Original Article

Orthopaedic

Cannulated Screw Fixation of Fracture Neck of Femur

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ABSTRACT

Objective: To determine the outcome of cannulated screw fixation of intra capsular fracture neck of femur in terms of union rates and complications.

Study Design: Retrospective case series study.

Place and Duration: This study was carried out at the DHQ Teaching hospital Abbottabad & Gilani hospital Abbottabad from March 2008 to March 2011.

Materials and Methods: Twenty four patients with intracapsular fractures neck of femur younger than 65 years of age including Garden I-IV, were fixed with cannulated screws, and included in this study. All cases were done by one surgeon and were followed for twenty four months.

Results: Union was recorded in twenty one patient's i.e. 87.5%. One patient from Garden III and two patients from Garden IV went in to non-union and were converted in tohemiarthoplasty. Combined Union rate of Garden III and IV was 78.57 %.

Conclusion: Cannulated Screw fixation of intracapsular fracture neck of femur is a safe and effective method.

Key Words: Fractures neck of femur, Cannulated Screw fixation, Osteosynthesis of fracture neck of femur.

INTRODUCTION

Historically known as the unsolved fracture[1], intra-capsular fracture of neck of femur, is gradually developing consensus regarding its management. Once there was a vogue for primary arthoplasty for this fracture, due mainly to lack of proper facilities i.e. C-arm and Orthopedic table (mainly in developing countries) and a fear of very high rates of non-union and AVN of femoral head.

Some of the earlier studies reported a nonunion rate of 4 % to 59% and AVN of 10% to 86%. Such wide differences could have been the result of improper patient selection regarding age, co-morbidities, type of fracture ,method and extent of reducation, method and material of fixation and timing of surgery.[2,3,4]

All these factors do effect the outcome however the most important ones are; age <65, accurate reeducation, best is Garden reeducation $\text{INDEX}\frac{180}{160}$degrees and timing of Surgery.[5,6]

Many studies have shown high rates of morbidity and mortality for prosthetic replacements in fractures neck of femur. [7,8,9,10,11] The risk of prosthetic replacements was two and half time higher when total hip arthoplasty was done for hip fractures rather than for osteoarthrosis .[12, 13]Similarlypost operative thirty days mortality was about 06%, wound infection 07% and dislocation rates were about 08% in 85 primary THR done for displaced fracture neck of femur[14].

But now the trend is shifting towards close reduction under C-arm and internal fixation of these fractures particularly in younger and physiologically fit patients[15]. With the gradual better development of fixation devices i.e. from SP nail, to cannulated Screws, results have definitely improved[16]. Therefore in our view cannulated screw fixation should be considered as the treatment of choice in these fractures, owing to its low cost, less hospital stay and lower perioperative morality and morbidity.[17]

MATERIALS AND METHODS

Case record of series of 24 patients with intra-capsular fracture neck of femur who were operated and followed from march 2008 to march 2011, were studied.

All these operations were done either in DHQ teaching Hospital Abbottabad or Gilani Hospital Abbottabad by the same surgeon. 88% of patients were female with age range of 52 to 64 years. Two patients were boys of 14 and 16 years. One of the female patients was 18.

Fractures were classified according to Garden Classification. Base line investigations were done but head viability was not assessed as most of the surgeries were done within first 24 hours of injury. Spinal anesthesia was used in all cases. Close reduction where required was done and checked under C-arm in both planes and then fracture was fixed with three parallel cannulated screws passed over guide wires through a small skin incision.

Fellow Up: Sutures were removed from week to ten days. Non weight bearing movements were started as soon as pain allowed after one month. Monthly follow up started till radiological union achieved. Afterwards, 03 monthly follow up visits continued till 02 years.

RESULTS

Clinical and radiological methods were utilized to assess union. Almost all female patients above 50 had domestic trauma while other had injures in road traffic accidents, falls from height and sporting injures.

All patients with Garden I and II achieved union without any complication one of the patient with Garden III was reopreated after two weeks due to loss of reduction and posterior angulation. She ultimately went into non union and was converted into hemiarthoplasty. Two more patients from Garden IV group needed hemiarthoplasty secondary to non union. Nevertheless none of the patients went into AVN till a maximum period of two years.

Garden type, number of patients and union rates are shown in Table 1.

Complications are summarized Table 2

Table No.1: Outcome

Garden Type	No of Patients	Union Rate
I & II	10	100%
III	09	88.8%
IV	05	60 %

Over All Union rates was 87.5 %

Table No.2: Complications

Complications	Garden Type	%age
AVN	I and IV	none within 24 months
Non Union	III and IV	12.5 %
Loss of reduction	III and IV	8.33 %
Wound infection	----------	0 %
Blood Transfusions	None	None
Decubitus Ulcer	III	4.34%
Reopreation	4	16.6%

DISCUSSION

Intra capsular fractures of neck of femur can be treated either by internal fixation or replacement arthoplasty. An algorithm that considers Physiological age and activity level of the patient is help full when deciding whether to fix or replace the hip in a patient with a displaced femoral neck fracture[18].

In our study we achieved an overall union rate of 87.5% but 41.66 % of our patients belonged to Garden I and II and no non union occurred in this grouped. Swiontkowshietal showed 100% union rate although only 30% of fractures were displaced[19].

Union rates were 88.8 % in type III fractures while only 75 % of type IV fractures achieved union in our study but this is still better than many other reported series.

Main reason for higher rates of non-union and osteonecrosis are: timing of surgery, posterior comminution, accuracy of reduction, method and material of fixation age and type of fracture.

Regarding timing of surgery some authors reported 100% union when it was done within eight hours of the injury. Other say that internal fixation can be equally effective if performed within one week of injury ,however after that fibrosis around fracture and hip and proximal migration of the distal fragment necessitates other open procedures such as intertrochanteric osteotomy or bone grafting for union to take place [20,21].

Anatomical reduction before fixation and maintaining it while fracture heals is very important as risk of early displacement is high during first six weeks and most angulate posterorly usually due to posterior comminution.[22, 23]

The technique of fixation with multiple parallel cannulated screws was introduced in 1980, [24] and is still considered the best. Patwaetal recommended three screws placed antero superiorly postero superiorly and posteroinferiorly in an inverted Triangle with no added advantage for a fourth screw on the basis of anatomy of neck of femur[25, 26].

Many studies have concluded that occurrence of AVN and non-union are quite high in patients with displaced fracture, with age > 80 years, with co-morbidities like renal failure, diabetes mellitus, osteoporosis and steroid intake.[27]

Holmberg et al studies patients with internal fixation for fracture neck of femur and reported 5% mortality (134 of 2441) at three months compared with a 14% (13 out of 95) mortality in first three months after hemiarthoplasty.[28]Arnaletal reported a 01% in hospital mortality (10 out of 750) who had an internal fixation for fracture neck of femur compared with an 11 percent (18 in 160) who had primary prosthetic replacement.[29]

Hence in the light of this study and affirmation by many previous .it can be said that internal fixation with cannulated screws is associated with low operative mortality and morbidity and is cost-effective, depicted by less operative time, small incision less blood loss, low cost of implants and short hospital stay.

CONCLUSION

Cannulated screw fixation should be the first choice of treatment in intra capsular fracture neck of femur in relatively young and fit patient.

REFERENCES

1. Nicoll EA. The unsolved fracture (editorial). J Bone Joint Surg (Br) 1963;45:239.
2. Catto MA. A Histological study of avascular necrosis of the femoral head after transcervicalfracture. J Bone and Joint Surg 1965; 47-B (4) 749-776.
3. Dorr LD, Glousman R, Hoy AL, Vanis R, Chandler R. Treatment of Femoral neck fractures with total hip replacementversus cemented and non cementedhemiarthoplasty J Arthoplasty1986;1: 21-28.

4. Franzen H, Nilsson LT, Stromqrist B, Johnsson R, Herrlin K. Secoundary total hip replacement after fractures of the femoralneck. J Bone and Joint Surg 1990;72-B(5):784-787.
5. Simon WH, Wyman ET. Femoral neck fractures: a study of the adequacy of reduction Clin Orthop 1970;70:152-60.
6. Gautum VK, Anand S, Dhaon BK. Management of displaced neck fractures in young adults 1998;29:215-18.
7. Eiskjaer S, Ostgard SE. Risk Factors influencing mortality after bipolar hemiarthoplasty in the treatmentof fractures of femoral neck. Clin Orthop 1991; 270:295-300.
8. Garcia A. Displaced intra-capsular fractures neck of femur mortality and morbidity. J Trauma 1961; 1:128-132.
9. Holmberg, Skalin R, Thorngren KG. Treatment and outcome of femoral neck fracture an analysis of 2418 patients admitted from their own homes. Clin Orthop 1987;2118:42-52.
10. Hunter GA. Comparison of the use of internal fixation and prosthetic replacement for fresh fractures of the neck of femur. British J Surg 1969; 56:229.232.
11. Hunter GA. Should we abandon primary replacement for fresh displaced fractures of the neck of femur? Clinic Orthop 1980;152:158-161.
12. Greenough CG, Jones JR. Primery total hip replacement for displaced sub capital fractures, of the femur. J Bone and Joint Surg 1988:70B(4): 639-643.
13. Nilson LT, Franzen H, Stromqvist B, Wiklund I. Funcation of the hip after femoral neck fractures treated by fixation or total hip replacement. Internat Orthop 1991;15:315-318.
14. Coates RL, Armour P. Treatment of sub capital femoral fractures by primary total hip replacement. Injury 1979;11:132-135.
15. M Ashraf N, Fraz A, Shah MA, Talat BK. Fracture neck of femur treated with cannulated screws in middle aged patients. J POA 2009;21:2:45.518.
16. Wilson JN. Fractures of the neck of femur In: Jones W, editor. Fractures and joint injuries. 6th ed. Churchill Living stone; 2002.p.935-957.
17. Asnis SE, Wanek L, Gaglione S. Intra Capsular fractures of femoral neck, results of Cannulated Screw Fixation J Bone and Joint Surg 1994; 76(12):1793-1803.
18. Kyle RF. Fracture of the femoral neck.Instr course Lect 2009.58-61-8.
19. SwiontKowski MF, Winquist RA, Hansen ST. Fractures of the femoral neck in patients between the age of twenty and forty nine years. I Bone & Joint Surg (Am):1984;66-A : 837-846.
20. Bray TJ. Femoral Neck Fracture Fixation. Clin Orthop 1997,339;20-31
21. Nagi ON, Gautum VK, Marya SKS. Treatment of Femoral neck fractures with Cancellous Screw and fibula graft. I Bone Joint Surg (Br) 1986;68-B: 387-91.
22. Garden RS. Malreduction and avascular nemesis in sub capital fractures of the femur. J bone and Joint Surg 53(B) 1971;2:183-193.
23. Garden RS. Reduction and fixation of sub capital fractures of the femur of sub capital fractures of the femur. Orthop Clin North Am 1974;5:683-712.
24. Asnis SE. The guided screw system in intracapsular fractures of the hip. Contemp Orthop 1985;10:33-42.
25. Harty M. The calcarfemorale and the femorale neck. J Bone Joint Surg (Am) 1957;39:625-630.
26. Hoaglend FT, LowWd. Anatomy of the femoral neck and head, with comparative data from Caucasians and Hong Kong Chinese. Clin Orthop 1980;152;10-16.
27. Sahu A, Harshavardena N, Maret S, Dhir A, Taylor H. Outcome of AO Cannulated Screws for the fracture neck of femur in 412 patients done over a 5 year period with < minimum fallow up of two years. Abstract British editorial Society of Bone & Joint Surgery 2007.
28. Conradi HS, Kalen R, Thorngren K. Mortality after cervical hip fracture 3002 patients followed for 6 years. Acta Orthop Scandinavia 1986;57:8.11.
29. Arnold WD, Lydan JP, Minkoff J. Treatment of intracapsular fractures of the femoral neck with special reference to Percutaneous Knowles pinning. I Bone and Joint Srug 1974;56 A 245-262.

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