



A STUDY OF TREATMENT OF FRACTURE NECK OF FEMUR IN ADULT USING BONE IMPREGNATED HIP SCREWS

Orthopaedics

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ABSTRACT

The increasing incidence of high velocity injuries increase the incidence of these fractures. Ideal treatment for these fractures has been surged by various Orthopaedics Surgeons in the past. Even though femoral neck fractures can occur at any age group, it is most commonly seen in elderly. Incidents of non-union and avascular necrosis are high in these fractures. The interruption or diminished circulation to the proximal fragment are the cardinal reasons for the non-union and avascular necrosis. Most of these fractures are unstable, absence of cambium layer of periosteum and bathing of fracture site by synovial fluid adds to the cause of above complication. Patients who have sustained an intra-capsular femoral neck fracture admitted in the Department of Orthopedics, Travancore Medical College, Kollam from July 2010 to August 2013 were taken for this study after taking their consent. Recommendation of BIHS as a novel implant and its long term benefits/ risks is difficult to evaluate in the present study due to the short follow up. It requires a longer follow up.

KEYWORDS

Treatment, Fracture, Neck of Femur, Bone impregnated hip screws.

Introduction:

The increasing incidence of high velocity injuries increase the incidence of these fractures. Ideal treatment for these fractures has been surged by various Orthopaedics Surgeons in the past. Even though femoral neck fractures can occur at any age group, it is most commonly seen in elderly. Incidents of non-union and avascular necrosis are high in these fractures. The interruption or diminished circulation to the proximal fragment are the cardinal reasons for the non-union and avascular necrosis. Most of these fractures are unstable, absence of cambium layer of periosteum and bathing of fracture site by synovial fluid adds to the cause of above complication.

Early internal fixation can reduce morbidity and mortality of these fractures but not the incidence of non-union and avascular necrosis. The long term results of arthroplasty are not good but can provide pain relief and early mobilization. To preserve one's own head of femur rather than to bring associated problems with the replaced head is always better. Most of patients were willing to follow and perform the post-operative rehabilitation and hence had good functional recovery.

In 1950 Dalma recommended primary wedge osteotomy to change the vertical shearing force to compressive forces at the fracture site in cases of Pauwel's Type II & Type III fractures. Dugh (1955) introduced sliding nail plates to allow vigorous impaction at the fractures site. Stewert & Mj. Wells (1956) claimed good bone grafting in cases of nonunion.

In 1958 Muller German expert working in Switzerland popularized the idea of Pauwell. He resects a laterally based wedge so as to keep the pseudarthrosis site at right angles to the deforming forces. It stood the test of time and continue to be used most successful till today. He also recommended a sub trochanteric valgus osteotomy for treatment of unstable fracture of femoral neck, by which the forces acting on the femoral head are directed towards the fracture site with a purely compressive function which aids in holding of the fracture in 1959 Mass introduced a sliding nail plate to fix these fractures.

Judet in 1962 reported role of quadratus femoris muscle pedicle graft as a method for improving blood supply to the head in displaced fracture and to promote union of the fracture Weber & Cech (1973) reported good results after primary sub trochanteric valgus osteotomy in the management of femoral Neck fractures.

Ratliff (1974) advocated primary sub trochanteric valgus osteotomy for displaced vertical femoral neck fractures in children when there is great difficulty in internal fixation without disturbing growth plate and in displaced comminuted fractures where closed reduction was difficult. He could find no reference for this technique.

Meyers (1975) used muscle pedicle graft to increase the blood supply

to femoral head, and he claimed 80 to 90% of union rate and 11% of avascular necrosis¹, in 1975 Calandruccio introduced Richard's compression screw and reported 60 to 80% union rate and 20% a vascular necrosis². In 1981 the proceeding of ninth meeting of Hip Society at St. Louis Mosby accepted Ratliff's method in the primary treatment of intra capsular fractures in adults. Nies & Scheuer (1983) Walcher & Wiesinger (1983) Wentzensen & Weller (1983) Huang (1986) reported good results after Pauwe's osteotomy of fracture neck of femur^{4,5,6}. Radiographic signs of avascular necrosis in patients over 30 years of age are considered to contraindication for osteotomy by Walcher & Wleinger. IN 1986 O.N.Nag, V.K. Gauthm & S.K. Smarya from the post graduate Institute of Medical Sciences, Chandigarh introduced cancellous screw fixation and fibular graft for comminuted femoral neck fractures. R.K. Marti, H.M. Schuller and E.L.E Raymakers in 1989 first studies the influence of the osteotomy on the avascular process in the long term follow up of 50 cases who underwent osteotomy⁷. They advised osteotomy even in cases where there is avascular necrosis provided there is no severe collapse of head. They could find slow and restricted revascularisation of this avascular head after fracture union.

F.T.Ballmer et al (1990) stressed that exact preoperative planning is essential for valgus osteotomy⁸. So that one may correctly evaluate the radiographs, analyse the mechanics of nonunion, determine the surgical steps and choose the correct implant. The number of English language publications on pure valgus osteotomy is very limited.

Fractures of the neck of femur are treated traditionally by internal fixation or Hemiarthroplasty. The goal of treatment is to restore the length and stability of lower limb. Usually Cannulated hip screws are used for fixation of fracture neck of femur. The Bone Impregnated Hip Screw (B.I.H.S) is an alternative implant. In this study we present the clinical and radiological results of fracture neck of femur managed with B.I.H.S vs Cannulated Hip Screw.

All the fracture were classified by Garden's system of classification in the Indian population most of the patients with fracture neck of femur are between 40 to 70 years. These patients have increased physical demand and have a desire to have independent life with ability to squat.

Controversy still exists in the mode of treatment of fracture neck of femur in "Young-Old" (age between 55 and 65). In a meta-analysis it was found that there exists no statistical difference in method of treatment employed. Either internal fixation or arthroplasty.

In treating fracture neck of femur Cannulated cancellous screws are the gold standard ideally using three screws. Some surgeons replace one of the screws with fibular strut graft to stimulate the bone growth. There is only one report of use of cancellous graft in fracture neck of Femur (Samuelson), and the failure rate is reported as 22%²⁵. Present

understanding of the biomechanical principles employee three screws, each assigned a particular area of the neck of femur and this assumes an inverted triangular configuration. Since, each of the screws has a particular function to perform if one of the screw is replaced by fibular graft, the function assigned to that particular screw will be lost and the fracture tends to displace lately leading to delayed union and avascular necrosis. This study is intended to help the orthopedic surgeons to understand the use of Bone impregnated hip screws in the treatment of fracture neck femur.

Aims and Objectives:

To compare functional and radiological outcome of intracapsular fracture of femoral neck treated with Bone impregnated hip screws.

Materials and Methods:

Patients who have sustained an intra-capsular femoral neck fracture admitted in the Department of Orthopedics, Travancore Medical College, Kollam from July 2010 to August 2013 were taken for this study after taking their consent.

Sampling Simple Random Sampling: Sample Size has been found to be 12 Sample Size Calculation

Inclusion Criteria

1. Polytrauma patients
2. Garden's type 4 for Bone Impregnated Hip Screws (BIHS)

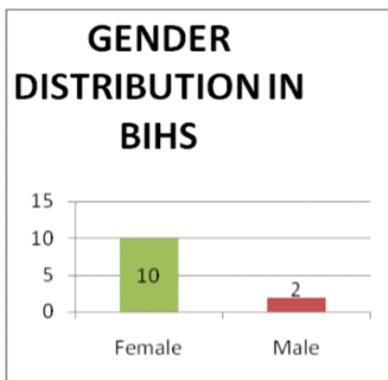
Exclusion Criteria

1. Severe Degenerative Disease
2. Avascular Necrosis

Results:

GENDER

In the BIHS group the gender distribution was two male (16.7%) and ten female patients (83.3 %).



Age Distribution & Frequency

AGE	BIHS
50 - 55 YEARS	5
56 - 60 YEARS	7

Comorbidities:

CO MORBIDITIES IN BIHS GROUP	NUMBER
DM	1
HTN	2
HTN, DM	2
NAD	7

DURATION OF HOSPITAL STAY IN DAYS

DURATION OF HOSPITAL STAY	BIHS
6 - 9 DAYS	6
10 - 13 DAYS	6

PARTIAL WEIGHT BEARING

PARTIAL WEIGHT BEARING IN DAYS	BIHS
<65 DAYS	6
>65 DAYS	5

Full Weight Bearing

FULL WEIGHT BEARING	BIHS
< 95 DAYS	5
> 95 DAYS	5

In this series, there were 4 patients with excellent Harris Hip Score, 5 patients with good Harris Hip Score none showed fair results according to Harris Hip Score and 2 had poor results.

Discussion:

The age of the patient in the present study ranged from 50 to 60 years, with an average of 56.41 years, cases treated Bone Impregnated Hip Screw (BIHS) due to the factor of post menausal osteoporosis.

In the present study, it includes female dominants in keeping with the fact that femoral neck fractures are more common in females due to postmenopausal osteoporosis. Male and Female ratio was noted in both groups.

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Though fractures of femoral neck are now better understood and the methods of treatment have improved, non-union and screw breakage of the femoral head are still serious problems. We had one case of Screw Breakage (4 %) in BIHS group treated with Total Hip Replacement and one case of Non - union (4 %) treated with Muscle Pedicle Grafting. Bonnaire FA et al³ in analysis of fracture gap changes, dynamic and static stability of different osteosynthetic procedures in the femoral neck found screw breakage to be a possible complication which can be corrected with Total Hip Arthroplasty.

Dedrick DK et al¹⁰ citing complications of femoral neck fracture in young adults in a 2 year prospective study found non - union to be 20 % (5 out of 25 patients).

Garden RS et al¹¹ malreduction and avascular necrosis in subcapital fractures of the femur states about the number of non - union which is found to be 83 out of 500 cases (16.6 %) for which inter trochanteric osteotomy was done. The case of non union was reported with CCS Screw in present study was treated with quadratus femoris muscle pedicle graft (MPG) as adjunctive treatment as described by Johnson KD et al⁷ in J Orthop Trauma Journal 1989.

Conclusion:

Recommendation of BIHS as a novel implant and its long term benefits/ risks is difficult to evaluate in the present study due to the short follow up. It requires a longer follow up.

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