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Management of fracture neck of femur with internal fixation alone or with fibular graft

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Abstract
Introduction: This study was conducted to assess the results of using free fibular graft to augment fracture fixation with cannulated cancellous screw for femoral neck.
Methods: The present study includes 15 cases of fracture neck of femur in elderly patients of the age 20-60 years irrespective of sex treated by Close / Open Reduction and Internal Fixation Using DHS / AO Cannulated Cancellous Screws Along With Strut Fibular Graft in the Department of Orthopaedics At PMCH Patna.
Results: 15 cases of fracture neck of femur were taken up for the study who reported to department of orthopaedics, PMCH between the ages of 20 – 60 years. The minimum duration between occurrence of fracture and surgical intervention was 3 weeks.
Conclusions: This technique is an ideal treatment for patients with neglected intracapsular neck of femur in younger age group in our part. Firstly our results were encouraging and secondly this fracture is cost effective and thirdly technically less demanding and lastly associated with good outcome allowing them to resume pre-fracture activities.

Keywords: Fresh fracture neck of femur, free fibular graf, multiple cancellous screws

Introduction
Fracture neck of femur continues to be a problem from the point of view of its management. It has passed through stages of immobilization in POP hip spica, internal fixation with Smith Peterson nail, nail plate, low angle nail before 1970. Now a day's popular fixation in adults is with cannulated cancellous screws and Dynamic hip screw. Orthopaedic surgeon in India and also in other developing countries has to treat patients from different economic strata from very rich to very poor patient who may not be able to afford even one meal a day. Majority of the patients have no health insurance and have to pay from their own pocket. The life style of the patients requiring them to squat or sit in buddha position makes it desirable to preserve the patient's own hip joint. The range of movements at the hip joint required to adopt these postures are neither possible nor permissible in any artificial joint available at present. In underdeveloped countries delayed presentation or improper treatment of femoral neck fracture is not uncommon because of poverty, lack of facilities and ignorance. The treatment of old femoral neck fracture is a much bigger challenge than that of fresh fractures. Under these circumstances internal fixation has to be combined with some type of bone graft or osteotomy. The addition of strut fibular graft have improved the rate of union specially if it has been delayed beyond 3 weeks. The functional results after union are quite satisfactory and lasting in very high percentage of cases. This study was carried out to observe the effect of strut fibular graft with other fixation devices in neglected fracture neck femur in terms of union, time for union, complications associated with it and lastly fuctional status of the affected hip. In this study we selected 15 patients of neglected fracture neck of femur between 20-60 years of age and observations were noted.
This clinical study presents long term follow up results of using free fibular graft to augment fracture fixation with CCS as treatment option for femoral neck fractures. The outcome was analysed by modified Harris hip scoring system and by radiographs taken during follow up.

Materials and Methods

The present study includes 15 cases of fracture neck of femur in elderly patients of the age 20-60 years irrespective of sex treated by Close / Open Reduction and Internal Fixation Using DHS / AO Cannulated Cancellous Screws along with strut fibular graft in the Department of Orthopaedics at PMCH Patna.

Exclusion Criteria

- Patient below 20 years and above 60 years of age.
- Pre-existing lesions of hip such as osteonecrosis of femoral head and degenerative arthritis. Malignancy
- Neurological disorder like seizures, psychosis or mental deterioration.

Surgical Procedure

All surgeries were performed on an elective basis using standard aseptic precautions surgery was performed under spinal or general anaesthesia.

Patient Positioning

The patients were positioned supine on the fracture table with a radiolucent padded counter traction post placed between the patient's legs. The uninjured leg was held in wide abduction using the fracture table. The injured leg was held in slight abduction, by a boot attached to the other leg extension of the fracture table. The C-arm image intensifier was positioned between the patients' legs and the adequacy of both the antero-posterior and true lateral views were verified before surgical preparation.

Reduction Technique

Closed reduction of fracture by Whitman or Lead better maneuvre under image intensifier control was performed in all the cases after the Patient was anesthetised. Reduction was confirmed with AP and Lateral view exposure by C-arm machine. The accuracy of reduction was confirmed by Garden's alignment index.

Garden's alignment index

On the antero-posterior view, the angle between the central compressive trabaculae within the femoral head and the medial cortex of the femur is measured. According to Garden, this angle is normally 160 degrees. On the lateral view, the major trabaculae are in the same axis as the axis of the femoral neck or lie at an angle of 180 degrees.

Skin incision

A lateral longitudinal incision centered over greater trochanter measuring about 5 to 8cms starting at the flare of greater trochanter and extending distally.

Insertion of the guide wire:

Two or Three guide wire were inserted in desired position in DHS / CC SREW respectively and confirmed using C arm image machine in both AP and Lateral view. In case of DHS the guide wire for the Hip Screw was inserted inferiorly as compared to the standarad position in AP View and central in Lateral view. The other guide wire was kept parallel to the first wire for the insertion of Strut Fibular Graft. In similar way in case of CC Screw two parallel guide wire used for insertion of CC Screw and third guide wire for the insertion of Strut Fibular Graft.

Drilling and Tapping and Insertion of CC SREW or DHS done Prepration of strut fibular graft and its insertion

Incision taken was standard incision used normally. Fibula was then extracted. Average length for extraction was 100 mm. It was then prepared according to thickness of neck. Usually half of the thickness of fibula used but in few cases whole of the fibula was inserted after reaming the appropriate guidrwire. Thereafter fibula was gently punched into the tract.

Closure of the wound: Wound over both the site was close in layers after securing hemostasis. Dressing over the wound applied. The wound was inspected on 5thpost operative day and injection gentamycin 500 mg infiltrated locally on suspicion of infection

Fig 1: X-ray left hip joint anteroposterior view showing 6-month-old femoral neck fracture; the fracture has united after nonvascular zed fibular graft osteosynthesis. Fellow up shows hip joint is still preserved with good functional outcome

Result

15 cases of fracture neck of femur were taken up for the study who reported to department of orthopaedics, PMCH between the age of 20 – 60 years. The minimum duration between occurrence of fracture and surgical intervention was 3 weeks.

Age of patient included in this study ranged from 20 to 60 years. Maximum number of patient were in age group 20 – 30 years. The mean age was found to be 37.27 years with a standard deviation of 11.48.

The incidence was found to be more in males as compared to female. 60% of patient were males and remaining 40% were females.

This table shows the mode of injury. Road traffic accident was found to be the most common mode of injury and was responsible for 80% of the total patient in this study.

The following table shows the incidence of RTA and fall from height in different age groups.

Most of the patient suffered RTA which was more common in patient less than 40 years of age. Only 20% patient had sustained fracture due to fall from height. 53% of patient who suffered road traffic accident were of age less than 40 years and remaining 27% patient of road traffic accident were of age above 40 years.

The mean hemoglobin of the observed population was found to be 8.61 gm% with a standard deviation of 1.95 gm%. All the patient had blood transfusion preoperatively except two patient.

Most patient had suffered displaced fracture neck femur. Garden Type III fracture was found to be most common type in this study followed by Type IV fracture. Together both these types consituted 93.33%.

Different range of movement in the postoperative follow – up at 2 years. This table shows 6 patient had flexion < 100 degree and 8 patients had flexion > 100 degree with 2 patients having fixed flexion deformity. There were 5 patient having extension less than 10 degree and 7 patient had extension > 10 degree. 12 patient had good range of abduction > 25 degree

and only 2 patient had less than 25 degree of abduction. Rotational movement with extended knee was observed in all patient with 12 patient having > 20 degree of external rotation and 2 patient had fixed internal rotation deformity of 10 degree. 12 patient had internal rotation more than 20 degree and 2 patient had internal rotation < 20 degree.

Immediate post-operative and 2year post-operative follow up. In immediate post-operative room 4 patient were observed to have bleeding for which wound was examined and antiseptic dressing applied, 5 patient had swelling, 5 patient had shortening of the affected limb and 1 patient had superficial infection which subsided after strict glycemic control and antibiotic therapy.

At 9 month follow up one patient had non-union for which Hemiarthroplasty was performed. There was no case of avascular necrosis of femoral head. 5 patient had limb length discrepancy.

10 out of 14 patient had well to excellent hip and 4 patient had poor to fair hip.

Maximum number of patient (42.85%) had good functional hip. Only 2 patient showed poor functional hip and were able to perform all their activities with some difficulty.

Table 1: Summary

NAME	REG NO	AGE (Yrs)	SEX	MODE OF INJ	HB GLOBIN	ASSOCIATED DISEASE	ADING OF FRACTURE	RATION DELAY	TYPE OF OPERATION	LYMPH USED	site of fracture	TIME TAKEN IN	PAIN	LIMP	DEFORMITY	LIMB LENGTH DIS	MOVEMENTS						HHS	RESULT
																	FLX	EXT.	ABD.	ADD.	IR (IN EXT	ER (IN		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
RAKESH KUMAR	EO/635	46	M	RTA	6.5	NIL	III	5 WK	CRIF	DHS	united	106	NONE	NONE	NIL	NIL	120	15	35	30	30	30	96	Excellent
BHIKHARI MANJHI	EO/829	58	M	FALL FROM	7.2	BPH	IV	14 WK	ORIF	DHS	united	145	MILD	MOD.	LLD	0.5	95	10	30	25	25	30	57	Poor
RANJANA SINHA	EO/1880	51	F	FALL FROM	6.6	HTN	III	8 WK	CRIF	DHS	united	110	SLIGHT	SLI.	LLD	0.5	100	15	25	25	25	30	83	Good
MALTI	EO/2150	42	F	RTA	8.4	NIL	IV	5 WK	CRIF	DHS	united	100	SLIGHT	SLI.	NIL	NIL	110	12	30	25	20	25	79	Fair
NIRANJAN DAS	EO/2239	36	M	RTA	9	NIL	III	9 WK	CRIF	DHS	united	105	MILD	SLI.	NIL	NIL	100	10	30	25	25	30	72	Fair
RAM KUMAR MANDAL	EO/6319	24	M	RTA	9.5	NIL	III	7 WK	CRIF	DHS	united	100	SLIGHT	SLI.	NIL	NIL	120	20	35	30	25	40	78	Fair
NITU KUMARI	EO/2383	22	F	RTA	9.1	NIL	II	3 WK	CRIF	CCS	united	95	NONE	NONE	NIL	NIL	115	10	35	30	25	30	96	Excellent
GAUTAM KUMAR	EO/4193	28	F	FALL FROM	11	NIL	IV	10 WK	CRIF	DHS	united	150	SLIGHT	SLI.	NIL	NIL	90	20	30	20	20	25	76	Fair
SHANTI DEVI	O/1035	33	F	RTA	8.1	NIL	III	8 WK	CRIF	DHS	united	120	SLIGHT	SLI.	NIL	NIL	100	15	35	30	25	30	74	Fair
SALU KUMAR	EO/125	23	M	RTA	11.3	NIL	IV	8 WK	CRIF	DHS	united	110	SLIGHT	SLI.	LLD	1	100	10	30	25	20	25	81	Good
RAMNATH RAI	O/1154	52	M	RTA	8.6	IHD	IV	10 WK	ORIF	DHS	united	140	SLIGHT	MOD.	LLD	1.2	95	10	25	20	20	30	65	Poor
PREMI	EO/952	45	F	RTA	4.7	HTN	III	6 WK	CRIF	DHS	united	130	SLIGHT	SLI.	LLD	0.7	105	15	35	30	30	35	78	Fair
VIKASH KUMAR	EO/3127	26	M	RTA	12.2	DM	IV	13 WK	ORIF	DHS	not united													
BAL GOVIND PASWAN	EO/600	38	M	RTA	8.2	NIL	II	4 WK	CRIF	CCS	united	115	NONE	NONE	NIL	NIL	115	15	40	25	30	30	94	Excellent
NUKUL SAHANI	EO/1435	35	M	RTA	8.7	NIL	III	5 WK	CRIF	DHS	united	110	NONE	NONE	NIL	NIL	110	15	35	30	30	35	98	Excellent

Discussion

In our study 4 patients (28.57%) had no pain and 10 patients (71.42%) had post-operative pain. Using Harris hip score criteria for pain 8 patients had slight pain, which was occasional and did not compromise any activities. 2 patients had mild pain which had no effect on average activities but pain aggravated on unusual activities and they responded to aspirin. The analgesic was given to all these patients to be taken on sos basis.

We found limp in 10 patients. Out of these 8 patients had slight limping and 2 patients had moderate limping. Limping was either due to limb length discrepancy or pain or both. Customised shoe with raised heel was given to 5 patients who had limb length discrepancy and they responded to it and were satisfied. Remaining 3 were sent for physiotherapy and did not report to department till completion of this study. We observed shortening in 5 patients which ranged from 0.5 to 1.2 cm. They did well with conservative management. Post-operative movement observed in our study had flexion ranging from 0-120 in flexed knee. Only 3 patients had flexion less than 100 degree. In all the patients extension was within normal limit. Remaining movement of abduction, adduction, internal and external rotation was found within normal range.

In our study functional outcome was evaluated using Harris Hip Score as it widely accepted now a days. In our study harris hip score ranged from 57 to 98 with a mean of 80.5. in our study 4 patient (28.57%) had excellent hip, 2 (14.28%) had good hip, 6 (42.85%)had fair hip and 2 (14.28%)had poor hip.

Roshan A, Ram S in their study on 32 patients, followed them for an average of 6.1 years postoperatively, found average Harris hip score of 87.1 and reported early return to the function in young active patients disabled by old femoral neck fracture. [53]

Daria Singh *et al*. worked on 25 patients of ununited fracture neck of femur in age group 21-55 years. The gap between injury and operation included 6 weeks to 58 weeks. They were treated by closed reduction, cancellous screw fixation and fibular strut graft and followed upfor 2-6 years. They used Mishra criteria for functional end results, which were excellent in 21, good in 3 and poor in 1 patient.[63]

Pal CP in their study on 72 patients of neglected fracture neck femur and reported excellent hip in 41.66%, 27.77% had good hip, 20.83% had fair hip and remaining 9.72% had poor hip using Harris hip scoring system. [58]

Gurvinder singh kainth *et al* worked on 22 patients with neglected femoral neck fracture with a mean delay between trauma and surgery of 12 weeks. They measured functional outcome using Askin and Bryan criteria. They observed excellent outcome in 2 patients, good in 17 and poor in 3 patients [57].

The difference in functional outcome in our study as compared to other studies were minor and may be due to small sample size.

Conclusion

Healing of femoral neck fracture is the best desirable outcome for any tretment options. Salvaging the femoral head for young patients with neglected femoral neck fracture is

challenging. Arthroplasty, total hip or partial hip, is recommended in older age group especially in patients more than 60 years of age. The appropriate treatment depends on age of patient, other co-morbid conditions, viability of femoral head, size of remnant femoral neck, extent of osteoporosis, duration of disease and state of joint space.

Osteosynthesis using fibular graftng with internal fixation, valgus osteotomy, vasularised bone grafting or displacement osteotomy have been advocated for neglected femoral neck fractures. These procedures can achieve painless stable hip unlike Girdlestone excision arthroplasty which results in painless unstable hip. Vasularised bone grafting is a good option but is technically more demanding.

Cortical bone grafting is a recognised method of treating avascular necrosis of femoral head and presence of strut fibular graft can prevent the collapse of subchondral bone until complete revascularisation occurred. [50] It might reduce the incidence of AVN for which further study is needed.

Out of total 15 patients in our study union was achieved in 14 cases and non-union occurred in only one case. No case of AVN was reported. All the 14 patient who had union did well in terms of pain, limping, range of movement and other routine activities. Our procedure allows the preservation of biological hip joint and allows to return to pre-fracture activities. It also allowed patients to sit cross leg and squat, a common practice in our culture which is neither possible nor permissible in any hip arthroplasty.

Therefore we conclude from our study that this technique is an ideal treatment for patients with neglected intracapsular neck of femur in younger age group in our part.Firstly our results were encouraging and secondly this fracture is cost effective and thirdly technically less demanding and lastly associated with good outcome allowing them to resume pre-fracture activities.

References

1. Arbab S, Ud Din S. Osteosyntheis of intracapsular fracture neck of femur with cancellous screw and fibular graft. J Postgrad Med Inst. 1991; 5:64-9. [Google Scholar]
2. Huang CH. Treatment of neglected femoral neck fractures in young adults. Clin Orthop Relat Res. 1986; 206:117-26. [PubMed] [Google Scholar]
3. Haidukewych GJ. Salvage of failed treatment of femoral neck fractures. Instr Course Lect. 2009; 58:83-90. [PubMed] [Google Scholar]
4. Pauyo T, Drager J, Albers A, Harvey EJ. Management of femoral neck fractures in the young patient: A critical analysis review. World J Orthop. 2014; 5:204-17. [PMC free article] [PubMed] [Google Scholar]
5. Zuckerman JD. Comprehensive Care of Orthopaedic Injuries in the Elderly. Baltimore: Urban & Schwarzenberg, 1990. [Google Scholar]
6. Arnold WD, Lyden JP, Minkoff J. Treatment of intracapsular fractures of the femoral neck. With special reference to percutaneous Knowles pinning. J Bone Joint Surg Am. 1974; 56:254–62. [PubMed] [Google Scholar]
7. Banks HH. Factors influencing the results in fractures of the femoral neck. J Bone Joint Surg. 1962; 44:931-64. [Google Scholar]
8. Banks HH. Nonunion in fractures of the femoral neck. Orthop Clin North Am. 1974; 5:865-85. [PubMed] [Google Scholar]
9. Chapman MW, Stehr JH, Eberle CF, Bloom MH, Bovill EG, Jr Treatment of intracapsular hip fractures by the Deyerle method. A comparative review of one hundred and nineteen cases. J Bone Joint Surg Am, 1975 57(5):735-44. [PubMed] [Google Scholar]
10. Estrada LS, Volgas DA, Stannard JP, Alonso JE. Fixation failure in femoral neck fractures. Clin Orthop Relat Res. 2002; 399:110-8. [PubMed] [Google Scholar]