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Clinical and functional outcome of total hip arthroplasty in failed proximal femoral fracture osteosynthesis

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Abstract

Introduction: The use of internal fixation for hip fractures can fail secondary to nonunion, loss of fixation, femoral head osteonecrosis, posttraumatic arthritis, malunion, infection, or symptomatic hardware. Conversion of failed hip surgeries to THA is indicated where the bone quality is poor, head is damaged due to previous internal fixation, poor bone stock, or limb shortening

Methodology: Detailed history and proper clinical examination was done to find out – duration of illness, focus of infection in the body, sensory and motor examination, vascularity of the limb, ambulatory status of the patient, deformities of the hip, Range of Movements (ROM) of the hip, limb length discrepancy and status of the other joints

Results: The average pre-operative Harris Hip Score was 36.28 and the Harris Hip Score at most recent follow-up was 83.19. The result was excellent in 8 patients, Good in 6 patients, fair in 5 patients and poor in 2 patients

Conclusion: Uncemented total hip arthroplasty is the procedure of choice for the patients with failed proximal femoral osteosynthesis providing pain relief, preservation of mobility, range of motion and easy rehabilitation

Keywords: Total hip arthroplasty, femoral osteosynthesis, Harris hip score

1. Introduction

Due to increase in the aging population, the number of hip fractures in the elderly population is increasing. The management of these fractures ranges from conservative method to osteosynthesis and primary replacement arthroplasty. More and more of these fractures are treated surgically by osteosynthesis for better rehabilitation and early return to function. Various factors causing failure following osteosynthesis include osteoporosis, improper fracture reduction or poor implant position. The objective of any surgical care of a proximal femoral fracture should be the achievement of a stable osteosynthesis that allows early full weight bearing mobilisation of the patient, because long-term immobilisation soon becomes a vital threat to the affected patients who are usually elderly with correlating comorbidities^[1]. Failed treatment of proximal femoral fractures typically leads to profound functional disability and pain. The outcome in patients in whom this procedure fails and who subsequently require revision to a total hip arthroplasty has only recently been studied extensively. With the increasing life span of patients with fixed proximal fractures, late complications of these surgeries are becoming significant. Within this scenario, it has been argued that the most effective solution to the proximal femoral fractures in the majority of patients is open reduction and internal fixation, with elective conversion, when necessary, to total hip arthroplasty in patients who have a complication^[2, 3].

Proximal femoral fractures fixation demonstrates overall failure rates in the range of 3%-12%, with non-union in 2% to 5%, device penetration in 2% to 12%, and varus collapse in 5%-11%. The primary indication for secondary surgery is relief of pain resulting from the aforementioned complications. Bipolar or total hip arthroplasty may be utilized for the salvage of such failed fracture fixations of the proximal femur^[4, 5].

The use of internal fixation for hip fractures can fail secondary to nonunion, loss of fixation, femoral head osteonecrosis, posttraumatic arthritis, malunion, infection, or symptomatic hardware.

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Conversion of failed hip surgeries to THA is indicated where the bone quality is poor, head is damaged due to previous internal fixation, poor bone stock, or limb shortening. Total hip arthroplasty in these patients may be difficult because of presence of previous implant, poor bone stock, scarred tissues and increased risk of infection. These failed proximal femoral osteosynthesis are occasionally treated with conversion to THA [6, 7].

2. Methodology

2.1 Inclusion Criteria

Patients with failed osteosynthesis of proximal femoral fractures which includes failed DHS, Cancellous Screws, TFN or Any Other Implant Insitu

- Aseptic loosening
- Non union
- Improper fixation
- Breakage of implant leading to loss of function
- Fracture around implant
- Avascular necrosis of femoral head

2.2 Exclusion Criteria

- patients with failed primary arthroplasty /hemiarthroplasty (unipolar/bipolar)
- Infected proximal femoral fixation

Detailed history and proper clinical examination was done to find out – duration of illness, focus of infection in the body, sensory and motor examination, vascularity of the limb, ambulatory status of the patient, deformities of the hip, Range of Movements (ROM) of the hip, limb length discrepancy and status of the other joints.

The deformity, range of movements (ROM) and limb length discrepancy were measured for all the patients in the standard proforma made for each patient. All the patients were assessed using Harris hip score

3. Results

Table 1: Gender Distribution

Sex	No. of cases	Percentage
Male	16	76.19
Female	5	23.80

Male patients constitute 76.19% in our study group

Table 2: Type of Primary Proximal Femoral Fractures

Primary Femoral #	No of Cases	Percentage
Intertrochanteric #	5	23.80
Subcapital # Neck of Femur	2	9.5
# Neck of Femur	12	57.14
Subtrochanteric #	2	9.5

In this study of about 21 patients 12 cases of failed corticocancellous screw fixation and 7 cases of failed DHS fixation and two cases of failed short PFN were studied.

Table 3: Type of Primary Fixation of Proximal Femoral Fractures

Primary Fixation	No of Cases	Percentage
DHS	7	33.33
Corticocancellous Screw Fixation	12	57.14
Short Proximal Femoral Nail	2	9.5

Table 4: Type of Implant Used

Type of implant	No. of cases	Percentage
Modular series of uncemented Total Hip Replacement	5	23.80
Uncemented regular Total Hip Replacement	16	76.19

In 5 cases modular series was used for uncemented total hip arthroplasty and in one case constrained liner was placed.

Table 5: Final Results (Harris Hip Score at last follow-up)

Result	No. of Cases	Percentage
Excellent	8	38.09
Good	6	28.57
Fair	5	23.80
Poor	2	9.52

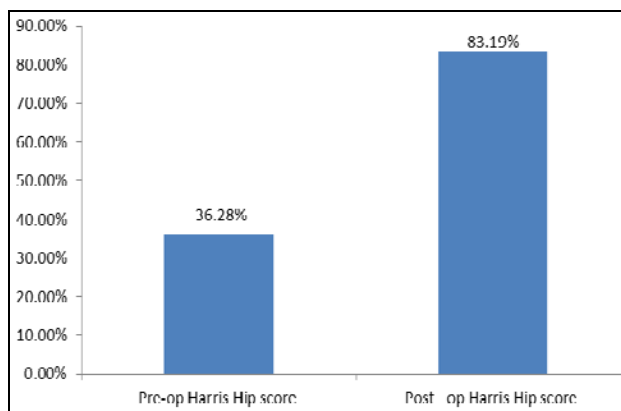


Fig 1: Harris Hip score

The average pre-operative Harris Hip Score was 36.28 and the Harris Hip Score at most recent follow-up was 83.19. The result was excellent in 8 patients, Good in 6 patients, fair in 5 patients and poor in 2 patients.

3.1 Pain: There was marked relief in pain post operatively. Majority of the patients presented with mild pain in the immediate post operative period but there was gradual improvement in the pain scores with complete pain relief in the subsequent follow-ups. However 4 patients had pain even during their last follow-up, of which 2 patients had mild pain with no effect on average activities and 2 patients has moderate pain with some limitation of ordinary activity or work. Prior to surgery 14 patients (66.66%) had marked pain with serious limitation of activities and rest of the patients had moderate pain with some limitation of ordinary activities. At final evaluation 80% of the patients presented with relief of pain with no effect on average activities.

3.2 Function: At the last follow up, 17/21 (80.95%) patients could walk unlimited distance, 18(85.71%) patients walked without support and could use public transport. 80% of the patients who were employed prior to the surgery returned to work. 17 patients were completely pain free and 2 patients complained of mild pain and 2 patients with moderate pain.

3.3 Limp: 25% of the patients had limp at final follow-up.

3.4 Satisfaction: 90% the patients were satisfied with the outcome of the uncemented total hip arthroplasty and considered their hip to have better function after surgery.

4. Discussion

In our study seven intertrochanteric fracture treated with dynamic hip screw(33.33%), twelve fracture neck of femur with corticocancellous screw(57.14%) and two subtrochanteric fracture with proximal femoral nail (9.5%) were converted to hip arthroplasty following failure of fracture fixation The indication for salvage was either one or a combination of the following : non-union (71.42%), loss of fixation with collapse of femoral head(19.04%), avascular necrosis of the femoral head (9.52%), or fixation failure such as screw cut out from the femoral head (23.80%), screw penetration through head(23.80%).

Failed internal fixation devices, frequently with broken screws, must be removed from the femur. Special instruments for the removal of broken screws can simplify this process. The surgery takes a longer time because the internal fixation device must first be removed. The surgeon must dissect through the old scars to expose the internal fixation device. This also causes increased blood loss. The un united head and neck fragment or fragments usually are in a deformed position and must be mobilized before being excised. Many specific problems may occur during conversion of failed internal fixation of intertrochanteric fractures to hip arthroplasty. The anatomy of the proximal femur usually is distorted, especially if the reduction of the hip fracture is imperfect, or if there is comminution of the medial bony buttress. The bone quality usually is poor as a result of preexisting osteoporosis, which further decreases as a result of disuse after the failure of internal fixation. The greater trochanter either is not solidly healed or can be fragmented again during hip arthroplasty, thus affecting the abduction function, which leads to an increased dislocation rate and can adversely affect the ambulatory function. Proper reattachment of trochanter with tension band wiring is necessary for the stability of the hip and proper functioning of the abductor mechanism Salvage of failed intertrochanteric fractures proves to be considerably more challenging. Unstable intertrochanteric fracture patterns tend to heal with distortion of the neck shaft relationship. Sizable medial displacement of the distal portion of the canal made conventional reaming and broaching difficult, which has to be done carefully. The commonly encountered fracture patterns leave the proximal femur shortened, in varus, and with medial displacement of the neck on the shaft. If the surgeon does not recognize the deformity of the upper femur, penetration of the shaft or fracture of the upper end of the femur may occur. In our series there was no perforation of the canal.

Ours is a prospective study comprising of 21 patients with total hip arthroplasties. The mean age of patients in the group is 58.66 years (range 38 to 80 years), which is comparable to the study done by Shekhar Srivastav and his colleagues who reported the results in 20 patients mean age of 62 years (range 38 to 85 yrs) ^[1]. Also comparable to study done by SKS Marya and his associates with mean age of 65 years (range, 60-72 years) ^[5].

The average pre operative Harris Hip score in our study is 36 which is similar to the pre operative average Harris Hip score in the studies done by Carmelo D'Arrigo and his colleagues ^[2]. They studied 19 total hip arthroplasties in 21 patients with average pre operative harris hip score of 37. Javahir A Pachore ^[3] and his associates studied 30 patients of which 9 patients underwent total hip arthroplasty average preoperative harris hip score was 27.9. Shekhar Srivastav ^[1] and his colleagues studied 21 hips in 20 patients were average preoperative harris hip score was 32. Akram Hammad, Ahmed Abdel-AAL,

reported mean preoperative harris hip score 26 in 32 patients they studied ^[8].

In our study the average pre operative Harris Hip score of 36 improved to 82.03 post operatively at last follow-up. The increase in Harris Hip score is attributed to the surgical technique, type of the implant used, post operative care and physiotherapy advised to the patients.

The post operative Harris Hip score observed in our study is comparable to the study conducted by Shekhar Srivastav¹ and his colleagues who reported increase in the Harris Hip score from 32 points pre operatively to 79 points at the most recent evaluation. Also comparable to the study conducted by Carmelo D'Arrigo and his associates who reported improvement from 37 points preoperatively to 81 points at the time of the last follow-up². It also comparable to study conducted by Prof,dr Amr A.K.H Abouelela⁹ and his associates who observed improvement in harris hip score from 17.8 to 87.7 points post operatively. A study has reported post operative mean harris hip score of 81.8 at last follow up comparable to our study ^[7].

5. Conclusion

This study has shown excellent results following the uncemented modular total hip arthroplasty in failed proximal femoral osteosynthesis in terms of pain relief, increased walking distance, and functional capabilities of the patients.

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