Section: Orthopaedics

Original Research Article

MANAGEMENT OF FAILED PRIMARY OSTEOSYNTHESIS SUBTROCHANTERIC FEMUR FRACTURE BY CONTRALATERAL DISTAL FEMUR LCP

Nitin Kumar Agrawal[1], Vijeta Kumari[2]

[1]Associate Professor, Department of Orthopaedics, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India.
[2]Assistant Professor, Department of Anaesthesia, IMS, BHU, Varanasi, Uttar Pradesh, India.

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Corresponding Author:
Dr. Nitin Kumar Agrawal
Email: agrw.nitin@gmail.com

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Abstract

Background: Failed subtrochanteric fractures with implant are difficult to manage. There are limited intramedullary (PFN) & extramedullary (DCS) implants which can be used in non-union subtrochanteric fracture cases. We choose distal femur LCP of contralateral side in revision surgery. The aim of this study is to show the efficacy of distal femur LCP for salvaging failed subtrochaneric fractures. **Materials and Methods:** We included 24 patients of non-union subtrochanteric femur fracture with failed osteosynthesis. All patients were operated with contralateral distal femur LCP from july 2017-july 2020. Preoperative parameters like age, sex, mode of injury, type of implant, time from primary surgery to revision surgery recorded. All patients were followed up clinically, radiologically and functional outcomes were assessed in terms of Harris-hip score. **Result:** All 24 patients achieved union after mean duration of 5 months (range 3-9 months). Only 2 patients developed superficial SSI which were treated by prolonged antibiotic course. No major complication occurred in any patient. Average functional Harris-hip score was 85.60 (range 78-95) at last follow-up. **Conclusion:** contralateral distal femur LCP can be used as a viable alternative to manage failed primary osteosynthesis subtrochanteric femur fractures and is associated with good functional results.

INTRODUCTION

Subtrochanteric fractures are always challenging for trauma surgeons in spite of recent advances in implants and surgical techniques. These fractures account for approximately 10-34% of all hip fractures and occur in all age groups.[1] In young adults, these fractures occur due to high velocity trauma and in old age group due to trivial trauma. There are many options to manage these fractures which can be divided into extramedullary (DCS, 95-degree condylar blade plate, anatomical proximal femur LCP) and intramedullary implants (PFN). Intramedullary fixation is better and has superior results as compared to extramedullary fixation and associated with less blood loss & early weight bearing.[2] But these fractures are very notorious in nature and always have a tendency to go into non-union because of their unique anatomical & biomechanical properties.[3] We therefore evaluated the efficacy of reverse contralateral distal femur LCP in non-union subtrochanteric fractures that were managed initially with either intramedullary or extramedullary implants.

MATERIALS AND METHODS

We conducted a prospective study of 24 patients (18 males, 6 females) with non-union subtrochanteric fractures following intramedullary implant (15 patients) & extramedullary implant (9 patients). Average age of patients was 58.5 yrs (range 30-65 yrs). All the patients were operated by single orthopaedic surgeon at a tertiary level centre in between July 2017 to July 2020. Approval from institute's ethical committee was taken & Informed consent was taken from all the patients. Reverse distal femur LCP of opposite side was used for revision surgery in all the cases. The surgery wae done at an average interval of 6 months (range 5-9 months) from the primary surgery. In all the cases, cortico-cancellous bone grafting was done.

Surgical Technique: All patients were operated in lateral decubitus position under regional anaesthesia on a radiolucent table. Previous implants were removed. Non-union site was open and freshening of fracture ends done. Open reduction and fixation with reverse contralateral distal femur LCP were done. While inserting proximal screws into femur neck, image intensifier was used to confirm the position in

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both antero-posterior & lateral view. After plate fixation, cortico-cancellous graft was taken from ipsilateral iliac crest and put at non-union site. Wound closed in layers without drain. All the patients were allowed to non weight bearing walk with walker or axillary crutches from 2nd day after surgery. Patients were discharged at 5th or 7th day of surgery and regular follow-up was done.

RESULTS

All 24 patients were followed up clinically & radiologically and average follow-up period was 20 months (range 16-30 months). No patient died or lost-up during period of follow-up. All patients achieved union after an average duration of 5 months (range 3-9 months). Mean operative time was 120 mins (range 100-150 mins) and mean blood loss was 400 ml (range 350-500 ml). primary fixation was done with proximal femur nail in 15 pts, DCS in 5 pts, anatomical proximal femur plate in 4 pts. High velocity trauma (road traffic accident, fall from height) occurred in 11 patients and 13 patients developed fracture due to trivial fall. No major complications developed in any pt. only 2 patients developed superficial surgical site infection which were treated by pus culture/sensitivity & prolonged antibiotic course. The functional outcome was assessed by Harris hip score. Mean Harris hip score was 85.62 (range 78-95) after 9 months of follow-up. Outcomes were excellent in 20%, good in 50%, fair in 20.3% and poor in 9.70% of patients.

Figure 1: nonunion subtrochanteric fracture with PFN in situ

Figure 2: Contralateral Distal femur LCP

Table 1: Patient variables and observations

Patient	Age	Sex	Mode of injury	Time to union(months)	Follow-up(months)	Primary surgery fixation implant	Harris hip score	Operative time(minutes)	Complication
1	30	M	RTA	3	16	PFN	80	115	None
2	45	M	FFH	6	20	PFN	83	110	None
3	65	F	Trivial fall	7	30	DCS	85	120	None
4	50	M	Trivial fall	4	22	PFN	90	110	None
5	40	M	RTA	6	18	DCS	95	135	None
6	35	M	RTA	4	19	PFN	78	130	None
7	33	F	FFH	5	25	PFN	79	150	None
8	42	M	RTA	7	15	DCS	80	100	None
9	65	M	Trivial fall	9	21	PFN	93	108	None
10	44	M	RTA	4	17	Proximal femur LCP	92	122	None
11	30	M	RTA	4	23	PFN	91	130	None
12	53	F	FFH	6	28	PFN	88	135	Superficial SSI
13	60	F	Trivial fall	5	16	Proximal femur LCP	87	150	None
14	55	M	RTA	5	18	PFN	78	100	None
15	56	M	Trivial fall	6	17	PFN	79	110	None
16	60	M	Trivial fall	5	24	DCS	80	100	None
17	52	M	RTA	5	22	Proximal femur LCP	85	120	None

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18	60	F	Trivial fall	3	20	DCS	86	128	Suerficial SSI
19	63	M	Trivial fall	6	17	PFN	94	112	None
20	57	M	Trivial fall	5	18	PFN	93	135	None
21	63	M	Trivial fall	4	21	PFN	78	130	None
22	64	F	Trivial fall	4	20	PFN	95	120	None
23	62	M	Trivial fall	3	16	PFN	86	100	None
24	64	M	Trivial fall	5	17	Proximal femur LCP	80	110	None

**RTA=Road traffic accident *FFH=Fall from height *PFN=proximal femur nail *DCS=dynamic condylar screw plate *SSI=surgical site infection*

DISCUSSION

Subtrochanteric fracture management is associated with many complications like non-union, delayed union etc. These fractures have an overall incidence of non-union or delayed union after any type of primary fixation from 7% to 20%.[4,5] These complications occur mostly because of either wrong choice of implant for fracture pattern or wrong surgical techniques. Revision osteosynthesis is always difficult in these fractures because of poor bone stock due to previous surgery and higher biomechanical forces at non union site along with fibrosis causing difficulty in fracture reduction.[6] We choosen distal femur LCP of opposite side in our study because the shape of plate fits well with contour of greater trochanter and plate have anterior bowing which matches with anterior femoral shaft convexity. In non-union cases, we need fixation in compression mode which can be provided with this plate. As the poor bone stock of proximal femur due to previous surgery needs a good fixation, distal femur LCP have multiple options of screw insertion at different angle which can provide better purchase of implant as compared to other implants like DCS, PFN or DHS.

There are studies which support the use of distal femur LCP for management of non-union subtrachanteric fractures. Dumbre patil SS et al,[6] recommended reverse distal femur LCP can be used as salvage option in non-union cases of proximal femur fractures. In their study, they reported all twenty patients achieved union without any complications.

Al–otaibi in his study used distal femur LCP for management of failed subtrochanteric fractures treated by PFN.[7] All 11 cases achieved union with excellent to fair functional outcome in 90% of cases. Gogna P et al,[8] recommended the use of contralateral reverse distal femur LCP for fixation of subtrochanteric fractures. In their study, they achieved 87.5% union rate with this plate as primary procedure. Han et al,[9] compared the results of PFN & reverse LISS distal femur plate in the treatment of proximal femur fractures and concluded that the use of reverse LISS distal femur plate is more effectively avoided coxa vara & better for patients with severe osteoporosis. In another study, Ouyang Y et al,[10] recommended the use of contralateral reverse LISS distal femur plate for primary fixation of subtrochanteric fractures in elderly patients unsuitable for nailing procedure.

There were some limitations in our study. Sample size was small and there were no control group hence significant statistical conclusions cannot be made by this study.

CONCLUSION

Based on our study, we can conclude that contralateral reverse distal femur LCP is a good option for management of non union subtrochanteric fracture failed osteosynthesis. Further clinical studies with larger number of patients & control group are required to prove the outcome and effectiveness of distal femur LCP in management of non union subtrochanteric fractures.

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