

Research Article

A comparative study between proximal femoral locking compression plates and proximal femoral nails in management of unstable intertrochanteric hip fractures.

Ahmed A. Shamma, Ehab A. El-Zahed and Hazim K. Abdelwahab

Department of Ophthalmology, El-Azhar Assiut Faculty of Medicine, Assiut University

Abstract

Introduction: intertrochanteric femur fractures are one of the most devastating injuries. Most of the fractures in the elderly results from either falling to ground or traffic accident. Fixing intertrochanteric fractures properly is clinically challenging. Various implants both intramedullary and extramedullary are available for their fixation. **Purpose:** is to compare the results of proximal femoral nails (PFN) and proximal femoral locking compression plates (PFLCP) in management of unstable intertrochanteric fractures and to evaluate the clinical results and complications. **Materials and methods:** 30 patients above 50 years with unstable intertrochanteric fractures 15 patients treated with proximal femoral nail and 15 patients treated with Proximal femoral locking compression plates.

Results: Intraoperative blood loss ($P < .001$), incision length ($P < .001$) and operative time ($P < .001$) were significantly less in the PFN group than in the PFLCP group. No significant difference was found between the groups in terms of radiologic exposure time ($P = .048$) and hospital length of stay ($P = .044$). Time to full union was significantly ($P = .021$) lower in the PFN group (mean 16.5 ± 1.6 weeks ; range, 14 to 20 weeks) than in the PFLCP group (mean 18.3 ± 2.3 weeks; range, 16 to 22 weeks). Of the 15 PFLCP patients, 14 achieve union uneventfully; all 15 PFN patients achieved union. Two PFN patients and three PFLCP patients developed a superficial infection ($P = 1$); all 5 infections were controlled with oral antibiotics. There was 1 nonunion in the PFLCP group but none in the PFN group. The nonunion patient, who also had a broken implant without any history of fresh trauma, was treated with implant removal then bipolar hemiarthroplasty. The group's incidence of fracture-unrelated postoperative complications (eg, bed sore, deep vein thrombosis) was comparable and not significantly different ($P = 1$). There was no significant difference between the groups in terms of functional outcome (HHS) at final follow-up ($P = 0.108$). **Conclusion:** both PFN and PFLCP were effective treatments for unstable trochanteric femur fractures. Both have good functional outcomes and acceptable complication rates. PFN is superior to PFLCP and showed statistically significant differences in shorter incisions and intraoperative bleeding , hospital length of stay , shorter time to full weight-bearing and time to union.

Key words: Unstable intertrochanteric Fractures- Proximal femur nail -proximal femoral Locking compression plate.

Introduction

Intertrochanteric fractures and the resulted postsurgical outcomes are still a major public health concern. These fractures are associated with substantial morbidity and mortality about 30% of elderly patients die within 1 year and many more will experience significant functional loss.⁽¹⁻⁴⁾

Intertrochanteric hip fractures account for approximately half of all hip fractures in the elderly; of these, from 50% to 60% are classified as unstable. Unstable fracture patterns

occur more commonly with increased age low bone mineral density.⁽⁵⁾

The purpose of the treatment for intertrochanteric fractures is to make patients return to their pre-fracture functional levels and avoid long-term disability and medical complications.⁽³⁾

Stable fractures can be easily treated with osteosynthesis with predictable results. However, the management of unstable intertrochanteric (fractures with a large posteromedial

fragment, lesser trochanter is displaced, subtrochanteric extension - reverse obliquity) in elderly patients is a challenge because of difficulty in obtaining anatomical reduction and associated with high rates of morbidity and mortality, although the results have improved with the use of internal fixation. ⁽⁶⁾

Aim of work

The aim of this study is to compare the results of proximal femoral nails and proximal femoral locking compression plates in 30 patients above 50 years with unstable intertrochanteric fractures 15 patients treated with proximal femoral nail and 15 patients treated with Proximal femoral locking compression plates.

Patients and Methods

Study design: prospective cohort study. A prospective comparative study will be

conducted in El Hussein university hospital and Alhelal hospital including thirty patients with unstable intertrochanteric fractures half of them will be treated by proximal femoral nail and the others will be treated with Proximal femoral locking compression plates.

- Inclusion criteria

- Age group: adults older than 50 years.
- Sex: both sexes
- Patients who are independently mobile before sustaining fracture.

- Exclusion criteria

- Age: younger than 50 years.
- Pathological fractures.
- Associated fractures that may affect functional outcome.
- Nonambulatory patients before injury.
- Inflammatory arthritis.

Results

Table 1: Operative and perioperative outcomes

Variable	PFN (n=15)	PFLCP (n=15)	p-value¶
Incision length (cm)	7.1 ± 0.9	18.1 ± 2.2	<.001
X-ray exposure time (min)	2.6 ± 0.7	2.1 ± 0.4	.048
Operative blood loss (ml)	162.0 ± 66.2	436.7 ± 159.8	<.001
Operative time (min)	57.2 ± 6.3	120.7 ± 17.5	<.001
Hospital length of stay (days)	4.2 ± 1.0	5.1 ± 1.2	.044

Data are mean ± SD.

¶Unpaired t test.

Discussion

In the study we aimed to evaluate whether these theoretical advantages could be proved in practice, by a comparison of the results of PFN and PFLCP implants. In our study, we found that PFNs prove to be more useful in difficult fractures with a unstable fractures. The rotational stability was higher when proximal femoral nail is used in these fractures.

The results showed that patients in both groups could recover their preoperative functions, namely both fixations had better efficacy. However, in comparison with PFLCP, PFN was superior in perioperative bleeding, duration of surgery, mean length of stay and mean healing time of fracture. The incision of PFN was smaller which implantation was guided by a

guide pin. So the periosteum of fracture site was not necessary to be stripped, so the fracture was easy to heal.

The incidence of wound infection was found to be lower with intramedullary implants which resulted in early ambulation of the patients. Non-union of trochanteric fracture although is a rare. We did not encounter any secondary femoral fracture in patients managed by proximal femoral nails though this is one of common complication reported in some previous studies. The implant related complications were much more with PFLCP.

One of our PFLCP patients had a deep wound infection and managed with debridement and antibiotics. During follow up, there was slight

pull out of the 2nd and 3rd screws and patient shows deep infection again after 5 months managed with removal the plate and debridement.

Summary and conclusion

both PFN and PFLCP were effective treatments for unstable trochanteric femur fractures. Both have good functional outcomes and acceptable complication rates.

PFN is superior to PFLCP and showed statistically significant differences in shorter incisions and intraoperative bleeding, hospital length of stay, shorter time to full weight-bearing and time to union.

Reference

1. Johnell O & Kanis JA An estimate of the worldwide prevalence and disability associated with osteoporotic fractures. *Osteoporos Int* 2006; 17: 1726–1733.
2. Subasi M, Kesemenli C, Kapukaya A, et al., Treatment of intertrochanteric fractures by external fixation. *Acta Orthop Belg* 2001; 67:468-474.
3. Beaupre LA, Jones CA, Saunders LD, Johnson DWC Buckingham J, Majumdar SR. Best practices for elderly hip fractures patients: a systemic overview of the evidence. *J Gen Intern Med* 2005; 20(11): 1019-25.
4. Crawford CH, Malkani AL, Cordray S, Roberts CS & Sligar W: The trochanteric nail versus the sliding hip screw for intertrochanteric hip fractures: a review of 93 cases. *J Trauma* 2006; 60: 325–328.
5. Zuckerman JD, Sakales SR, Fabian DR, Frankel VH: Hip Fractures in Geriatric Patients. Results of an Inter disciplinary Hospital Care Program. *Clin Orthop* 1994; 274:213
6. Jabshetty AB. Management of intertrochanteric fracture by DHS fixation. *Ind J Sci Tech* 2011; 4:1681- 84.
7. LaVelle DG. Fractures and dislocations of the hip. In: Canale ST, Beaty JH, editor. *Campbell's operative orthopaedics*. 11th ed. Philadelphia: Mosby 2008; 3237-308.
8. Sierra RJ, Cabanela ME. Conversion of failed hip hemiarthroplasties after femoral neck fractures. *Clin Orthop Relat Res* 2002; 399: 129-139.
9. Friedl W, Clausen J. Experimental examination for optimized stabilization of trochanteric femur fractures, intra-or extramedullary implant localisation and influence of femur neck component profile on cut-out risk. 2001; 71: 1344-1352.
10. Parker MJ & Handoll HHG (2008c) Gamma and other cephalocondylic intramedullary nails versus extramedullary implants for extracapsular hip fractures in adults. *Cochrane Database Syst Rev* 2, 2008.