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Distal femoral hinged total knee replacement in Rorabeck type 3 distal femur periprosthetic fractures in elderly patients.

Orthopaedic

KEYWORDS: Distal Femur , Rorabeck Type 3, Periprosthetic Fractures, Hinge Total Knee Replacement.

Dr Vaibhav Aterkar — Assistant professor Department of orthopedics, SBKS medical college, Vadodara.

Dr Abu Ghufran — First year resident Department of orthopedics, SBKS medical college.

Dr Sarvang M. Desai — Professor Department of orthopedics, SBKS medical college.

ABSTRACT

Background : A constrained hinge knee prosthesis offers a useful alternative treatment to internal fixation in selected elderly patients with periprosthetic fractures, and has a high probability of survival. Although the use of cemented hinge total knee arthroplasty to treat distal femoral fractures in elderly patients has some practical advantages over the use of techniques of fixation, concerns as to a high rate of loosening after implantation of these prostheses has raised doubts about their use in the past. **Patients and methods :** We evaluated the results of distal femoral hinged total knee replacement in the treatment of 6 fractures in six patients with a mean age of 78.8 years (72 to 86) from year 2014 to 2016 at our institute. **Conclusion :** This study shows the status of postoperative mobility, survival and advantages of replacement over fixation techniques in this age bracket.

Introduction :

Conventionally distal femoral periprosthetic fractures, are either treated by open reduction and internal fixation (plate-screw or angle blade-plate) or minimally invasive (retrograde intramedullary nails or locking plates). (1,2) In these circumstances, stable reduction and osteosynthesis may not be achievable and if fixation fails, further surgery may be required. Inspite of achieving a good fracture fixation, early weight bearing will not be possible in such cases typically till 2-3 months and hence cascading other co morbidities related to non ambulatory status in the elderly. (3)

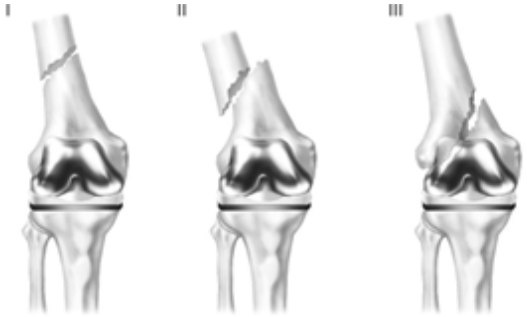
The non-revision indications for distal femoral replacement include acute distal femoral fractures and nonunion in selected elderly patients with a high prospect of survival. Distal femoral replacement is indicated as a revision procedure in patients with severe comminuted periprosthetic fractures who have associated osteopenic or osteoporotic bones, and cataclysmic revision cases of gross ligamentous instability, extreme osteolysis, or extensor mechanism dysfunction. The benefits of this salvage option have been established beforehand in the treatment of such fractures around the hip, shoulder and distal humerus.

This treatment modality can provide a speedy recuperation and good outcomes in older patients with periprosthetic fractures marked by significant comminution and osteopenia and for patients who require a salvage option.(4)

Patients and Methods:

From 2014 to 2016, in a period of 24 months we treated six Rorabeck type 3 (Displaced; component loose or failing) fractures in 6 patients with a cemented hinged total knee replacement.

All patients in our study were 70 years or older who were socially dependent and community ambulators. There were 2 male and 4 female patients in our study with a mean age of 78.8 years (72 to 86).



Classification of supracondylar femoral fractures above total knee arthroplasty described by Rorabeck and Taylor

A thorough physician and anaesthetic presurgical evaluation was done and patients were entitled for the procedure only after they were deemed medically fit for anaesthesia.

Of the 6 patients five injuries were sustained in simple domestic falls and one patient was involved in motor vehicle accident. Average time from Index TKR surgery was 9.16 years (6 to 14).

Operative technique :

Preoperative planning is essential to the better accomplishment of this operative procedure. It starts with radiographic evaluation of both the involved and opposite extremity. Radiographs of the contralateral extremity should include the entire extremity as well as AP and lateral views .These radiographs will be helpful in determining length of the extremity being reconstructed as well as size of the components to be used.

Preoperative radiograph

The patient should be evaluated preoperatively for any possibility of an infectious process or aseptic loosening. Patient's medical and nutritional status should be optimized before the surgery.

All cases were done under combined spinal epidural anesthesia. Preoperative antibiotics and perioperative tranexamic acid was used as per our protocol. The patient was positioned in the supine position and a high thigh tourniquet was applied. Our incision was incorporated in the previous incisions in all cases and a standard

medial parapatellar arthrotomy was taken and extended as necessary . The distal femur was skeletonized as described by the femoral peel approach (5)

Resection was done till viable and non comminuted was encountered. Length was measured from tibia to femur cut surfaces as also verified with the other limb. Trial implantation was done with appropriate length, rotation, alignment and patella femoral tracking , and was found satisfactory.

A sound knowledge of knee anatomy, knee biomechanics and eyeballing plays the most crucial part in the success of this intervention.

The femoral and tibia canals should be irrigated and dried and appropriate cement restrictors placed and the components should be carefully cemented in place paying strict attention to the rotation of the femur and the tibia as determined during the trialing and I accordance with the bone markers. Once the cement is set, the final components can be articulated with the appropriate bushings, axle, yoke, bearing, locking screws.


FINAL IMPLANTATION POST OPERATIVE RADIOGRAPH

Closure was done in layers over a drain which was removed after 24-48 hours. With cemented TKR, weight-bearing can be as tolerated and physiotherapy commences as per routine.

Results:

The mean length of hospital stay was 8 days (5 to 16). One patient had postoperative myocardial infarction 25 days after surgery from which he recovered eventually. There was septic loosening in one index case which was revised in single stage implantation. Two index cases had aseptic loosening. Significant osteoporosis was present in all cases.

The level of dependency was not altered, and 4 out of 6 had regained their previous level of mobility. Average knee range of motion was 100 degrees (80-120) with all patients walking full weight bearing at a minimum 6 month follow up. Only 2 patients had associated back pain with radiculopathy for which back excercises were started from which both of them recovered partially. Superficial wound infection was seen in 1 case for which antibiotics were prescribed and wound healing and infection resolution was complete after 15 days.

TABLE 1

Total Number of patients	6
Average age	78.8 years
Average time from index surgery	9.16 years
Mean length of hospital stay	8 days
Average knee range of motion	100 degrees
Septic loosening	1
Aseptic loosening	2
Superficial infection	1

Discussion :

Our cohort is a small well defined group of elderly, dependent and osteoporotic patients with complex periprosthetic fractures of the distal femur with a highly specific indication (Rorabeck type 3). The goals of treatment differ from those in younger patients, with the main aim being the early restoration of a stable limb which will allow the patient to mobilise early. All our patients were mobilized full eight bearing the second day or weight bearing as tolerated.

The mean length of in-patient stay of our patients was 8 days (5 to 16), which compares favourably with a mean stay of about17-20 days when internal fixation techniques were used (6).

The decision to retain bone and the choice of implants or prosthesis have differed, such as primary unconstrained replacement with a long-stemmed femoral component with or without fracture fixation or condylar excision with a constrained prosthesis (7,8,9,10)

All the above techniques may allow the utilization of semiconstrained prosthesis, rather than a constrained prosthesis. But these implants rely heavily on native bone stock and fracture union for their survival and functioning , which is always a big uncertainity in periprosthetic fractures in this age bracket. Internal fixation is associated with a spectrum of disadvantages such as infection, fixation failure, nonunion, immobilization, bracing and non weight bearing.

The use of a distal femur hinged knee replacement circumvents all these problems.

Conclusion :

With appropriate patient selection, the prosthesis has a high probability of surviving and thus ensuing risk of nonunion is abolished, and the risk of implant failure, malalignment and deep infection is low. Hence distal femur hinged knee replacement may be regarded as a definitive surgery and a one stop treatment for selectively indicated cases of periprosthetic fractures in elderly population with poor bone stock.

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