

Study of Primary Cemented Total Hip Arthroplasty in Fracture Neck Femur

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Abstract: ***Introduction:** The operative treatment of a displaced sub capital fracture in elderly is also controversial. The dilemma is whether to reduce the fracture and use internal fixation or to perform a total or partial hip replacement arthroplasty. Young patients should be treated by internal fixation and very old less healthy patients by hemiarthroplasty, which is agreed upon by most authors, there remains a group in between where both these option have their advocates. **Material & Methods:** 60 hips were included in this study with cemented prosthesis in 45 patients with a fracture of the femoral neck above the age of 60 years who came for regular follow up till 1 year. Detailed clinical and radiological examination with other relevant investigations was carried out in all patients in orthopaedic emergency/ OPD. The clinical assessment involved a detailed history. The salient questions asked were time of injury, mode of injury, pre-injury activity status, any previous hip pathology/pain. **Results & Conclusion:** All patients were preoperative mobile independently enjoying unrestricted activity ♦ Excellent results were obtained in 38%, good results in 53% and fair results in 9%. None of the patients had a poor result. ♦ 91% of the patients were pain free and independently mobile at the last follow up. ♦ No acetabular or femoral component loosening / migration were seen. This was attributed to proper cementing technique. Cemented THA is a very useful procedure for the primary treatment of femoral neck fractures in elderly. This procedure markedly improves the functional status of the patient in terms of early mobilization, avoiding the complications of prolonged immobilization*

Keywords: Hip Arthroplasty, fracture, femur neck

1. Introduction

Fracture neck of femur has always been a great challenge to the orthopaedic surgeon and still remains the unsolved mystery as far as the treatment and its results are concerned. Non-operative treatment has its own disadvantages in terms of a high mortality rate, problems like thromboembolism, bedsores, atelectasis and an inevitable non-union.¹

Internal fixation is associated with a high incidence of nonunion and avascular necrosis as it is influenced by many factors such as age of the patient, degree of osteoporosis, displacement of head, delay in reduction, the type of fixation device and its final position.² Hemiarthroplasty avoids these complications, which result from inadequate blood supply to the femoral head, but is often unsatisfactory in younger patients because of high incidence of acetabular erosion and pain. Infection, loosening and dislocation are other problems, which add to the poor clinical results and a need for second surgery. Repeat surgery has its own share of high incidence of medical complications and mortality.³

It has been argued that total hip arthroplasty is a good primary treatment for this group as it is the salvage procedure for failures of both the above mentioned procedures.⁴ The aim of surgical intervention in these elderly patients is to restore them to pre-fracture status as rapidly as possible, obviating the complications of failed osteosynthesis, secondary surgery and recumbency. It was decided as a protocol to use primary total hip replacement in active elderly patients of age 60 years and above who had a fracture of the femoral neck. The outcome of primary total hip replacement done in 45 such cases has been evaluated and results are presented.

2. Materials and Methods

50 hips were included in this study with cemented prosthesis in 45 patients with a fracture of the femoral neck above the age of 60 years who came for regular follow up till 1 year.

Detailed clinical and radiological examination with other relevant investigations was carried out in all patients in orthopaedic emergency/ OPD. The clinical assessment involved a detailed history. The salient questions asked were time of injury, mode of injury, pre-injury activity status, any previous hip pathology/pain.

General physical and systemic examination was carried out in detail about renal system, cardiovascular system, respiratory system and central nervous system for any neurological involvement. The affected hip was clinically compared with the normal hip and the following observations were noted: attitude, deformity, local tenderness, attempted movements, limb length discrepancy and any neurovascular deficit.

The position of the limb during pre-operative X-ray of pelvis with both hips was with both lower limbs in full internal rotation to visualize the fracture of the femoral neck. Total thickness of the cortex and width of the medullary canal of femur, into which the stem was to be inserted, was determined.

Radiographs of the pelvis were reviewed to see if there were any signs of osteoarthritis, the medial wall and protrusioacetabuli. Pre-operative planning as a routine included templating to know the size of the prosthesis, neck length and requirement of additional procedures like the use of bone graft to fill defects in acetabulum or femur. For orientation of the pelvis in the frontal plane the two tear drops were identified and a line was drawn through their

distal end. A second line perpendicular to this was drawn through the midpoint of the pubic symphysis.

Three neck lengths allow for an additional increase in offset, the acetabular component was then chosen by measuring the radiological diameters of the bony acetabulum with the template. The procedure was explained in detail to the patient and relatives including other operative treatment options. The advantages and disadvantages of a total hip arthroplasty vis -avishemiarthroplasty were explained. Those who opted for a total hip replacement were taken up for surgery.

EXCLUSION CRITERIA – Active infection of the hip joint or anywhere systemically – Patients with any process that is rapidly destroying bone (generalized progressive osteopenia) – Bedridden patients – Any patients with neurological disorder like Parkinsonism hemiplegia etc.

All the surgeries were carried out under an antibiotic cover. A broad spectrum antibiotic was chosen which covered both gram positive and gram negative organism. All operations were done by the same surgeon. The patient was placed in lateral position with the limb draped free. A mid lateral skin incision was made centered over the greater trochanter extending two inches proximal and four inches distal to it.

The hips were evaluated according to the criteria laid down by Harris. The Harris Hip score assesses pain, function, deformity and range of motion of the affected hip and this was used to analyze the results of these cases. All the patients were assessed clinically at 2 weeks, 4 weeks, 8 weeks, 12 weeks, 6 months and 1 year from the date of surgery. Specific questions were asked regarding use of walking aids, capability of independent ambulation, use of public transport along with limb length measurements at each follow up. Trendelenberg's test was performed in all patients to assess the abductor mechanism.

Radiological review included routine AP view taken prior to the surgery to grade the fracture according to Gardens classification. Observations and measurements were made on the anteroposterior and lateral radiographs of the hip. Assessments were made for any radiolucency (defect in the cement mantle) around the stem /cup, orientation of stem and cup, union of the trochanteric sliver, change in the position of the stem/cup and heterotopic ossification.

Heterotopic ossification was classified using the system of Brooker et al. Grade I Represents islands of bone with in the soft tissue about the hip Grade II Include bone spurs in the pelvis or proximal end of femur leaving at least 1 cm between the opposing surfaces. Grade III Represent bone spurs that extend, from the pelvis or the proximal end of femur which reduce the space between the opposing bone surfaces to less than 1 cm. Grade IV Indicates radiographic ankylosis.

3. Results

There were 18 males and 27 females ranging from 60 to 75 years of age. The ratio of male to female 2:3 maximum number-of patients were in 60-65 age groups. Mean age was

64.6 years 67% of the patients were in the 60-65 year age group. Mean age at the time of operation being 64.6 years (range 60 -73).

Table 1: Age distribution

Age (years)	No. of patients	Percentage
60-65	30	67
66-70	10	22
71-75	5	11

Table 2: Sex distribution

Sex	Number of patients	Percentage
Male	18	40
Female	27	60

All patients were followed up personally at 2, 4, 8, 12 weeks, 6 months and 1 year after surgery. Patients were assessed clinically and radiologically. Direct question were asked regarding pain, mobility, use of walking aids, use of public transport and ability to drive an automobile. Limb length discrepancy was noted. Average preoperative shortenin g was 2.13cm (range 1 – 4 cm). While 37 patients had an equal limb length post operatively, 8 patients had an average shortening of 1.1cm (range 0.5 – 2 cm).

Nine patient (20%) developed urinary tract infection in the post operative period which responded to antibiotics according to culture sensitivity. 2 patients (4%) developed grade II bedsores. 1 patient, a known case of COPD developed post operative acute exacerbation of COPD and had a prolonged ICU stay. He was not diagnosed as PE and recovered satisfactorily. No other medical conditions like deep vein thrombosis, myocardial infarction, cerebrovascular accident etc. were seen.

4. Discussion

Total hip arthroplasty in selected patients was performed as a primary procedure for fracture neck of the femur. 45 such cases were followed up and evaluated clinically and radiologically. The indication for hip replacement in all cases was displaced femoral neck fracture in otherwise active individuals above the age group ranged from 60 yrs-75 yrs with average age of presentation being 67 yrs. In our study, the follow up period ranged from 2 weeks to 1 year with a mean duration of 7 months. All patients were alive at the last follow up. Coates and Armour had reported a mortality of 29%, 7% were known to ' have died in the first month mainly due to medical complications like Ischemic heart disease, pulmonary embolism and septicemia complicating wound infection.⁵ In the later studies mortality reported was significantly reduced, Taine and Armour 3% at one month 10% at 6 months (1985), Delamarter and Moreland⁶ 12% at one year (1987), Gebhart et al report a 0% in hospital mortality (1991).⁷ This has been attributable to advances in anaesthesia and critical care medicine and improvement in medical facilities. Average delay between admission and operations was 3.1 days. This delay was unavoidable as many patients had associated medical condition which required evaluation and stabilization before surgery. In older patients, stability of secondary conditions (cardiac, renal, pulmonary) must take precedence over

treatment of a femoral neck fracture, so that mortality can be decreased. All the operations were performed in a conventional operation theatre under antibiotic cover.

No deep infection was detected. superficial infection was noted in a diabetic patient which settled with suitable antibiotics in 3 weeks. This suggested that prophylactic antibiotic significantly reduced the rate of sepsis in conventional operation theatre. This was based on the studies in 24 favour of the use of systemic antibiotics, in orthopaedic surgery, by Bryan et al. Wilson et al reported significant decrease in infection rate, when prophylactic antibiotics are used, from 11 to 1% Nelson and Phillip reported an infection rate of 5.8% in a conventional operating room without the use of antibiotics and of 1.3% with the use of antibiotics; infection rate was 0.6% in the laminar flow room. Numerous approaches to the hip joint have been described, each claiming to have an advantage over the other.¹

Charnley recommended osteotomy of greater trochanter, for better visualisation of acetabulum and operative field. Liverpool approach gives a good view of the hip joint, is carried out through a smaller incision with minimal blood loss and reduction in operative time, decreasing the incidence of infection and reduced rate of posterior dislocation. Disadvantages include delayed rehabilitation, residual abductor weakness and limp.⁸ According to the Harris hip score 91% patients had good to excellent results in our study. Taine and Armour had reported 70% good or excellent results Gregory et al⁹ reported a mean Harris score of 83 with 6 patients having poor results. But in 4 of these cases this was due to factors other than the hip itself. Only 6% patients complained of hip pain with no patient requiring regular analgesics. Coates and Armour⁵ reported 89% patients to be pain free or having mild pain whereas 11% had severe pain which limited function and for which patients required regular analgesics. Delamarter and Mooreland reported 76% patients to be pain free following the operation.⁶

Limp was seen in 22% of the patients till last follow up. Six of these patients had a proximal migration of trochanteric sliwer.. Limp can be explained on the basis that abductors were elevated leading to shortening of the abductor lever arm.

5. Conclusion

Our study aimed at assessing the clinical as well as radiological results of primary total hip arthroplasty done for fracture neck of the femur in elderly patients 46 . ♦ Age at the time of surgery was greater than 60 ♦ All fractures were garden Type III and IV47 ♦ All patients were preoperative mobile independently enjoying unrestricted activity 48 . ♦ Excellent results were obtained in 38%, good results in 53% and fair results in 9%. None of the patients had a poor result. ♦ 91% of the patients were pain free and independently mobile at the last follow up. ♦ No acetabular or femoral component loosening / migration were seen. This was attributed to proper cementing technique. ♦ Dislocation did not occur in any patient.

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