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MEDULLARY BONE PLUG TO STABILISE AUSTIN MOORE PROSTHESIS.

Orthopedics

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ABSTRACT

Background: Partial hip replacement (cemented or uncemented) is the frequently done surgery in elderly patients with fracture neck of femur. Problems with cementing techniques are reported like increased infection rate and cardiac problems particularly in elderly patients with compromised cardiopulmonary reserve. Austin Moore prosthesis has its own complication like femoral loosening and frequent revision.

Material& Methods: We analysed results of 25 patients of fracture neck femur with Dorr type A and B proximal femoral morphology, treated by un-cemented partial hip replacement where double bone graft were used for additional stabilization.

Results: The mean follow up was 11 years. Prosthesis subsidence was found in un-cemented partial hip replacement with mean of 2.5 mm (range from 0 mm to 3.5 mm) which was well tolerated due to bone plugs formed around the tip and fenestrations of prosthesis except in one patient who had complained of thigh pain which required revision with cemented modular prosthesis subsequently.

KEYWORDS

Uncemented Bipolar prosthesis, uncemented Austin Moore Prosthesis, Double Bone graft

INTRODUCTION

Femoral neck fractures, one of the most common injuries in the elderly, have always presented great challenges to orthopaedic surgeons. The incidence of these fractures has increased with improvement in life expectancy and is expected to double in the next 20 years and triple by 2050[1]. The goal of treatment of femoral neck fractures is restoration of pre-fracture function without associated morbidity [2]. Experience of the last four decades has shown that hip arthroplasty is the best treatment for intracapsular fracture neck of femur in elderly in terms of both short-term and long-term results [3]. Currently, surgeons can choose between unipolar hemiarthroplasty, bipolar hemiarthroplasty and total hip arthroplasty in the treatment [4]. Unipolar hemiarthroplasty with Austin Moore prosthesis is rarely employed in the developed countries though it is very commonly used in developing countries like India. It should ideally be reserved for very limited or nonambulatory patients.[5] Though a Thompson's prosthesis is usually used with cement, Austin Moore prosthesis can be used in the presence of calcar. We have taken up this study to evaluate if using bone cement with the Austin Moore prosthesis offers any distinct advantages in reducing the complications of thigh pain, stem loosening and improving mobility.

Material and Method

A total of 50 patients of the fracture neck of femur were operated by a senior orthopaedic surgeon in elderly age group (range 60 to 75 years), with uncemented unipolar (Austin Moore) prosthesis. 40 patients met the required criteria for the study. 5 patients were lost in the follow-up. Among 35 patients, 25 patients, comparatively older with less functional demand were treated with Austin Moore prosthesis and rest 10 patients, comparatively younger with community ambulatory activity with uncemented bipolar prosthesis. We included patients with Dorr type A and B proximal femoral morphology. Patients with loose fitting stem were excluded from the study and their surgery was completed with cemented prosthesis.In our study, each patient was operated in lateral decubitus position with affected hip above and about 8 to 10 cm incision was taken with Moore approach. Skin, subcutaneous tissue and fascia were cut in the line of the incision. Gluteus maximus muscle fibres were split from anterior to posterior direction and retracted with hand held retractors. External rotators were cut in the single line of incision and secured.Capsule was cut in T shape manner, then head was extracted out and size of the prosthesis was measured. Bonegraft was taken from the removed head of the femur, Conical graft was prepared with the help of femoral head extractor and its size was measured with K nail gauge.

Fenestrations of the prosthesis were packed with bone graft and conical graft was fixed to the tip of the stem. Neck was prepared and rasping of the proximal femur up to two third of the length of stem was done with keeping proper ante version and lateralisation in mind. If the femoral canal was found press fit for the stem, the prepared stem was implanted. If the femoral canal was felt wide for the stem, the patient was excluded fromthe study and cemented prosthesis was. The capsule and external rotators were repaired. Wound was closed in layers.

Patients were mobilised to partial weight bearing for six weeks and then allowed full weight-bearing without support. Active hip abduction exercises and quadriceps exercise were initiated postoperatively.

Follow up was done at 6 weeks, 3 month, 6 month and then once a year for clinical and radiological evaluation. Among clinical criteria absence of pain and limp and ability to do daily living activities independently were assessed. Among radiological criteria sign of acetabular erosion and femoral stem subsidence (distance from the calcar to the prosthesis tip) were assessed.

Result

The mean follow up was 11 years (range from 2 to 20 years). There were excellentclinical and radiological results in all patients except in 2 patients. According to Harris Hip score, final outcome was excellent in 21 hips, good in 3 hips and poor in 1 hip.

Prosthesis subsidence was found in uncemented partial hip replacement with mean of 2.5 mm (range from 0 mm to 3.5 mm) which was well tolerated due to bone plug formed around the tip of the stem and in the fenestrations of prosthesis except in one patient who had complaints of thigh pain due to femoral loosening which required revision with cemented modular bipolar prosthesis subsequently. Groin pain was reported in another one patient due to acetabular erosion which required cemented total hip replacement subsequently. There was no incidence of hip dislocation.

Figure 1 -Preparation of conical graft

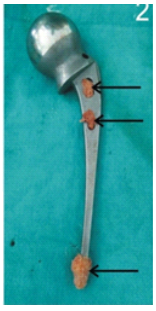

Figure 2 -Austin Moore prosthesis with fenestration peg grafts and conical tip graft

Figure 3- Conical graft being inserted into the canal

Figure 4 –Immediate post-op x-ray

Figure 5 – CT scan coronal section showing bone graft

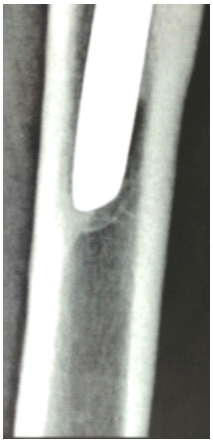

Figure 6 – Follow up x-ray after 20 years

DISCUSSION

Primary partial prosthetic replacement for recent fracture neck of femur is recommended in elderly ambulatory patients because of complications associated withinternal fixation like nonunion and osteonecrosis. [11, 12]

During procedure adequacy of calcar seating, residual femoral neck length and metaphyseal fill were kept in mind and errors in sizing the prosthesis were also avoided to prevent prosthesis failure. More than 12 mm length of the neck remnant, measured from the superior margin of thelesser trochanter to the resection margin atthe calcar of femur ; Less than 1 mm for Calcar seating, measured from the medial prosthetic collar to calcar and the relative metaphyseal fill greater than 70% of the stem of prosthesis in the medullary canal of femur at the level of tip of lesser trochanter on anteroposterior radiograph are considered adequate. Equal prosthetic head size measured from femoral head gauge is considered satisfactory [13]

Dorr's classification [14] was used to assess anatomy of proximal femur with three types: - Type A - Good cortical bone stock with narrow medullary canal. We did rasping and sometimes reaming also. Type B - Relatively good cortical support with wide medullary canal with no change of morphology. We prepared ourself for Bone graft impaction for such case and kept bone cement standby for those patients where stem fitting was felt loose. Once we did cementing, we excluded the case from our study.

Type C- Loss of much medial and posterior cortex with very wide medullary canal. We excluded these cases from beginning and did cemented prosthesis. Hudson et al. noted significantly higher mortality rate with internal fixation than partial hip replacement in their study of 367 femoral neck fracture in patients with 65 to 80 years of age group, although revision rate in both method of treatment was similar. They also noted similar complications andrevision rates in Rogmarket al. reported reported higher failure rate in internal fixation group and higher complication in arthroplasty group intheir 2 year of prospective study of 409 ambulatory patients with 70 years or older having Garden stage III or IV fractures. [18]

Although prosthetic replacement is reserved for patients 70 years old or older patients with a life expectancy of about 10 to 15 years but in our study reason for inclusion of patients younger than 70 years were old neck fracture due to long waiting list for operation theatre and inability to accept second revision surgery that is significantly common in patients with internal fixation. [15,16,17].

CONCLUSION

Our study showed that in addition to the transverse bar by fenestration grafts, bone block formed around the tip of the stem byconical graft provided strong pillar support and once it was integrated, it prevented sinking of the prosthesis with excellent result.

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