Research Paper

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Comparison of Different Modalities of Treatment for Extra-Capsular Proximal Femur Fractures

Medical Science

KEYWORDS : Extra capsular proximal femur fractures, proximal femur nail, dynamic hip screw and Ender's nail.

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ABSTRACT

Introduction: Our study has aimed to assess extra- capsular neck femur fractures and mainly on comparing three different modalities of treatment that were used in our patient group namely proximal femur nail, dynamic hip screw and Ender's nail. Materials and methods: 82 patients from May 2012-13 having extra-capsular proximal femur fractures. 76 patients were operated using any of the three modalities. Cases were followed and evaluated at 6 weeks interval for 6 months, the results were evaluated and recorded radiologically and functionally as per criteria's laid down by Harris hip score. The study comprises of data of sixty patients which followed up for 6 months, rest of the patients were lost to attrition. Results: We found that in type III and type IV inter-trochantric and sub-trochantric fractures proximal femoral nail implants have better results as compared to others (Dynamic Hip Screw & Ender's nail). Weight bearing was earliest in those patients operated with proximal femur nail, optimal range of motion of hip, cross leg sitting and higher harris hip scores were seen in cases of proximal femur nails and were least in those of Ender's nails. Radiologically union and alignment was seen in higher percentage in those patients of proximal femur nail group and were these with varus collapse were seen mostly in patients who were operated using Ender's nail. Infection rate were higher in patients operated using dynamic hip screw mostly due to open reduction.

Introduction: Extra-capsular proximal femur fractures are treated mainly by anatomical reduction (open or closed) and internal fixation, with some cases of severely comminuted fractures being treated by primary arthroplasty these days[4-10, 16]. Fixation can be extra-medullary or intra- medullary. In this study 60 patients of proximal femur fracture were treated by either extra or intra medullary devices. Extra- medullary device used was dynamic hip screw and intra-medullary device used was either proximal femur nail or ender's nail. Results were compared for the three modalities of treatment.

Materials and methods: 82 patients presented to our orthopaedic department from May 2012-13 having extra-capsular proximal femur fractures, fractures were one to four days old. 76 were operated using any of the three modalities, the rest 6 were medically unfit for surgery and were treated conservatively by giving skeletal traction using Steinmann pin. Patients were divided in a random basis and allotted to any of the three groups. Patients were operated 2 to 4 days after the day of presentation in our department as per fitness. Cases were followed and evaluated at 6 weeks interval for 6 months, the results were evaluated and recorded radiologically and functionally as per criteria's laid down by Harris hip score. Radiological parameters assessed were quality of bone, neck shaft angle, quality of reconstruction of postero-medial cortex, evidence of radiological union and any implant failures. The study comprises of data of sixty patients which followed up for 6 months, rest of the patients were lost to attrition. For statistical analysis fisher test was used.

Results: Patients having extra-capsular proximal femur fractures were divided into those having inter-trochantric (I.T.) & those having sub-trochantric (S.T.) fractures. (Table 1)

Age Group (in yrs.)	I.T.	S.T.
Less than 40	3 (5%)	7 (11.6%)
40 to 60	9 (15%)	11 (18.3%)
More than 60	23 (38.33%)	7 (11.6%)
Total	35	25

Table 1:- Distribution of all patients as per fracture type and further into age groups.

I.T. frctures were more common in elder age group whereas S.T fractures were more common in younger age group. (p=0.027)

Out of the 35 patients having Inter-trochantric fractures 24 (40%) were males and 11 (18.33%) were females. Out of the 25 patients with sub-trochantric fractures 17(28.33%) were males and 8 (13.33%) were females. No statistical difference was found in between the two fracture types (p=0.9).

Out of the 35 inter-trochantric fracture femur mode of trauma was fall in 28 (46.66%) patients and was road traffic accident in 7 (11.66%) patients. Out of 25 patients with sub trochantric fractures mode of trauma was fall in 8 (13.33%) patients and was road traffic accident in 17 (28.33%) patients. Subtrochantric fractures were found to be associated with road traffic accidents & Inter-trochantric fractures were more associated with fall (p=0.00098).

Out of the 35 patients having Inter-trochantric fractures 11 (18.33%) were operated using proximal femur nail, 12(20%) were operated using Dynamic hip screw and 12 (20%) were operated using ender's nail. Out of the 25 patients with sub-trochantric fractures 9 (15%) were operated using proximal femur nail, 8(13.33%) were operated using Dynamic hip screw and 8 (13.33%) were operated using ender's nail.

Out of the 35 patients having Inter-trochantric fractures significant shortening of operated lower limb was not seen in patients operated with proximal femur nail, it was 25 % in case of patients operated with Dynamic Hip Screw and 33.33% in case of those operated using Ender's nail. Out of 25 patients with sub trochantric fractures shortening was 11.11% in patients operated with proximal femur nail, it was 25 % in case of patients operated with Dynamic Hip Screw and 50% in case of those operated using Ender's nail. So shortening was observed more with Ender's nail in both groups of operated inter-trochantric fractures and those with sub-trochantric fractures.

As far as complications are concerned rate of infection in case of proximal femur nail were significantly low (5%) probably as it was performed in a close manner in most of the patients, in one patient in which it got infected, had duration of surgery more than 2 hrs and surgeon had to resort to open reduction and fixation as reduction was not achieved in a closed manner.

Infection rate was higher in open surgeries where dynamic hip screw was used (20%) duration of surgery was time appropriate in all these cases & mostly were due to nature of surgery and patient factor. Infection rate was 10% in cases of patients operated using Ender's nail, infection was mostly at the site of nail insertion in both the cases, in these cases nail was associated with back out and was found to be exposed, poor patient status was also an additive factor. Implant back out leading to impingement pain at times was present in 5 % of patients operated with proximal femur nail, 10 % of patients operated with dynamic hip screw and 40 % of patients operated with Ender's nail. Implant breakdown in case of proximal femur nail, dynamic hip screw and Ender's nail was 5%, 5% and none respectively.

15 % of patients operated with Ender's nail developed bed sores due to prolong immobilization. Complication rates were much higher in case of Ender's nail except that implant breakage was absent.

Functional recovery was measured along various parameters as mentioned below:
Mean days for full weight bearing in case of proximal femur nail was 33 days with a standard deviation of 7.08 days, was 40 days in case of dynamic hip screw with a standard deviation of 7 days and 72 days with a standard deviation of 8.5 days in case of Ender's nail. Full weight bearing was seen early in case of proximal femur nail and was delayed in case of Ender's nail[ANNOVA TEST (F TEST) = 5.86 at degree of freedom 50 at 95% confidence limit which is highly significant].

At 6 weeks post operative follow up patients operated for intertrochantric fractures using proximal femur nail 18.18% patients were walking with support and 81.81% were walking without support; when dynamic hip screw was used 8.3% patients were walking with support and 91.66% patients were walking without support; in case of Ender's nail 50% patients were walking with support and the rest without support; in patients operated for sub-trochantric fracture using proximal femur nail all patients were walking without support; when dynamic hip screw was used 75% patients were walking with support and 25% patients were walking without support; in case of Ender's nail 62.8% patients were walking with support and 37.5% were walking without support. Overall patients operated using proximal femur nail were walking without support and patients operated with Ender's nail were walking with support. Mean days for cross leg sitting in case of patients operated using proximal femur nail was 71 days with standard deviation of 19.2 days, using dynamic hip screw was 100 days with a standard deviation of 13.1 days and using Ender's nail it was 98 days with standard deviation of 12.9 days. So cross leg sitting, important in Indian population, was achieved earlier in patients operated using proximal femur nail ANNOVA TEST (F TEST) = 9.91 at degree of freedom 50 at 95 % confidence limit. Harris hip score15 was mostly excellent in case of patients operated using proximal femur nail, very good in case of dynamic hip screw and was good in case of Ender's nail.

Radiologically following parameters were assessed:
Out of the 35 patients having Inter-trochantric fractures non union was absent when proximal femur nail or Dynamic hip screw was used. Rate of non-union in Inter trochantric fractures when Enders's nail was used was 8.33%. Out of 25 patients with sub trochantric fractures rate of non-union in patients operated using proximal femur nail was 11.11%, in case of dynamic hip screw was 12.5% and that in case of patients operated with Ender's nail was 25%. More cases of non union were seen in case of Ender's nail than in other modalities. Varus alignment was in case of patients operated using proximal femur nail, dynamic hip screw and Ender's nail was 5%, 25% and 30%; no valgus misalignment was observed in our case study.

Discussion: We aimed to evaluate the theoretical advantages of proximal femur nail, Ender's Nail and dynamic hip screw, by a comparison of them in intertrochanteric fracture and subtrochanteric fracture. The claimed advantage with intramedullary devices is that a smaller exposure is required than extramedullary devices, it may therefore be associated with lesser blood loss, shorter operating time and less morbidity11-14. There may also be mechanical advantages, because the shaft fixation is nearer to the centre of rotation of the hip, giving a shorter lever arm and a lower bending movement on the device17-21.

We found that in type III and type IV inter-trochantric and subtrochantric fractures proximal femoral nail implants have better results as compared to others (Dynamic Hip Screw & Ender's nail). Malrotation and deformity after proximal femur fracture fixation is usually a result of improper fixation of fracture fragments in rotation at time of surgery. In fractures managed by closed intramedullary nailing, incidences of Malrotation and deformity are found to be lower.

In our study we found that proximal femoral nail proves to be more useful in difficult fractures with a subtrochanteric extension or reversed obliquity and for high subtrochanteric fractures, where other forms of fixation are less satisfactory similar to other studies1,2.

Early weight bearing is the main stay of treatment in internal fixation, which was delayed in patients operated with Ender's nail and was earliest in those operated with proximal femur nail in our study similar to other studies 1,2,3,4. Higher percentage of patients, in operated proximal femur nail group, were found to walk without support at 6 weeks follow up. Mean days required for full weight bearing and cross leg sitting were shorter in those operated with proximal femur nail and were longer in those operated with Ender's nail.

Complication like non-union of proximal femur fracture although, a rare entity, follow unsuccessful operative stabilization with subsequent varus collapse and screw cut out through femoral head or due to an osseous gap secondary to inadequate fracture impaction.4,6,9 In our study most of these patients were operated by Ender's nail. Infection in the postoperative period is an important independent predictor of functional outcome irrespective of adequacy of internal fixation and radiological union. Adequate antibiotic coverage and sterile stitch line dressings deserve special attention. Incidence of infection was found to be lesser in proximal femoral nail and higher with dynamic hip screw mostly due to open reduction. Shortening, varus deformity, bed sores and implant back out were found more to be associated with Ender's nail used in proximal femur fractures than with other devices in our study. However implant breakage was seen in one patient in both study groups operated with proximal femur nail and dynamic hip screw.

Conclusion: In our study proximal femur nail was found to be implant of choice for proximal femur fracture compared to both dynamic hip screw and Ender's nail.

REFERENCE

1. Al - yassari G, Langstaff RJ, Jones JW, Al Lami M. The AO/ASIF –proximal femoral nail: a new device for the treatment of unstable femoral fractures. Injury 2002; 33:395-399. | 2. Comparative prospective study of proximal femoral nail and dynamic hip screw in treatment of intertrochanteric fracture femur Ranjeetesh Kumar MBBS*, R.N. Singh M.S. Ortho, FRCS, B.N. Singh M.S. Ortho, FRCS | 3. Evaluation of clinical outcome of subtrochanteric fractures of femur fixed with proximal femoral nail Deepinderjit Singh#, Rajesh Kapila*, Rakesh Sharma** | 4. Use of- Ender's nails in unstable trochanteric femoral fractures' C H Marsh FRCS, Bath & Wessex Orthopaedic Hospital, Bath, Avon BAI 3NJ, Journal of the Royal Society of Medicine Volume 74 July 1983 | 5. Altner PC, Reasons for failure in treatment of intertrochanteric fracture. Orthop Rev 1982; 11:117. Arrington ED, Davino NA, | 6. Rockwood compression fixation of subtrochanteric fracture Clin Ortho 17: 202-208. 1976. | 7. Baumagaertner MR, Chrostowski JH, Levy RN, intertrochanteric hip fracture In: Bronwer BD, Levine AM, Jupiter JB, et al eds, Skeletal trauma , vol,2, Philadelphia: WB saunders, 1992; 1833-1881. | 8. Boldin et al (2003): The proximal femoral nail (P.F.N.)- a minimal invasive treatment of unstable proximal femoral fractures. Actar Orthop Scand 2003, 74 (1);53-58. | 9. Campbells operative orthopaedics. 9th ed 1998.2181-2223. | 10. Choneka J et al. Biomechanical comparison of sliding hip screw and the done plunger J.B.J.S. 1995; 77B:277-83. | 11. Cleveland M, Bosworth DM, Thompson FR, et al. A ten year analysis of intertrochanteric fracture of femur. J Bone Joint Surg 1959; 41A : 1399-1408. | 12. Ender H.G. treatment of pertrochanteric and subtrochanteric fractures of the femur with Ender's pin in the hip proceeding of hip society CV Mosby St. Louis 187, 1978. | 13. Evans E. The treatment of trochanteric fractures of the femur J.B.J.S. 1949; 3113:190-203. | 14. Fielding J.W. subtrochanteric fracture 1966; 122:55-567. | 15. Harri's W.H. J.B.. J.S.Am 51:537-755,1969. | | 16. . Haidukewych GJ, Berry DJ, Hip artroplasty for salvage of failed treatment of intertrochanteric hip fractures. J. Bone Joint Surg Am. 2003 May; 85-A (5):899-904. | | 17. Hardy D. Descamps P et al use of an intramedullary hip screw compared with a compression hip screw with a plate for intertrochanteric fracture J.B.J.S. 1998; 80A 618- 630. | | 18. Hibbs, R.A. The management of the tendency of the upper fragment to tilt forward in fracture of the upper 3rd of femur. N.Y. med J. 75: 177-179, 1902. | | 19. Hoffmann P Change in the management of pre-subtrochanteric femoral fractures- a retrospective 10-year analysis. Aktuelle Truamatol 1994 Feb; 24 (1): 1-5. | 20. Hoglund EJ, New intramedullary bone implant surgery. Cyneoil obstrets 1917;24:243. | | 21. Hunghston JC (1984) unstable intertrochanteric fracture of the hip. J.B.J.S. 46A:1145. |