



International Journal of Orthopaedics Sciences

ISSN: 2395-1958

IJOS 2019; 5(2): 288-291

© 2019 IJOS

www.orthopaper.com

Received: 19-02-2019

Accepted: 23-03-2019

Dr. Prunav Adhav Prithvi Raj
Pondicherry Institute of Medical
Sciences, Kalapet, Pondicherry,
India

Dr. Siva Swaminathan
Pondicherry Institute of Medical
Sciences, Kalapet, Pondicherry,
India

Dr. Syed Najimudeen
Prof. Pondicherry Institute of
Medical Sciences, Kalapet,
Pondicherry, India

Dr. Gopi Kumar
Pondicherry Institute of Medical
Sciences, Kalapet, Pondicherry,
India

Dr. Ponnillavan Krishnan
Pondicherry Institute of Medical
Sciences, Kalapet, Pondicherry,
India

Analysis of the functional and radiological outcome of unstable intertrochanteric femur fractures treated with the proximal femoral nail or the dynamic hip screw

Dr. Prunav Adhav Prithvi Raj, Dr. Siva Swaminathan, Dr. Gopi Kumar and Dr. Ponnillavan Krishnan

DOI: <https://doi.org/10.22271/ortho.2019.v5.i2f.38>

Abstract

The incidence of intertrochanteric fractures is increasing in frequency in proportion to the increasing life expectancy of the general population. Intertrochanteric fractures are more commonly encountered in elderly osteoporotic patients. Both proximal femoral nailing (PFN) and the dynamic hip screw (DHS) are standard procedures which are being used in the management of unstable intertrochanteric fractures till date. In this study, we analyzed the functional and radiological outcome of treatment of unstable intertrochanteric fractures managed with internal fixation using either the proximal femoral nail or the dynamic hip screw. In our study, we included a total of 35 unstable intertrochanteric fractures (AO-A2 and A3) among which 19 patients were operated with the proximal femoral nail and 16 patients with the dynamic hip screw. It was found that the PFN group fared better than the DHS group, by having lesser time duration of surgery, lower intraoperative blood loss, lower duration of hospital stay, and lower incidence of complications as well. The functional outcome determined by the Modified Harris hip score was also found to be better in the PFN group in the initial post-operative period; however, at the end of one year it was found to be similar in both the groups. There was no statistically significant difference in the radiological outcome determined by the RUSH score (Radiological union score of hip) between the two groups at any point of time from the immediate post-operative period till the entire follow up.

Keywords: unstable intertrochanteric fractures, proximal femoral nail, dynamic hip screw

Introduction

Intertrochanteric fractures are more commonly encountered in elderly osteoporotic patients. Early and aggressive mobilization of the patients significantly decreases the associated morbidity and mortality rate [1]. These fractures are more common in females due to post-menopausal osteoporosis and metabolic changes involving the bone [2]. Conservative management has been associated with complications including pressure sores, respiratory and urinary tract infections, joint stiffness, pneumonia, deep vein thrombosis and thromboembolic complications resulting in increased patient suffering, morbidity and mortality. Coxa Vara and limb shortening have also been reported with conservative management. Hence, internal fixation has become the treatment of choice for all intertrochanteric fractures [3]. Both proximal femoral nailing and the dynamic hip screw are standard procedures which are being used in the management of unstable intertrochanteric fractures till date. In this study, we analyzed the functional and radiological outcome of treatment of unstable intertrochanteric fractures managed with internal fixation using either the proximal femoral nail or the dynamic hip screw.

Materials and Methods

This prospective study was performed at Pondicherry institute of medical sciences, Pondicherry, India from May 2016 to August 2018 after getting approval from the institute ethical committee. We included a total of 35 patients with AO/OTA-A2 and A3 unstable intertrochanteric fractures in our study. Polytrauma patients were excluded from the study. There was no randomization of the implant used in our study and the implant used was

Correspondence

Dr. Prunav Adhav Prithvi Raj
Pondicherry Institute of Medical
Sciences, Kalapet, Pondicherry,
India

selected based upon the integrity of the postero-medial cortex, extent of lateral wall comminution and fracture orientation. The proximal femoral nail was used in 19 patients and the dynamic hip screw was used in 16 patients. The parameters such as patient's age, gender, mechanism of injury, type of fracture orientation, duration of surgery, duration of hospital stay, intra-operative blood loss and complications such as infection and post-operative limb length discrepancy were documented. The patients were followed up at 6 weeks, 3 months, 6 months and 1 year and their functional outcome was assessed using the Modified Harris hip score [4]. The radiological outcome was assessed at each visit using the RUSH score (radiographic union score for hip) [5]. The data was collected and data analysis done by SPSS software version 22. Proportions were used for categorical variables and Means for continuous variable. Mean, standard deviation, frequency and percentage were used for descriptive purposes. T test was used to compare the mean between 2 groups. Chi square test was used to find association. A p-value of less than 0.05 (p value <0.05) was considered to be statistically significant.

Results

In our study, it was found that most of the patients were above 60 years of age. The mean age was 66 years. There was a slight male predominance with 20 patients being male and 15 patients being female. The proximal femoral nail was used in 19 patients (7 patients with AO-A2 type fractures and 12 patients with AO-A3 type fractures) and the dynamic hip screw was used in 16 patients (11 patients with AO-A2 type fractures and 5 patients with AO-A3 type fractures). The most common mechanism of injury was accidental fall. The mean duration of hospital stay was 13.79 days in the DHS group and 10.09 days in the PFN group. The lesser duration of stay required in the PFN group was found to be statistically significant with a p value of 0.009. The mean duration of surgery was 94.78 minutes in the PFN group and 127.59 minutes in the DHS group which was significantly higher than the PFN group with a p value of 0.001. The mean intra operative blood loss was 117.5 ml in the PFN group and 200.34 ml in the DHS group and this was found to be statistically significant. The functional outcome was measured by the Modified Harris hip score at 6 weeks, 3 months, 6 months and 1 year. At 6 weeks follow up the mean score was 50.28 in the PFN group and 42.43 in the DHS group. At 3 months follow up the mean score was 74.24 in the PFN group and 66.07 in the DHS group. At 6 months follow up the mean score was 87.48 in the PFN group and 81.71 in the DHS

group. At 1 year follow up the mean score was 88.22 in the PFN group and 87.13 in the DHS group. It was hence inferred that the functional outcome was initially better in the PFN group in the initial post-operative period till 6 months of follow up which were statistically significant with a p value of 0.001, but at the 1 year follow up, there was no statistically significant difference in the functional outcome between the two groups. The radiological outcome was measured by the RUSH score at 6 weeks, 3 months, 6 months and 1 year. At 6 weeks the score was 13.86 in PFN group and 13.36 in the DHS group. At 3 months the score was 19.14 in the PFN group and 18.86 in the DHS group. At 6 months the score in the PFN group was 25.43 and in the DHS group it was 26.57 and at 1 year the score was 26.24 in the PFN group and 25.33 in the DHS group. It was hence inferred that there was no statistically significant difference in the radiological outcome between the 2 groups at any point of time from 6 weeks of follow up till the full 1 year of follow up. One patient in the DHS group had a surgical site infection in the immediate post op period which settled with a wound debridement and intravenous antibiotics. One patient in the PFN group and three patients in the DHS group had a radiological varus malunion which were all clinically asymptomatic and hence no additional intervention was required. Three patients in the DHS group and one patient in the PFN group had a limb shortening of 0.5 cm but none of the patients had any functional disability.

Table 1: Comparison of parameters assessed

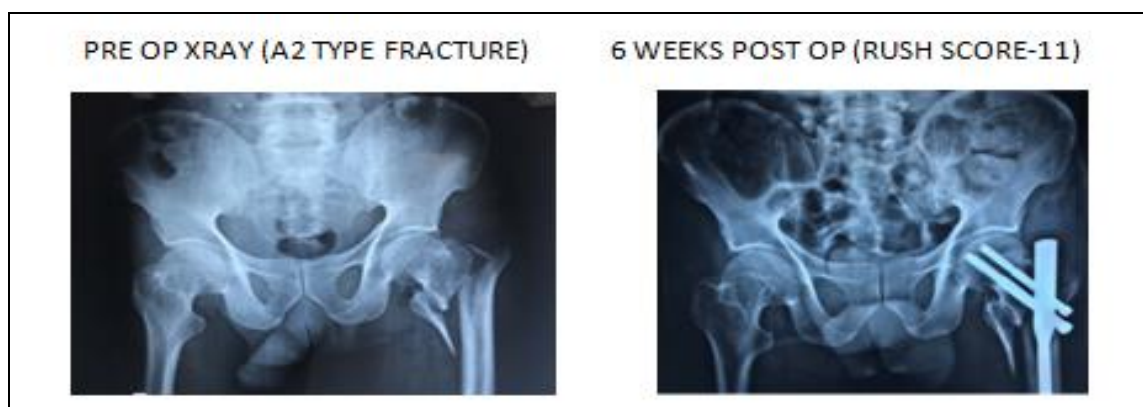
Parameter	PFN	DHS	P Value
Mean duration of hospital stay	10 days	13.79 days	0.009
Mean duration of surgery	94.78 mins	127.59 mins	0.001
Mean intraoperative blood loss	117.55 ml	200.34 ml	0.001

Table 2: Functional Outcome (Modified Harris Hip Score)

Follow Up	PFN	DHS	P Value
6 Weeks	42.43	50.28	0.001
3 Months	77.24	66.07	0.001
6 Months	87.48	81.71	0.001
1 Year	88.22	87.13	0.227

Table 3: Radiological outcome (Radiological union score of hip)

Follow Up	PFN	DHS	P Value
6 Weeks	13.86	13.36	0.223
3 Months	19.14	18.86	0.59
6 Months	25.43	25.57	0.709
1 Year	26.24	26.33	0.085



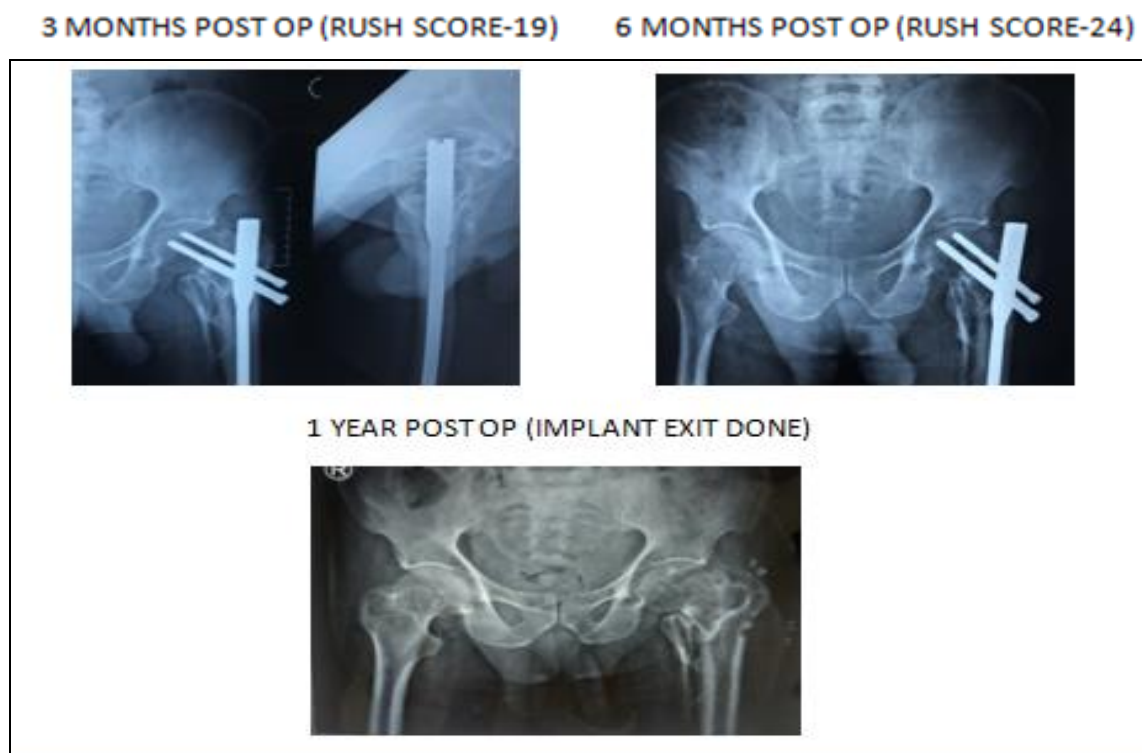


Fig 1: Fixation with PFN

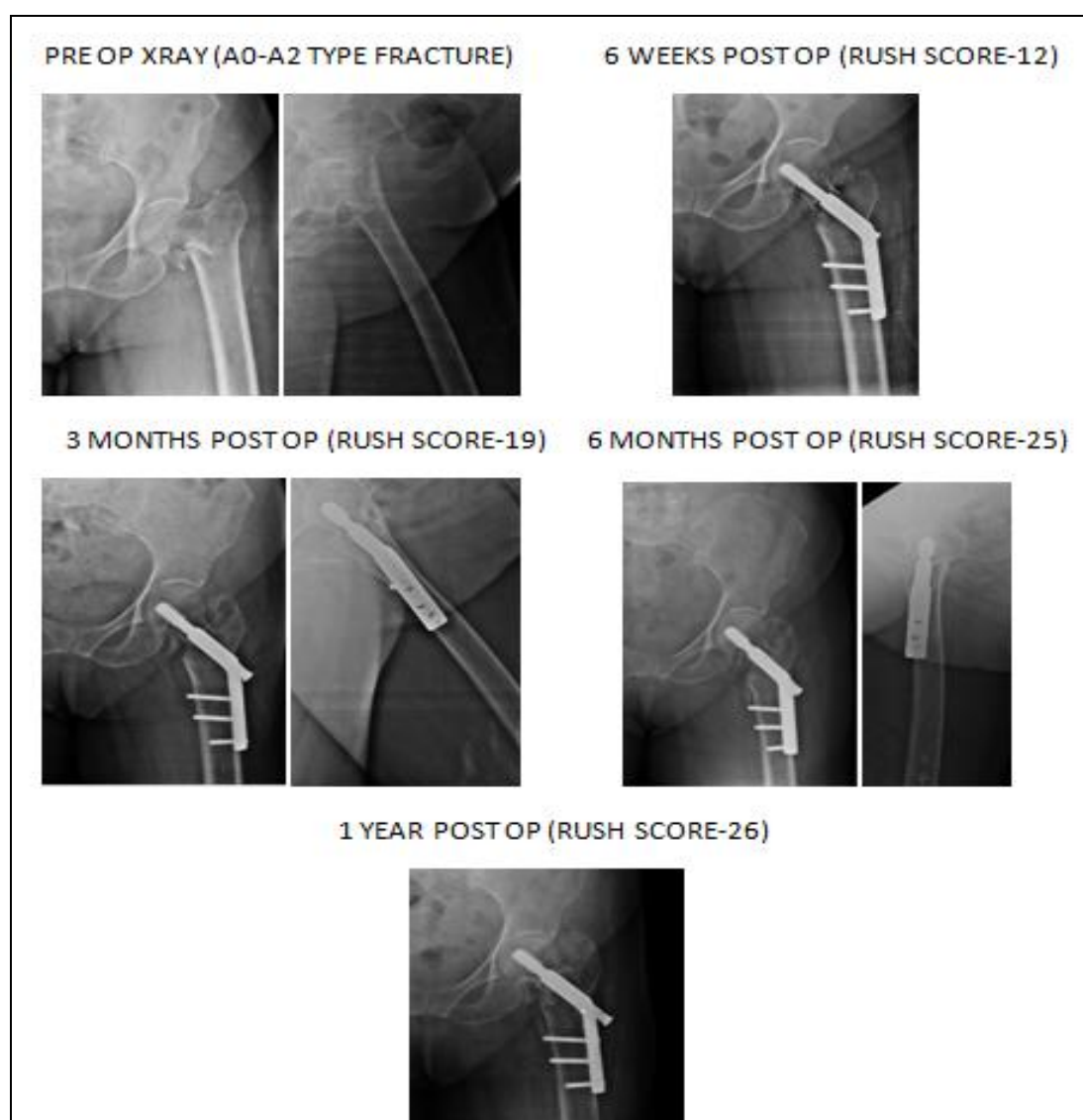


Fig 2: Fixation with DHS

Discussion

The aim of fixing intertrochanteric fractures is mainly to achieve a stable fixation, early mobilization and rehabilitation and making the patient functionally and psychologically independent. There has been an advent of a number of devices for internal fixation of these fractures. The first of such devices is Jewett and Holt fixed angle nail plate. This implant failed due to lack of controlled impaction. The sliding hip screw was used for fixation of these fractures with the advantage of controlled collapse. It showed excellent results in all stable fractures. However, failure was noted in fractures with posteromedial cortex comminution and extensive lateral wall comminution. Intramedullary devices such as the proximal femoral nail have a theoretical advantage of more load transfer, with short lever arm and decreased implant failure rate even in unstable fractures. In our study, we compared the functional and radiological outcome of fixation of unstable intertrochanteric fractures treated with the proximal femoral nail or the dynamic hip screw. The most common mode of injury was found to be trivial accidental falls followed by road traffic accidents. A prospective comparative study by Cyril Jonnes *et al.* [6] in 2014 similarly found the most common cause to be due to accidental falls and the next common cause to be road traffic accidents. In our study we included only unstable intertrochanteric fractures (AO/OTA-A2 and A3 type intertrochanteric fractures). We encountered a total of 18 AO/OTA-A2 type fractures of which 7 were fixed with the PFN and 11 were fixed with the DHS. We encountered 17 AO/OTA-A3 type fractures of which 12 were fixed with the proximal femoral nail and 5 with the dynamic hip screw. The proximal femoral nail was preferred in more AO/OTA-A3 type fractures due to the extensive lateral wall comminution. In our study the mean duration of surgery was 94 mins in the PFN group and 127 mins in the DHS group. The PFN group had a significantly lower mean duration of surgery. A prospective study by Shen *et al.* [7] in 2007 declared similar findings with the mean duration of surgery being 62 mins in PFN group and 99 mins in DHS group. A comparative study by Zhao *et al.* [8] in 2009 found the mean duration of surgery to be 57 mins in PFN group and 68 mins in DHS group. These findings were found to be similar to the finding in our study. In our study the mean intraoperative blood loss was 117 ml in the PFN group which was significantly lower than the DHS group which had a mean blood loss of 200 ml. This was probably due to the smaller incision required, lower duration of surgery and less soft tissue stripping. Shen *et al.* [7] in 2007 found the mean blood loss to be significantly higher in the DHS group, with a blood loss of only 123 ml in PFN group and a significantly higher blood loss of 304 ml in DHS group. Zhao *et al.* [8] in 2009 similarly found the mean blood loss to be 179 ml in PFN group and 269 ml in DHS group. These findings are found to be similar to the findings in our study. It was noted that the functional outcome was initially better in the PFN group from the immediate post-operative period till the 6 months follow up but in the 1 year follow up, there was no statistically significant difference in the functional outcome between the two groups. The prospective comparative study by Cyril Jonnes *et al.* [7] in 2014 also concluded that in the initial follow ups, even though the PFN group had a better functional outcome, there was no significant difference in the functional outcome between the groups in the long term. The radiological outcome measured by the RUSH score was not found to be significantly different at any point of time from the initial follow up till the entire one year follow up. This

was similar to the study by Cyril Jonnes *et al.*, which found that there was no significant difference in the radiological signs of union at any point of time in the entire follow up period.

Conclusion

From our study, we found that even though the PFN group had a better functional outcome in the initial 6 months, there was no significant difference in the functional outcome in the long term. Hence, both the PFN and DHS are good implants of choice for fixation of unstable intertrochanteric fractures. The PFN, however, scores better than the DHS in terms of less duration of hospital stay, less duration of surgery, less intra operative blood loss and less incidence of complications of limb shortening and varus malunion.

References

1. Vivek Trikha, Shishir. Epidemiology and rehabilitation of hip fractures in geriatric population, IJPMR. 2005; 16(1):16-19.
2. Egol KA, Koval KJ, Zuckerman JD. Handbook of fractures. 5th edition. Philadelphia: Wolter Kluwer Health, 2015.
3. Rockwood CR, Green DP, Bucholz RW, Heckman JD. Rockwood and Green's Fractures in Adults, 4th ed. Philadelphia: Lippincott-Raven Publishers. 1996; 2:1741-44.
4. Canale ST, Beaty JH. Fractures and dislocations of the hip; Campbell's operative orthopaedics 12th edition. Philadelphia: Elsevier.inc, 2013, 3.
5. Bhandari. Radiographic union score for hip substantially improves agreement between surgeons and radiologists. BMC Musculoskeletal disorders. 2013; 14:70.
6. Cyril Jonnes M, Shishir S, Syed N. Type 2 intertrochanteric fractures. Proximal femoral nailing (PFN) versus dynamic hip screw (DHS). Arch Bone and Joint Surgery. 2016; 4(1):23-28.
7. Shen H, Liang C, Fan Y. The clinical study of the treatment of intertrochanteric fractures in the elderly with DHS, Gamma nail and PFN. Chinese journal of clinical medicine. 2007; 2:226-28.
8. Zhao C, Liu D, Guo J. Comparison of proximal femoral nail and dynamic hip screw for treating intertrochanteric fractures. China J Orthop and Trauma. 2009; 7:535-37.