



RESULTS OF VALGUS OSTEOTOMY FOR “NEGLECTED” FRACTURE NECK OF FEMUR, 120° DOUBLE ANGLED BARREL PLATE: - HOW TO DO IT

Orthopaedics

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ABSTRACT

Introduction: A neglect fracture is arbitrarily defined as a fracture presenting late for more than three weeks from the time of the original injury, however, Myers et al, (12) in 1973 introduced the term “neglected” a delay of 30 days or more from the injury to seek medical treatment. The definition used by Myers will be used in this study.

The major problems associated with the neglected fracture neck femur are non-union, AVN, coxa vara and shortening of the affected limb. The patient presents with painful limp due to un-united status of the fracture, secondary osteoarthritis, shortening of the limb and defective lever arm mechanism.

Material and method: 16 patients with fracture neck femur, aged below 55 years, presenting late for 30 days or more from the index trauma were included in this study. All of them were treated with valgus osteotomy, at Dr Sushila Tiwari Govt Hospital and govt medical college, Haldwani, in years 2009 to 2019.

Conclusion: The outcome of neglected femoral neck fracture treated with valgus osteotomy and internally fixed with 120° double angle barrel plate is valuable procedure for the preservation of femoral head in young adult patients. And a large number of young femoral heads can be saved from sacrificing, if this procedure is learned and properly.

KEYWORDS

fracture neck of femur, neglected fracture femur, valgus Osteotomy,

INTRODUCTION

2-3% of all femoral neck fracture occurs in adults younger than 50 years and most of these are the result of high energy trauma (16). There is a lack of consensus in general, regarding the best treatment in the younger patient. The neglected fractures in young adults (age 60 years) is one of the most challenging to treat if femoral head salvage is attempted. AVN is a major reported complication ranging from 0 to 67% (4,5). That is why some authors presented the intracapsular fracture as a “vascular emergency”, and the earliest surgical intervention within 6 to 8 hours for the better outcome (18).

A neglect fracture is arbitrarily defined as a fracture presenting late for more than three weeks from the time of the original injury, however, Myers et al introduced the term “neglected” a delay of 30 days or more from the injury to seek medical treatment (12). The definition used by Myers will be used in this study.

The decision making process in the elderly patient is easier with an inclination towards hemi or total hip replacement due to poor result of osteosynthesis in elderly and good result achieved by the replacement in that age group (17).

The major problems associated with the neglected fracture neck femur are non-union, AVN, coxa vara and shortening of the affected limb and they present with painful gait, shortening of the limb, defective lever arm mechanism and secondary osteoarthritis.

As there is no clear guidelines for the treatment of neglected fracture neck of femur in younger patient, several methods have been used by different authors as salvage procedure, right from the osteosynthesis to McMurray's Osteotomy, Muscle pedicle bone graft (Myers/Bakshi), Pauwell's Osteotomy, free/ vascularised fibular grafting, excision arthroplasty (Girdle stone), arthrodesis to arthroplasty.

MATERIAL AND METHOD

All the adult patients with fracture neck of femur, presenting late for 30 days or more from the index trauma and treated with valgus osteotomy, at Dr Sushila Tiwari Govt Medical College and Govt Medical College, Haldwani, between years 2009 to 2019, were included in this study.

Inclusion criteria were the patient less than 55 years of age with fracture neck of femur presenting late for more than 30 days, with no visible signs of avascular necrosis of femoral head in plain

radiographs.

No special tests were done to detect precollapse status of AVN of femoral head, as this was not considered to be a contraindication for the valgus Osteotomy (1, 10). Only a pelvic radiograph showing both hip joints in antero-posterior view and AP in full internal rotation and LAT views of the affected hip joints were taken. The AP radiographs were evaluated for the signs AVN, fracture geometry/ displacements, change in the neck shaft angle, osteoarthritis changes and shortening of the affected limb. The LAT views were evaluated for the fracture displacement.

The most authors in the literature have reported that average of 25° to 30° is often sufficient to produce the desired effect (19, 20, 21). In our study we planned a 30° of lateral based wedge removal and internal fixation with 120° double angled barrel plates in all patients except in one 10 years old child in whom a bend high profile PHILOS (4.5 mm screws) was used for the internal fixation.

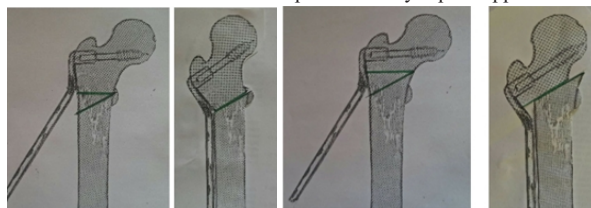
METHOD

All the surgeries were performed under spinal anaesthesia, using fracture table with the patient placed eccentrically on the edge of the table by moving the perineal post, for the ease of image intensifier manoeuvring. A gentle traction is applied and the fracture site is evaluated in AP and LAT views. Excessive traction is avoided for the reasons 1:- that it will distract the fracture site 2:- can damage any surviving vascularity of femoral head 3:- neck shaft angle is corrected to normal and valgus osteotomy performed, will result into a lengthened limb.

The entry point for the guide wire and Richard screw insertion is exactly same as we do in AO 95° DCS and when double angle barrel is slid over the Richard screw, plate part of the system will make an angle 25° from the lateral surface of the proximal femur, and now the patient ready for the 25° lateral base wedge removal.

Lateral based wedge is removed in subtrochanteric area. And it is important to identify the level of osteotomy (a wedge removal from more proximal level will result in medialization of distal fragment and less than desired lengthening of the limb). We do not use the oscillating saw as it generates a lot of heat and can cause thermal necrosis. Instead multiple drill holes are made in the bone and then with the help of a sharp osteotome and pointed bone nibbler wedge resection is

completed. Always leave the far medial end of the femur intact otherwise it becomes unstable and pose difficulty in plate application.



(A) Normal level of osteotomy (A) And proximal level osteotomy

And then the limb is gently abducted to bring the distal fragment of femur closer to the plate and secure with screws. Patient is allowed non weight bearing on walking frame for six weeks after that patient is allowed partial weight bearing on walking frame. Full weight bearing allowed only after appearance radiological signs of fracture healing.

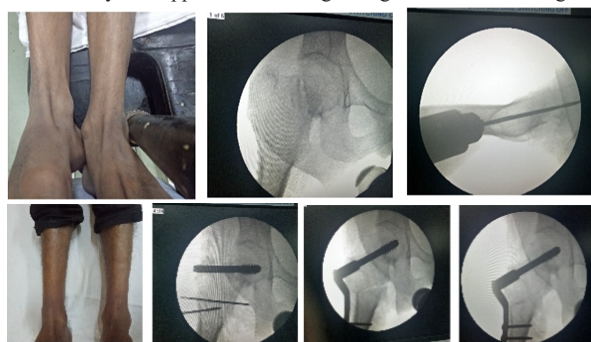


Fig showing the steps of surgical procedure and correction of limb length discrepancy

RESULTS

Valgus osteotomy was performed in 16 patients between the years 2009 to 2019 with the average follow up of 16 months (12 months to 34 months). There were 13 male and 3 female patients. In 9 patients neglected fractures were seen on left side and 7 on right side. In all the patients osteotomy site healed in an average time of 13 weeks (8 wks to 16 wks), but the fracture site took little longer time with average time of 18 weeks (12 wks to 32 wks).

Lateral closed wedge osteotomy were performed in all the patients with average change in the fracture inclination by 25° and that resulted in average limb lengthening of 2.0 cm. One patient developed avascular necrosis of femoral head after 16 months of surgery. There was an implant cut through in one female patient (subcapital fracture neck of femur) after 6 weeks of surgery.



Patient 1: - 27 yrs old male with 40 days old injury



Patient 2; - 10 years old patient with 6 weeks old injury, internal fixation with contoured PHILOS

Functional outcome was judged according to Askin-Bryan criteria

Excellent: - Full range of movements and strength, little or no pain and essentially normal appearing radiographs.

Good : - Some limitation of motion, mild discomfort and mild joint space narrowing.

Fair : - Some limitation of motion and moderate pain with

degenerative changes or aseptic necrosis.

Poor : - Severe restriction of function and pain requiring salvage procedure.

We observed excellent results in 3 patients, good result in 8 patients, fair results in 2 patients and poor results in 2 patients (AVN and implant cut through).

DISCUSSION

Dickson in 1953 in his presidential address to American Orthopaedic Association, made a plea to avoid a "defeatist attitude" in sacrificing the femoral head in favour of advancing replacement technology.(22) and this plea is still as relevant over 50 years down the line.

Late presentation of fracture neck femur in India is not uncommon as most of them seek the initial treatment from traditional bone setters.

Marti et al (10), presented results of valgus osteotomy in 41 patients of non-union of femoral neck, with union rate of 86%. They experienced technical difficulties in six patients requiring a second surgery for re-fixation. Seven other patients required replacement due to persistent non-union, late segmental collapse or implant failure at the shaft. Angelen8 reported 13 patients with failed internal fixation of femoral neck treated with valgus osteotomy achieving a union rate of 100% Avascular necrosis without head collapse has not been considered to be a contraindication for valgus osteotomy. Calandruccio and Anderson (6) considered that vascular damage at the time of fracture decides whether or not necrosis will develop. According to Stromqvist and Hanison overcorrection fresh femoral neck fractures to more than 20° to 30° valgus or malrotation will affect the remaining vessels and increase the chance of developing necrosis but whether this holds true in old cases with resorption of neck is debatable ().

By doing the valgus osteotomy the sheering forces are converted into compressive forces by placing the fracture site perpendicular to the resultant body weight force as it changes the Powell's angle from an obtuse to acute angle. B Day et al studied the effect of high femoral osteotomy upon the vascularity and blood supply of the hip, using bone scans, micro angiography, isotope clearance and preosseous venography and found 25% increase in the femoral head blood flow on the operative site (23).

CONCLUSION

The outcome of neglected femoral neck fracture treated with valgus osteotomy and internally fixed with 120° double angle barrel plate is valuable procedure for the preservation of femoral head in young adult patients, if done properly. I wish, more and more younger orthopaedic surgeons learn this procedure so more and more young femoral heads can be saved.

REFERENCES

- 1 Askin SR, Bryan RS. Femoral neck fractures in young adults. Clin Orthop. 1976;114:259-264
- 2 B Day, Shim SS, Leung G. Effect of the high femoral osteotomy upon the vascularity and blood supply of the hip. Surgery gynecology and obstetrics. 1984; 158(5):443-9
- 3 Baksi DP. Internal fixation of ununited femoral neck fractures combined with muscle-pedicle bone grafting. J Bone Joint Surg Br 1986;68:239-45.
- 4 Banks HH. Factors influencing the result in femoral neck fractures. J Bone Joint Surg 1962;44A:931-9645
- 5 Banks HH. The healing of intra-articular fractures. Clin Orthop Relat Res 1965;40:17-29.
- 6 Calandruccio RA, Anderson WE. Post fracture AVN of femoral head: Correlation of experience and clinical studies. Clin Orthop. 1980; 152:49-84.
- 7 Huang CH. Treatment of neglected femoral neck fractures in young adults. Clin Orthop Relat Res 1986;117-26.
- 8 Kalra M, Anand S. Valgus intertrochanteric osteotomy for neglected femoral neck fractures in young adults. Int Orthop 2001;25:363-6
- 9 Manish Sharma, LK Sood, RK Kanojia, Alok Sud. Valgus osteotomy for nonunion fracture neck femur. INDIAN JOURNAL OF ORTHOPAEDICS 2004; Volume 38 : Number 2 : P. 88-91
- 10 Marti RK, Schuller HM, Raymakers ELFB. Intertrochanteric osteotomy for non-union of femoral neck. J Bone Joint Surg (Br). 1989; 71:782-78
- 11 McMurray TP. Ununited fractures of the neck of the femur. J Bone Joint Surg Am 1936;18:319-27
- 12 Meyers MH, Harvey JP Jr, Moore TM. Treatment of displaced subcapital and transcervical fractures of the femoral neck by muscle-pedicle-bone graft and internal fixation. A preliminary report on one hundred and fifty cases. J Bone Joint Surg Am 1973;55:257-74.
- 13 Nagi ON, Dhillon MS, Goni VG. Open reduction, internal fixation and fibular autografting for neglected fracture of the femoral neck. J Bone Joint Surg Br 1998;80:798-804.
- 14 Roshan A, Ram S. Early return to function in young adults with neglected femoral neck fractures. Clin Orthop Relat Res 2006;447:152-7.
- 15 Sandhu HS, Sandhu PS, Kapoor A. Neglected fractured neck of the femur: a predictive classification and treatment by osteosynthesis. Clin Orthop Relat Res 2005;(431):14-20.
- 16 Shih CH, Wang KC. Femoral neck fractures 121 cases treated by Knowles pinning. Clin

- Orthop Relat Res 1991;195-200.
- 17 Sikorski JM, Barrington R. Internal fixation versus hemiarthroplasty for the displaced subcapital fracture of the femur. A prospective randomised study. *J Bone Joint Surg Br* 1981;63-B:357-61.
- 18 Swiontkowski MF, Winquist RA, Hansen ST Jr. Fractures of the femoral neck in patients between the ages of twelve and forty-nine years. *J Bone Joint Surg Am* 1984;1:837-46.
- 19 Anglen JO. Intertrochanteric osteotomy for failed internal fixation of femoral neck fracture. *Clin Orthop Relat Res* 1997;(341): 175-182.
- 20 Magu NK, Rohilla R, Singh R, Tater R. Modified Pauwels' intertrochanteric osteotomy in neglected femoral neck fracture. *Clin Orthop Relat Res* 2009; 467: 1064-1073.
- 21 Varghese VD, Boopalan PR, Titus VT, Oommen AT, Jepeganiam TS. Indices affecting outcome of neglected femoral neck fractures after valgus intertrochanteric osteotomy. *J Orthop Trauma* 2014; 28: 410-416.
- 22 Dickson JA. The "unsolved" fracture: A protest against defeatism. *J Bone Joint Surg Am* 1953;35:805-822.
- 23 Stromqvist B, Hansson LI, Palmer J, Thorngren KG. Femoral head vitality at reoperation for femoral neck fracture complications. *Arch Orthop Trauma Surg* 1984;103:235-240