TREATMENT OF INTRACAPSULAR FRACTURE NECK FEMUR BY CANCELLOUS HIP SCREW FIXATION IN ADULTS

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ABSTRACT

BACKGROUND

Neck of femur fracture is one of the commonest fracture seen at all ages. It comprises 20% of all the fractures and 50% of all intracapsular fractures, only 15% of all the neck of femur (NOF) fracture is undisplaced, remaining 85% is displaced. Even in undisplaced neck of femur fractures, surgery is treatment of choice. Mechanism of injury in this is simple. Fall with force being transmitted to femoral neck via greater trochanter. There are other mechanism also.

MATERIALS AND METHODS

This is a prospective and retrospective study conducted at MGM Medical College, Kishanganj, in which 15 patients who is suffering from NOF fracture were selected randomly. All these patients were treated by closed reduction by Flynn method and internal fixation by three divergent cannulated screws with 10 mm distance from each other. Fixation was done under spinal or epidural anaesthesia. Preoperatively, optimal 3 kg surface traction was given in affected limb.

RESULTS

Out of 15 operated patients, 2 patients had implant failure due to fall and 3 patients did not turned up for surgery, hence these 5 patients were excluded from the study. Rest 10 patients were followed up at 4, 12, 24, 48 and 96 weeks. In 2 cases, there was nonunion. In 2 cases, fracture united after follow up of 14 months. A 2 years follow up was done for 6 patients in which there was no evidence of an avascular necrosis and all these cases had good healing.

CONCLUSION

In neck of femur fracture, our first intention injury of treatment is by internal fixation in young individuals as well as elderly population. We should never directly go for partial/full replacement in young individuals. We felt the most important thing, which should be kept in mind while operating is to do accurate reduction and rigid fixation with 3 parallel short headed cannulated screw.

KEYWORDS

Neck Fracture, Closed Reduction, Cancellous Screw, Osteonecrosis, Revascularisation, Union.

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BACKGROUND

Neck of femur fracture is one of the commonest fracture seen round the globe at all ages in all races. It comprises 20% of all the fractures. Intracapsular fractures account for 50% of all NOF fractures. The lifetime risk to sustain neck of femur fracture is high and lies within a range 40%-50% in women and 13%-22% in men. There is very little debate about management of the displaced NOF fracture, which is invariably treated with fixation. Only 15% of all the NOF fracture is undisplaced, remaining 85% of displayed occurs mainly in elderly female patients in whom progressive osteopenia and osteoporosis is seen with age. Even in undisplaced neck of femur fractures, surgical treatment is needed and it is accepted worldwide.[1] Treatment options include reduction and fixation, unipolar arthroplasty, bipolar hemiarthroplasty and total hip arthroplasty. Recent survey of practice indicate widespread

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variation. In these option, more than 500 per reviewed studies have been published on the subject, yet there is no consensus on which treatment is superior or given guidelines for treatment decisions.

Mechanism of injury in this is simple fall with force being transmitted to femoral neck via greater trochanter. Another mechanism is external rotation of leg with increasing tension in anterior capsule and iliofemoral ligament as neck rotates, head remains fixed and fracture occurs. In young individuals, fracture is due to high energy trauma due to cynical loading leading to microfracture and macro fracture.

Today, hemiarthroplasty and total hip replacement is worldwide accepted treatment of fracture neck of femur. Keeping this principal in mind, 3 short threaded cancellous hip screw fixation is good alternative of hemiarthroplasty and total hip replacement.

MATERIALS AND METHODS

This is a prospective study in which 15 patients with NOF fracture were selected randomly. All these patients were treated with closed reduction by Flynn method and internal fixation by three divergent cannulated screws with 10 mm distance from each other. Fixation was optimal, 3 kg surface traction was given preoperatively in affected limb.

On O.T. table, close reduction was done under guidance of fluoroscopy. Final AP view and lateral view was checked in C-arm with patient in supine position with pelvis fixed and 15 degrees abduction and 20 internal rotation of the affected limb in all the cases. Fracture was neither in valgus in AP view nor in retroversion in lateral view.

Patient were operated under spinal or epidural anaesthesia through lateral approach. A long incision of around 10 cm starting from greater trochanter to upper femoral shaft was given. Incision was deepened upto bone retracting the periosteum. No retractor were used to avoid the distraction of fracture. Then, first guidewire was passed from 2 cm below base of greater trochanter upto head drilling the lateral cortex in the direction of apposite anterior superior iliac spine in the parallel plane to operation table until resistance is felt. Second guide wire was passed in a plane parallel to 1st guide were just 1 cm above and 10 degrees away from 1st wire. Guidewire was made to lie in the middle of the neck or calcar. Cancellous screw of size 6.5 mm were used for fixation. Size of screw can be determined preoperatively from the radiographer of hip of unaffected limb. Size of screw intraoperatively can be determined by length of guidewire. Then, one screw is fixed in direction of guidewire till screw crosses fracture line, which is confirmed by sudden release of resistance. Short threaded screw (16 mm) is placed of long threaded (32 cm) screws. Then, second screw and third was fixed in the direction of the guidewire. Lower screw was 5 mm longer than the upper screw. Traction of the limb should be released before final tightening. The screw should remain 2 to 5 mm in subchondral cortex. Position of screw is checked under fluoroscopy. Wound is closed in layer. Broad-spectrum antibiotic usually cephalosporin should be administrative intraoperatively as well as postoperatively for 5 days. Complete bed rest and non-weightbearing of the affected limb was given for 12 weeks followed by partial weightbearing with external support with complete weightbearing physiotherapy exercise such as static quadriceps exercise, passive hip movement started after 48 hours of surgery. Sutures were removed after 12 to 14 days of surgery. Full weightbearing depends on fracture healing from 3 to 6 months.

OBSERVATION AND RESULTS

Out of the 15 patients operated, 2 patients had implant failure due to fall and 3 patients did not turn up for surgery; hence, these 5 patients were excluded from the study. Rest 10 patients were followed up at 4, 12, 24, 48 and 96 weeks. In 2 operated cases, there was nonunion. In 2 cases, fracture united after follow up of 14 months. At 2 years follow up of remaining 6 patients there was no evidence of any avascular necrosis and all these cases had good healing.

In this study, 3 patients was in 16 to 25 years age group and 7 patients was in 25-60 years age group. In 8 cases, fracture was classified as garden's type III and for rest 2 cases was classified as garden's type IV fracture. Out of the 10 patients studied, 4 were females and 6 were male patients.

Type	Number of Cases	Union	Percentage
Transcervical	9	7	77.7%
Subcapital	1	1	100%

Table 1. Shows Union of Fracture and its Relation to Site of Fracture

Nature	Number of Cases	Union	Percentage
Garden type 3	8	7	87.5%
Garden type 4	2	1	50%

Table 2. Showing Type of Fracture and its Relation to Union Rate

Age of Fracture	Number of Case	Union
1-14 days	7	5 (71.5%)
14-30 days	3	3 (100%)

Table 3. Showing Success in Union in Relation to Duration of Fracture Before Operation

Age of Patients	Number of Case	Union
16-25 years	3	3 (100%)
25-40 years	2	1 (50%)
40-60 years	5	4 (80%)

Table 4. Showing Relation of Results to Age of Patients

Results	Number of Cases	Percentage
Excellent	6	60%
Good	2	20%
Fair	2	20%

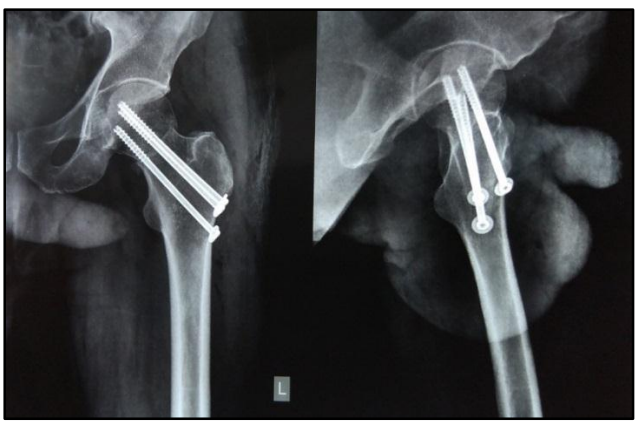
Table 5. Showing Result at Last Follow up (2 years) Interim of Function

Results at last follow up-

Excellent- Excellent fracture union achieved with full range of movement and comfortable squatting without any pain shorting or limping was achieved in 6 of the patients.

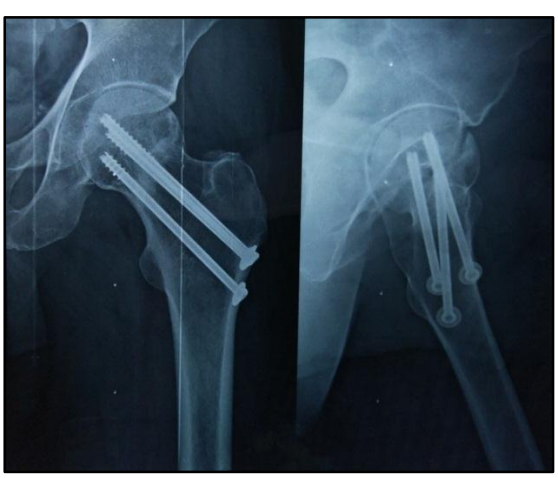
Good- Mild pain or discomfort was present. No limping was present and almost full squatting present.

Fair- Nonunion of fractures, shortening, limping and pain, restriction of movement and squatting.



Immediate Postoperative

X-Ray after 4 Months



X-Ray after 21 Months

Complications- After a follow up of 24 months, none had the evidence of avascular necrosis as per x-ray of pelvis AP view or CT scan of affected joined. Screw back out was seen in 1 case where fracture was united.

DISCUSSION

The main purpose of treatment of femoral neck fracture is to restore the functional and anatomical status with various methods available which are safe and reliable. More than 500 peer reviewed studies have been published on the subject, yet there is no consensus on which treatment is superior or firm guidelines for treatment decisions. Various methods of treatment are followed to increase the rate of union in all the cases. 100% success is never achieved.

Now, it was become an established fact that treatment of NOF fracture is ORIF, but choice of implant is still a debatable issue. Various published studies have revealed excellent results with different implants.[2] In previous days, S.P. nail gone good success rate regarding union around 56%.[3] Garden's cannulated cross screw fixation was 70% success rate, union was seen in 85% of the cross fixed with multiple Knowles pin fixation. DEIS fixation with early weightbearing solved 25% nonunion and 27% avascular necrosis.[4] In all the three above-mentioned cases, patients were treated within 72 hours of injury. Charnley's spring locked compression screw had an 80% success rate.

In the present study out of 10 patients of NOF, closed reduction with 3 parallel screws was done in 1 case and ORIF with 3 parallel screw fixation was done in remaining 9 cases. Reduction was achieved in all the cases. All cases were operated within 3 to 21 days of injury in all the ten patients. All the patients were followed up for more than 24 months. In about 80% of the cases, union was achieved. Six of the ten cases were followed up for more than 24 months. No Patient had any sign of avascular necrosis. One of the major complications after neck of femur fractures is femoral head osteonecrosis, which occurs in 9%-35% of displaced neck of femur fractures.[5-12]

In this study,accurate reduction was achieved before screw fixation and fracture was fixed with 3 parallel screws as it prevents rotation. Short threaded screw was preferred over long threaded screw and then fracture line is crossed as it helps in compression during final tightening. At the time of final tightening, traction in the limb was released. Proper placement of screw was checked by image intensifier in operation table. The screws were neither inverse in AP view nor was in retroversion in lateral view. Garden had concluded in his study that alignment index after reduction should be in the range of 155-180 degrees in both AP and lateral views.[13-15] Measurement of size, if screw was done with accuracy, so that screw lies in 2 mm of subchondral bone.

In this study,all the three screws were 10 degrees apart from each other. 6 cases were operated within 15 days of injury, rest 4 cases were operated within 21 days of injury. No significant difference in rate of union was seen in cases operated within 15 days, after 15 days and before 21 days. Retractor was used gently, so that it did

not disturb reduction. Rigidity of fixation was checked intraoperatively by surgeon and position of screw by image intensifier after full range of passive movement of hip. Postoperatively, check x-ray was done next day and then in follow up at 3, 6, 12, 24 and 48 weeks interval. Partial weight bearing was given at 6 weeks, which was gradually increased to full weight bearing.

In 3 cases below 20 years of age in spite of less satisfactory reduction, 100% union was achieved. Out of the 4 cases who were above 50 years of age, 3 of them had features which were united (75%). Three patients did not follow advice and started weightbearing within 1 month, but still fracture united nicely.

In many studies, it has been concluded that early full weight bearing from early postoperative period without detrimental effects r enhances fracture healing by compression at the fracture site.[16] Stable fixation in neck of femur fracture allows revascularisation to occur in an optimal mechanical environment and decreases the risk factor of further vascular damage.[17,18]

CONCLUSION

It is well said that one might try to copy other, but copying cannot make one equivalent to other, similarly a natural stable hip is better than anything. In NOF fracture, our first intention of treatment was to preserve natural hip joint by internal fixation in young individuals as well as elderly population. One should never directly go for partial/full replacement in young individuals. Lifestyle, habit/customs of patients and squatting position of the people was taken into consideration. In this study, we felt the most important thing, which should be kept in mind while operating is to do accurate reduction and rigid fixation with 3 parallel short headed cannulated screws. If this is achieved, then this surgery can be easily preformed even in rural areas even in late reported cases without much risk and it will improve quality of life of individual without much stress.

However a large study comprising more number of cases from different sociocultural environment will dictate future strategies in this still grey area of orthopaedic practice.

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