate the clinical and functional outcomes of uncemented Total Hip Replacement using Modified Harris hip score and radiological assessment.

Methods: The study was carried out on 42 hips of 32 patients of Total Hip Replacement operated in the Department of Orthopedics, Tertiary care Hospital from April 2016 to April 2018. Information on the patients was compiled from clinical details, case files and operation theater records. This was a retrospective as well as prospective study. Patient follow up was for a minimum of 6 months to a maximum of 24 months (2 years).

Results: Excellent or good pain relief and function were obtained in 85.7% of patients after THR, which was performed in a population of active patients. The mean total pre operative score was 33.43, which improved post operatively to a mean score of 89.43. The most common complication noted was stress shielding (33.3%). Osteolysis and nerve injury were seen in 4 individual patients. 18 patients (42.9%) did not have any complications. 66.6% of the patients who had single or multiple complications showed good to excellent results.

Conclusion: Our study suggests that the current generation implants without cement can provide satisfactory clinical and radiographic outcomes after an intermediate duration of follow-up. Though the study was not free of complications, the overall functional and clinical outcome showed good results.

KEYWORDS

Uncemented Total Hip Replacement; Modified Harris Hip Score; Osteoarthritis; Anterior thigh pain; Stress shielding.

INTRODUCTION

Total hip replacement arthroplasty is a surgical procedure, which has relieved millions of people from incapacitating pain arising from the hip joint. At present it is the most commonly performed adult re-constructive hip procedure.[1] The success of Total Hip Replacement arthroplasty is its ability to relieve the pain associated with hip joint pathology, while maintaining the mobility and stability of the hip joint.

The incidence of chronic disabling conditions of the hip such as osteoarthritis, inflammatory arthritis and osteonecrosis is on the rise. The most common condition for which total hip arthroplasty is done is severe osteoarthritis of the hip, accounting for 70% of cases. The primary indication for this procedure is severe pain and the limitation in activities of daily living that it causes. To warrant doing total hip replacement, pain must be refractory to conservative measures such as oral nonsteroidal anti-inflammatory medication, weight reduction, activity restriction, and the use of supports such as a cane.

The field of total joint replacement is in an evolutionary state. The first total hip replacement is thought to have been done in London by Phillip Wiles in 1938.[2] The procedure was further developed in the 1950s by pioneers such as McKee and Farrar.[3] This early work laid the groundwork for the innovative studies of Sir John Charnley who, in the late 1960s, approached the problem of artificial hip joint design by using the biomechanical principles of human hip joint function.[4,5] Improvements in implant design materials and fixation techniques continued but Charnely's basic concept continues to be valid.

Conventional cemented total hip arthroplasty dramatically improves a patient's function and quality of life. With contemporary prostheses and modern cementing techniques, the rate of femoral loosening appears to be substantially reduced.[6] Regardless of the cementing technique, mechanical loosening occurs more commonly in young, heavy, active men and with certain prosthetic designs.

Noncemented total hip arthroplasty was developed in response to evidence that cement debris plays an important role in promoting bone lysis and loosening. Prosthetic devices have been developed that achieve fixation without cement, either by "press-fit" or by biologic in growth. With the press-fit technique, stabilization is achieved by interference fit of the implant into the femur. With biologic ingrowth, fixation occurs by bone ingrowth into a porous surface. Noncemented devices are most frequently used in young patients with high physical demands, where a revision surgical procedure in the future will be more likely. Preliminary data suggest that noncemented total hip arthroplasties have a relatively low revision rate and excellent prosthetic durability for as long as 15 years. Compared with cemented hip arthroplasties, however, patients have a higher incidence of low-grade temporary thigh pain. Although short-term results appear to be less satisfactory compared with cemented hip arthroplasty, after 5 to 20 years, the results in the two procedures are similar.[7]

Early complications of hip arthroplasty include fracture, nerve injury, dislocation, deep vein thrombosis and pulmonary embolism. Late complications include infection, heterotrophic ossification and loosening. Aseptic femoral and acetabular loosening which is a potential cause of pain and loss of function have emerged as the most serious complications of THR and the most common indication for revision.[8] Periprosthetic fractures of femur can be a difficult problem to manage. Several factors contributing to these adverse effects, which may eventually result in failure of the total hip arthroplasty, include the selection of the patients and the materials and design of the implant.[9] Many designs have been studied in an attempt to minimize these adverse effects and thus improve outcome. Total hip replacement (THR) relieves the pain and functional disability experienced by patients with moderate to severe arthritis of the hip, improving their quality of life.[10] It is a highly cost-effective procedure.[11] The anatomically designed prosthesis can provide good results, with low prevalence of pain in the thigh and loosening of the component, in younger active patients.

Evaluation of long term outcomes of an operative procedure is important to determine the durability of the procedures like total hip replacement (THR). Patient derived outcome scales have become increasingly important to surgeons and clinical researchers for measuring improvement in function after surgery. It provides a means for comparison of the results of different clinical interventions which may lead to changes in operative technique and implant design over

time. The Harris hip score is the most widely used scoring system for evaluating hip arthroplasty.[12]

This study is undertaken to assess the clinical and functional outcome of the uncemented total hip replacement in our institution.

Objectives of Study

To assess the Clinical and Functional outcomes of Uncemented Total Hip Replacement

- Using Modified Harris Hip Score in terms of
- Pain
- Functional disabilities
- Deformity
- Range of movements
- Limb length discrepancy
- Radiological assessment for evaluation of outcome and complications.

METHODOLOGY

Study Design

The study was carried out on 42 hips of 32 patients of Total Hip Replacement operated in the Department of Orthopedics, Tertiary Hospital Surat from April 2016 to April 2018. Information on the patients was compiled from clinical details, case files and operation theatre records. This was a retrospective as well as prospective study. Patient follow up was for a minimum of 6 months to a maximum of 24 months (2 years).

The following **Inclusion/ Exclusion criteria** were used for recruitment of patients in the study.

Inclusion Criteria:

- All the patients who had undergone Uncemented Total Hip Replacement for isolated hip pathologies at our hospital.

Exclusion Criteria:

- The patients who had undergone Uncemented Total Hip Replacement with deformities or pathologies of other joints of the lower limb, which may have had an adverse bearing on the functional outcome of the surgery.
- The patients who had undergone Cemented Total Hip Replacement.

Study Procedures

Patient Data

32 patients were available for the follow-up with their previous operative records, annual X-ray films and follow-up papers. 10 patients underwent bilateral total hip replacement and 22 patients underwent unilateral total hip replacement.

All patients underwent a standard clinical and laboratory evaluation that includes briefly information about age, sex, address, clinical history and routine investigation which were done pre operatively. X-Ray of hip joint with AP view was done. Information on the patients was also compiled from clinical details, Case files and Operation theatre records. Pre-op ROM, deformities and its values were recorded for the study by clinical evaluation or from the hospital case sheets and discharge summaries.

Pre- Operative Planning

Clinical assessment

Detailed history and proper clinical examination is essential to find out: Duration of illness, focus of infection in the body, sensory motor examination, vascularity of limb, ambulatory status of the patient, deformities of the hip, ROM of the hip and status of the other joints.

The deformity and ROM were measured with goniometer. All the patients were assessed using Modified Harris Hip Score.

Radiological assessment

Radiogram of the pelvis with both hips with proximal half of shaft of femur AP view was taken for all patients. The radiograph was evaluated for

- size of the acetabulum
- bone stock of the acetabulum
- any protrusion and periacetabular osteophyte formation
- the structural integrity of the acetabulum
- need for bone grafting
- Size of the femoral canal

Templating was done for the aectabular and femur components. The appropriate acetabular cup size, and anteversion was determined. On the femoral side, using a template, appropriate neck length, offset and stem size of the implant is chosen.

The aim of the pre-op planning was to obtain the following results post-operatively.

1. An acetabular socket located in the anatomical position.
2. Centre of rotation of femoral head located in its normal anatomical position.
3. Restoration of limb length.
4. Restoration of abductor moment arm.

Surgical Technique

In our study we have used the posterolateral approach for Hip joint.

Post operative protocol

The hip is positioned in approximately 15 degrees of abduction while the patient is recovering from the anesthetic using a triangular pillow to maintain abduction and prevent extremes of flexion.

First post op day, check X-rays are taken. The patient is taught static quadriceps exercises; knee and ankle mobilization exercised and made to sit.

Second post op day dressing changed and smaller dressing is applied. Gait training was started using a walker with weight bearing to tolerance. Drains were removed 24 to 48 hours after surgery.

IV antibiotics were given for 48 hrs later switched over to oral antibiotics for further 5 days more. DVT prophylaxis was given in the form of low molecular weight heparin / heparin for first five days after surgery.

12th post op day sutures are removed and discharged from the hospital to be reviewed after one month.

They were advised-

- Not to squat
- Not to sit cross legged
- Not to use Indian toilets
- Not to cross the lower limb across the midline

Follow Up

The patients were followed up at 6 weeks, 3 months, 6 months, 1 year and at yearly intervals. Patient follow up was for a minimum of 6 months to a maximum of 24 months (2 years).

Clinical assessment

During each visit, medical history was taken and physical examination was done. The deformity and ROM were measured with goniometer. The clinical and functional outcomes were evaluated by **Modified Harris Hip Score.**

The score is reported as 90-100 for excellent results, 80-90 being good, 70-79 fair, 60-69 poor, and below 60 a failed result.

Radiological Assessment

A radiograph was taken at the end of the procedure and during follow up visits. The standard radiograph was an anteroposterior view of pelvis including both hips and sufficient length of femur. The radiological assessment included positioning and alignment of the acetabular and femoral components and complications such as periprosthetic fractures, loosening, osteolysis, dislocation, subsidence and heterotrophic ossification.

Method of Statistical Analysis

Appropriate statistical analysis was applied for comparing the incidences of adverse events and other complications. Additional exploratory (parametric as well as non-parametric) analysis of the data was performed as deemed essential by using appropriate statistical tests.

The following methods of statistical analysis have been used in this study: The Excel and SPSS (SPSS Inc, ver. 10.5 Chicago) software packages were used for data entry and analysis. The results were

averaged (mean + standard deviation) for each parameter for continuous data and numbers and percentage for categorical data presented in Table.

RESULTS

The study was carried out on 42 hips of 32 patients who underwent uncemented Total Hip Replacement. In all the patients, posterolateral approach was used. Intraoperatively, for 2 patients we came across increased vascularity, due to previous surgery in the same hip. Haemostasis was achieved. Bone grafting was done in 2 patients with acetabular cyst and in 6 patients the acetabular cup was fixed with 2 acetabular screws each. During the procedure 3 patients had Type A2 Vancover fracture of the proximal femur which was fixed with SS wire cerclage which united as documented by the follow up Xrays. One patient developed foot drop in the immediate post operative period which failed to recover even after 1 year.

Age distribution

This study was conducted on patients with age ranging from 23 to 61 years with a mean age of 43.62 years at the time of surgery.

Gender Distribution

In this study, 38(90.5%) were males and 4 (9.5%) were females.

Diagnosis

The main indication for surgery was AVN in 22 patients (52.4%). 8 (19.0%) were arthritis due to other causes.

Ankylosing spondylitis and non union fracture neck of femur group had 6 patients (14.3%) each.

Table 6: Showing diagnosis in the study

Indication	Frequency	Percent
Ankylosing Spondylitis	3	14.3
Arthritis	4	19.0
AVN	11	52.4
Non Union Fracture of Neck of Femur	3	14.3

Side Affected

10 patients underwent bilateral total hip replacement and 22 patients underwent unilateral total hip replacement.

24 (57.1%) total hip replacement was done on the left side and 18 (42.9) on the right side.

Prosthesis

The prosthesis used were of 2 companies, DePuy and Zimmer. 34(81.0%) of them were DePuy.

Femoral Stem

In 24 patients (57.1%), we used the DePuy Corail stem.

Stem size: The maximum stem size used was 14 and minimum was 5. According to this study, stem size 11 was most frequently used (23.8%), followed by stem size 13 (19%).

Femoral Head

In 34 patients (81.0%), we used head size 28 +1.5 head offset was used more frequently, 16 patients (38.1%).

Acetabular Component

Shell: In 57.1% of the patients (24 patients) we used DePuy Duraloc Shell.

The maximum shell size used was 58 and minimum was 48. Shell size 54 was the most commonly used (38.1%) and size 48 was the least commony used.

Liner: The liner size used corresponded to the size of the head. Size 28 was the most frequently used 81.1% (17 patients).

Component Size

For example, with regards to stem size of DePuy company, 16 stems were used, with the minimum size being 9 and the maximum being 14. Similar data has been depicted for the different components as well.

Follow up

The minimum patient follow up for the study was 6 months and the maximum was more than 24 months (up to 42 months). Majority of the patients were followed up during the period of 6 to 24 months (57.1%).

Table: duration of follow up

Follow-up months	Frequency	Percent
6 Months	12	28.6
>6-24 Months	24	57.1
>24 Months	6	14.3
Total	42	100.0

Outcome

Modified Harris Hip Score

Table: Pre operative and post operative scores according to the various parameters of the Modified Harris Score System

	N	Mean	Std. Deviation	Min	Max	't' value	'p' value
Pain	Pre 21	11.43	3.586	10	20	621.919	<0.001
	Post 21	41.71	4.256	30	44	64.823	
Function-Gait	Pre 21	10.24	8.233	0	27	116.673	<0.001
	Post 21	27.05	4.873	13	33	2.105	
Function-Activity	Pre 21	5.29	2.473	0	10	116.673	<0.001
	Post 21	12.00	1.414	10	14		
Absence of	Pre 21	3.62	1.203	0	4	2.105	0.155
deformity	Post 21	4.00	.000	4	4		
ROM Score	Pre 21	2.33	1.354	0	4	55.323	<0.001
	Post 21	4.67	0.483	4	5		
Total Score	Pre 21	33.43	12.331	17	61	288.445	<0.001
	Post 21	89.43	8.733	63	99		

N represents the total number of patients included in the study. 'p' value of less than

0.05 indicates statistical significance.

For the total score and each of the parameters, higher score implies lesser disability. The mean total pre operative score was **33.43**. The maximum score being, 61 and the minimum, being 17. Post operatively the total mean score was **89.43**, with the 63 being the minimum and 99 being the maximum.

With regards to the different parameters in the scoring system ie, pain, gait, functional activity and ROM, there was a statistically significant improvement ('p' value of <0.001) in the post operative score when compared to pre operative score.

But no statistically significant difference in score was found in the parameter - absence of deformity, post operatively, implying that most of the patients did not have any severe deformities preoperatively.

Outcome Analysis

Table: Comparison of the pre operative versus post operative scores according to the grading

Outcome Score Grade	Visit	
	Pre	Post
Poor	38(90.5%)	0
Fair	4 (9.5%)	6 (14.3%)
Good	0	6 (14.3%)
Excellent	0	30(71.4%)
Total	42	42

The score is reported as 90-100 for excellent results, 80-90 being good, 70-79 fair, 60- 69 poor, and below 60 for a failed result. Pre operatively 90.5% had a poor score. The results showed a significant improvement, wherein 71.4% had an excellent score and 14.3% showed good and fair results each. No patient had a poor score.

Post Operative Limb Length Discrepancy

Table: shows the limb length discrepancy in the patients post operatively.

Lengthening	Frequenc y	Percent
1.0	4	9.5
1.5	4	9.5
Not Applicable	34	81.0
Total	42	100.0

4 patients (9.5%) had 1 cm limb lengthening and 4 patients (9.5%) with 1.5cm lengthening in the operated side.

In the age group of patients less than 30 years (19% of the study group), all of these patients had excellent post operative outcome scores. In the 30 – 50 year age group 75% had excellent and 12.5% had good and fair results each. In the patients above 50 years, 55.6% had excellent outcome scores and 22.2% had good and fair outcome scores. Though the outcome scores were fair in 12.5% of 30-50 group and 22.2% in above 50 group there was no statistical significance noted.

6 patients with AVN and 2 patient with non union fracture neck of femur had fair outcome (70-79 score). But there was no statistically significance between the indication of surgery and final outcome.

Post Operative Acetabular Cup Angle
In 42.9% of the patients the acetabular cup angle was 40°. The average acetabular angle was 45.7°±5.284

Outcome according to Acetabular Cup Angle
4 patients with acetabular angle <50 had fair post operative outcome scores and 18 had excellent score where as in the ≥ 50 group, 2 had fair, 6 had good and 12 had excellent scores.

Femoral Stem Placement
In 23.8% of the patients the femoral stem was in varus position and in 76.2% it was placed centrally.

Outcome According to Femoral Stem Placement
Out of the 6 patients who had fair outcome score 4 patients had centrally placed femoral stem and 2 were placed in varus. There was not statistical significance noted.

Complications
The most common complication noted was stress shielding (33.3%). Osteolysis and nerve injury were seen in 4 individual patients. 18 patients (42.9%) did not have any complications

Table: Shows the frequency of various complications seen in the study

Complications	Frequency	Percent
Nerve injury	2	4.8
Superficial Infection	2	9.5
Periprosthetic Fracture	3	14.3
Anterior thigh pain	3	14.3
Stress Shielding	14	33.3
Osteolysis	2	4.8
No Complication	18	42.9

Table: shows the frequency of patients with single and multiple complications

Complications	Frequency	Percent
Nerve injury	2	4.8
Superficial Infection	4	9.5
Stress Shielding	8	19.0
Periprosthetic Fracture	2	4.8
Anterior thigh pain + Stress Shielding	2	4.8
Anterior thigh pain + periprosthetic fracture	2	4.8
Stress Shielding + Periprosthetic Fracture	2	4.8
Anterior thigh pain +Osteolysis + stress	2	4.8
shielding	2	4.8
No Complication	18	42.9
Total	42	100

Out of the 10 patients with varus positioning of the stem, 2 patients had intraoperative periprosthetic fracture, 6 patients had stress shielding and 2 patient had anterior thigh pain. Stress shielding and osteolysis were also seen in the patient with anterior thigh pain with varus stem.

8 patients with stress shielding, 4 patients with anterior thigh pain, 4 patients with periprosthetic fracture had centrally placed stems.

One patient out of the five with varus stem, did not have any complications while 8 out of 16 with central stem, had no complications.

Anterior thigh pain occurred in only 14.3% of the patients (6 patients) in the present study, which disappeared after few months. Out of these three patients, 4 had size 9 stem and one had size 13.

Stress Shielding
Stress shielding was noted in 14 (33.3%) of the patients and 12(85.7%) of them were above the age of 40. All the patients had good to excellent outcome score.

Stress Shielding versus Placement of Stem
60.0% of the patients with varus stem and 25% with central stem had stress shielding. 42.9% of the patients with stress shielding had varus stem and 57.1% of patients with stress shielding had normal stem placement. There was no statical data to prove any association of stress shielding to placement of the stem.

DISCUSSION

Total hip arthroplasty is a well documented surgical procedure [59]. It relieves pain and functional disability experienced by patients with moderate to severe arthritis of the hip, improving their quality of life.60

The study was carried out on 42 hips of 32 patients who underwent uncemented Total Hip Replacement. In western literature, as per Harkness[59], Charney[61], Eftekhar[60] total hip arthroplasty has primarily been described for patients in older age group of sixty and above. In our study, 42.9% of the patients were found to be in the 50 and above age group, with age ranging from 23 to 61 years and a mean age of 43.62 years. Majority, 38 (90.5%) were males and 4 (9.5%) were females. The Harris hip score is the most widely used scoring system for evaluating hip arthroplasty. [12]We used Harris hip score to assess the functional outcome in our study.

Singling out the primary indication of the procedure is difficult, but reports of Eftekhar[60], Harkess[59] document the arthritis group to be the most common indication. Arthrits was the most common indication for THR surgery in our study as well, most of which were caused secondary to Avascular necrosis.

Our study included new generation prosthesis that demonstrated improved clinical and radiological outcomes compared with those associated with early designs of prostheses inserted without cement.[62-68]

Excellent or good pain relief and function were obtained in 85.7% of patients after THR, which was performed in a population of active patients. The mean total pre operative score was **33.43**, which improved post operatively to a mean score of **89.43.** Bourne et al.[62], in a study of 101 total hip replacements with the PCA (porous-coated anatomic) prosthesis (Howmedica, Rutherford, New Jersey), reported an average Harris hip score of 96 points, but only patients who were free of pain were evaluated. When patients who had pain were included, the overall average score was 90 points. Heekin et al.[69] reported an average score of 93 points after a minimum of five years of follow-up of 91 hips that had been treated with the PCA prosthesis. In a study by Katz et al.[66], the results of 14 arthroplasties, in which the stem had been fixed without cement, the hip score averaged 84 points at forty-six months. Barrack and Lebar[70] reported an average Harris hip score of 93 points after 49 arthroplasties in which the LSF (long-term stable fixation) prosthesis (OTI [Osteoimplant Technology International], Hunt Valley, Maryland) had been used.

In our study, all patients in the age group less than 30 years, (19% of the study group), had excellent post operative outcome scores. In the 30 – 50 year age group, 75% had excellent and 12.5% had a good and fair result each which is in par with a study by Mont et al.[71], who reported favorable results of total hip replacements without cement in patients with non-inflammatory osteoarthritis less than forty-five years old.

Another factor that may be of importance in determining the outcome of arthroplasties without cement is the selection of patients. Rheumatoid arthritis, avascular necrosis or congenital hip dysplasia may influence the biological integration of the implant and bone-remodeling[65], thereby affecting the overall outcome. In our study we found that there was no statistical significance between the indication of surgery and final outcome. Bourne et al.[62], who studied the outcomes of total hip replacement with insertion of PCA prosthesis without cement in patients who had advanced osteoarthritis, reported pain in the thigh five years after 27 percent (twenty- seven) of 101 arthroplasties and more than 2 millimetres of subsidence of the femoral

component in twenty-five hips. In our study we did not have any cases of subsidence of the implant.

Anterior thigh pain occurred in only 14.3% of the patients (6 patients) in the present study, which disappeared after few months. Out of the three patients, 4 had size 9 stem and one had size 13. DePuy corail stem was used in all three. Our study detected no association between pain in the thigh and position of the stem which shows similar results as seen in a study by Matthew J. Kraay, Victor M. Goldberg, et al, pain in the thigh occurred after only 5 percent (five) of the total hip arthroplasties and detected no association between pain in the thigh and the size of the stem.[72] In other studies [62,65] in which a PCA prosthesis had been used, pain in the thigh occurred after 13% (14) of 111 arthroplasties, 22% (24) of 110 arthroplasties, and 27% (twenty-seven) of 101 arthroplasties at one, two, and five years, respectively. Callaghan et al.[64] reported that 16 of forty-six patients (forty-nine hips) had pain in the thigh at two years after an arthroplasty with the use of the PCA stem. Heekin et al.[69] reported pain in the thigh in association with 15 percent of ninety-one hips at five years in a study of a similar population.

Extensive pedestal formation is considered another potential radiographic sign of instability of the implant. In the present study this was not seen in any of the cases. Though we came across osteolysis in one patient in zone 2 of acetabulum and zone 4 of femur in one patient, the final outcome was not affected. However, our follow-up may have been too short. In contrast, Campbell et al.[65] reported that 25 percent (twenty-eight) of 110 stems had notable subsidence at two years, and Barrack and Lebar [70] found that 6 percent (three) of forty-nine stems had subsided at least three to four millimeters. Studies [73,74] with longer follow-up have demonstrated a notably higher prevalence of femoral osteolysis.

Intra operative peri-prosthetic femoral fractures are becoming increasingly common and are a major complication of total hip replacement (THR). The largest study of intraoperative femoral fractures at the time of revision total hip arthroplasty was reported by Meek et al.[75]. Of 211 consecutive patients, 64 (30%) sustained an intraoperative femoral fracture and 147 did not sustain a fracture. Berend et al.[76] reported on 1320 primary total hip arthroplasties done with use of an uncemented femoral stem. There were 58 intraoperative calcar fractures, which were treated with cerclage wires or cables and unrestricted weight bearing postoperatively. At the time of follow-up, at a mean of 7.5 years and a minimum of 2 years, no patient had undergone a revision. In one study, an intraoperative femoral fracture was encountered during 1% (238) of 23,980 primary total hip arthroplasties compared with 7.8% (497) of 6349 revisions[77], and subsequent studies have demonstrated similar results.[78,31-34] In the study mentioned above[77], the rate of periprosthetic fracture during primary total hip arthroplasty was 5.4% (170 of 3121) when a cementless femoral component was used compared with 0.3% (sixty-eight of 20,859) when a cemented stem was used. Other studies demonstrated a prevalence of intraoperative fracture of 1.2% (seven of 605) when a cemented stem was used and 3% (thirty-nine of 1318) when a cementless femoral component was used.[79,34]

In our study during the procedure, 14.3% of patients (6 patients) had Type A2 Vancover fracture of the proximal femur which was fixed with SS wire cerclage, which united as documented by the follow up X rays. We had a higher rate of periprosthetic fracture when compared to other studies. Though an overall better outcome score was seen in patients with no fracture, patients with periprosthetic fracture had no a statistical significance between the pre operative and post operative outcome score in our study.

Stress shielding was noted in 33.3% of the patients and 85.7% of them were above the age of 40. All the patients had good to excellent outcome score. There was no statical data to prove any association of stress shielding to placement of the stem. In another study stress-shielding is common in patients who are sixty-five years of age or older, and it can be pronounced. However, these reactive changes did not adversely affect the clinical outcome or radiographic stability or predispose the distal aspect of the femur to osteolysis in our series.[80]

Konyves and Bannister[53] noted that lengthened limbs were also associated with lower clinical hip scores. Limb-length discrepancy can result from a poor preoperative patient evaluation as well as intraoperative technical errors with regard to the level of resection of the femoral neck, the prosthetic neck length, or the failure to restore offset. In our study 4 patients had lengthening of less than 1.5 cm and 3 (75%) of them had excellent outcome and 1(25%) had fair results.

CONCLUSION

In conclusion, the outcome of total hip arthroplasty without cement is determined by multiple factors, including the design of the component, the selection of the patients, and the operative technique. The results of the procedure must be evaluated in long-term studies. Our study suggests that the current generation implants without cement can provide satisfactory clinical and radiographic outcomes after an intermediate duration of follow-up. Though the study was not free of complications, the overall functional and clinical outcome showed good results.

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