

Pros and Cons of Gamma Nail Fixation in Intertrochanteric Fracture

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Abstract: Intertrochanteric fractures are a common type of fracture in the proximal femur, occurring most frequently in elderly individuals between the ages of 66 and 70. The incidence of this type of fracture has been increasing. The most common mechanism of fracture is simple trauma, with the left side being more commonly affected than the right. Given the necessity of effective treatment, GN has identified the best method for this type of fracture as being the least invasive, with the least bleeding, the shortest operation time, and the fastest weight bearing. This makes it an appropriate treatment for elderly patients, who constitute the majority of patients with this type of fracture.

Keywords: PROS, CONS, NAIL, Patients, Fracture, Proximal, Mechanism.

INTRODUCTION

Intertrochanteric fractures are common extracapsular fractures of the proximal femur, primarily in elderly people, especially osteoporotic females. They can be classified into Types I, II, III, and IV. The incidence of intertrochanteric fractures has increased, with many patients dying within 12 months, especially in the elderly. Effective treatment is necessary to reduce mortality and morbidity. The most common surgical treatment is internal fixation, which offers rapid pain relief, early weight bearing, and mobilization [Celiktas, M. *et al.*, 2015; Zhang, L. *et al.*, 2016].

The sliding screw fixation method significantly decreased the occurrence and severity of malunions and implant cut out. However, it still has shortcomings in numerous aspects: The numbers 8 and 9.

- Persistent knee pain and discomfort.
- Insufficiently dependable to permit early weight bearing in individuals with more complicated fractures.

Performing this procedure in young individuals is challenging due to the high density of cancellous bone.

Currently, gamma nails are widely regarded as the most effective and advanced therapeutic option for intertrochanteric fractures [Lee, W. T. *et al.*, 2014; Chen, T. *et al.*, 2010; Valverde, J. A. *et al.*, 1998]. The intramedullary nail is a titanium ten funnel-shaped device. Compared to previous approaches, the gamma nail technique requires a smaller incision, resulting in a reduced risk of infection, hemorrhage, and harm to the surrounding soft

tissue. Furthermore, weight bearing was accomplished within the initial week in over 80% of patients, resulting in excellent results in a similar proportion of cases [Anglen, J. *et al.*, 2008; Anglen, J. O. *et al.*, 2008].

Gamma nails may be associated with complications such as secondary displacement, hematoma formation, non-union, and infection. However, they remain the most effective treatment for fixing intertrochanteric fractures [Bohl, D. D. *et al.*, 2014; Shen, J. *et al.*, 2016].

PATIENTS AND METHODS:

Cross-sectional prospective analytical study extended from July 1, 2023, to March 1, 2024, including fifty adults; there were twenty females and thirty males which they have intertrochanteric fracture femur. Patients ranged in age from 45 to 80 years were managed and treated in Thi-Qar Government in Al-Nasiriya Teaching Hospital and Al-Husain Teaching Hospital. The inclusion criteria consisted of at least three months follow up with clinical and radiological assessment, and with unstable or stable intertrochanteric fractures were treated with Gamma nails. A well-prepared questionnaire had been filled out for each patient enrolled in this study, where age, sex, mechanism of injury : [Fall from a height (FFH), simple trauma, road traffic accidents RTA] side of injury [left side, right side] Duration of operative, number of gauzes, time for follow up, number of camera shots, time for weight bearing, The patients were often in poor general health based on present comorbidity diseases [hypertension, diabetes mellitus, or both, COPD, cardiac disease, other

diseases] and complications occurred after operation as listed below:

- Delayed union
- Non-union
- Malunion (Valgus- Varus)
- Cut throw screw
- Infection
- Avascular necrosis

Reasons for choose the project:

Intertrochanteric fracture is widespread among the elderly and can be associated with a high risk of

immobilization and pulmonary problems, so the GN is shown to be superior to other procedures of fixation due to short operative duration, less blood loss, and early weight bearing. These made GN the best fixation procedure for intertrochanteric fracture. [Jones, H. W. et al., 2006]

Aim of project:

To prove the advantages of GN and discover the disadvantages and how to avoid it.

RESULT

Table 1: A total of 50 cases with Intertrochanteric fracture underwent internal fixation with gamma nail; the mean age is 61-65, 30 males and 20 females

Age	Male	Percentage	female	Percentage
45 – 50	2	4%	1	2%
51 – 55	2	4%	2	4%
56 – 60	5	10%	3	6%
61 – 65	5	10%	3	6%
66 – 70	7	14%	5	10%
71-75	6	12%	4	8%
76 – 80	3	6%	2	4%

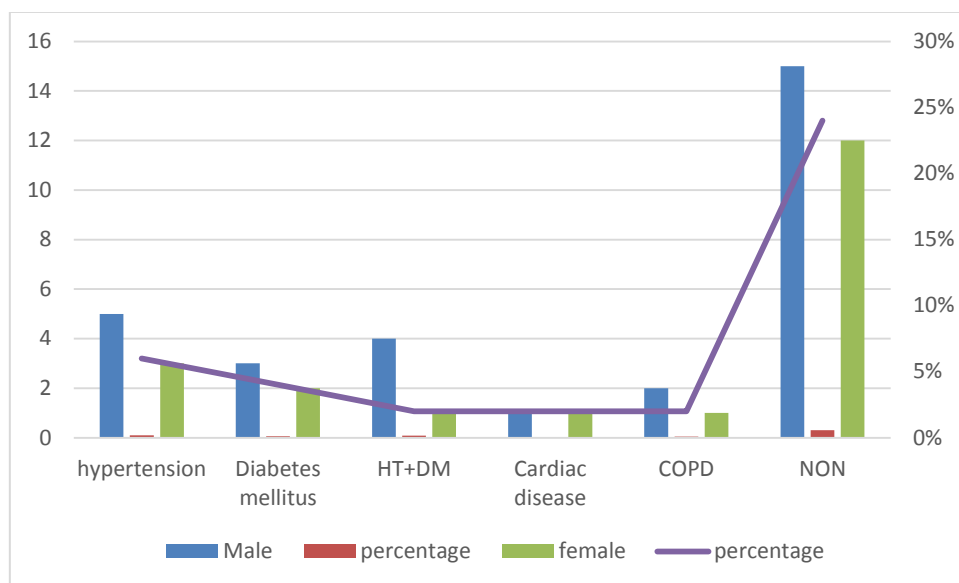


Fig 1: Comorbidity association with intertrochanteric fracture

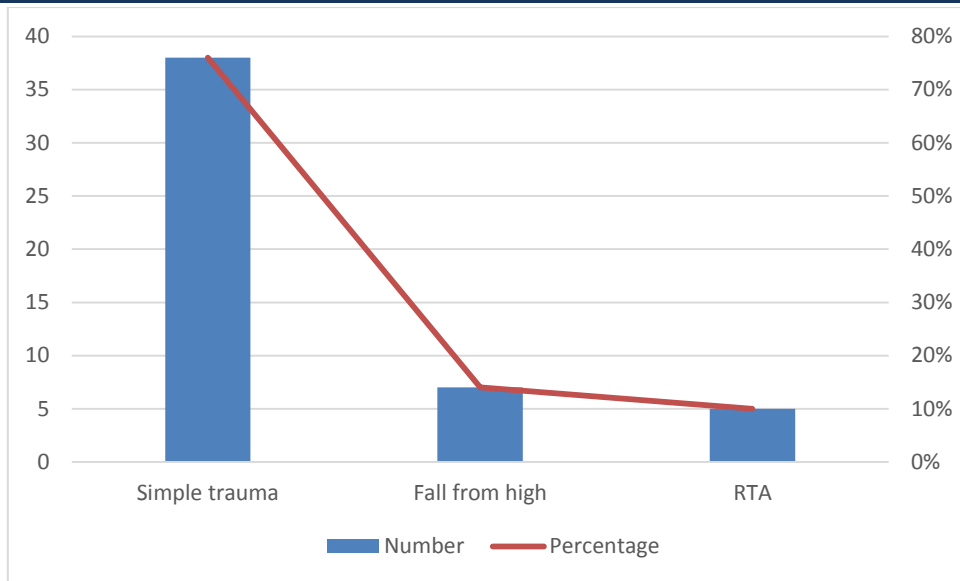


Fig 2: Mechanism of fracture

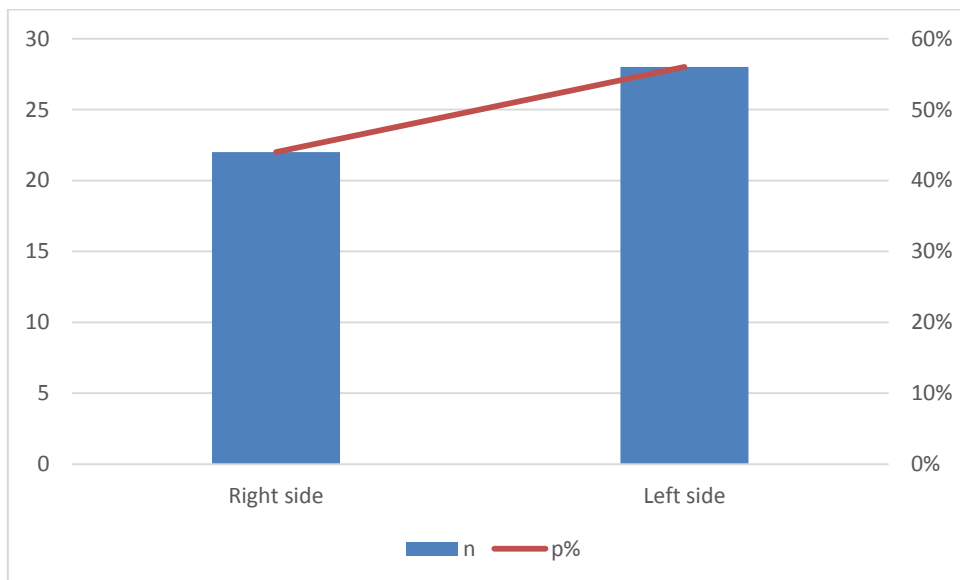


Fig 3: Side of fracture

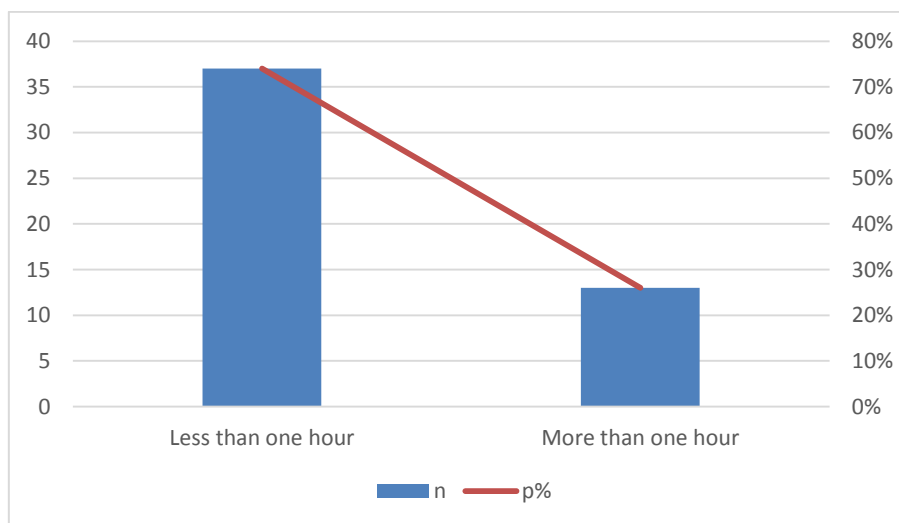


Fig 4: Parameters of operation

Table 2: Parameter of operation

Number Of gauzes	<5	35	70%
	>5	15	30%
Number Of camerashot	Less than 50 of the camerashot	36	72%
	More than 50 of camerashot	14	28%
Follow up	Less than eight months	33	66%
	More than eight months	17	34%
Early Weight-bearing	Less than three weeks	42	84%
	More than three weeks	8	16%

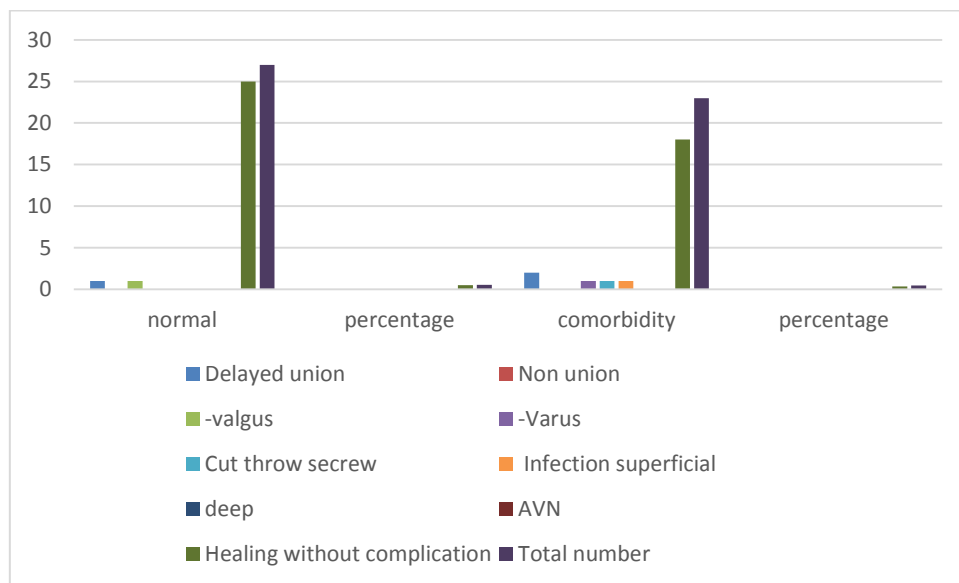


Fig 5: Complications with comorbidity

DISCUSSION

This study evaluated the pros and cons of intramedullary fixation [gamma nail] by cross-sectional study of patients with intertrochanteric fracture femur. Our findings revealed the age 66-70 predominance among ages [Knobe, M. *et al.*, 2012]. More than 50% of patients have no comorbidity disease, and about 10% of males and 6% of females with hypertension. Simple trauma seems to be the most common mechanism of fracture, which is about 76%. With 50 cases, the left side shows more incidence than the right side. This study revealed that the main advantage of gamma nail fixation in the intertrochanteric fracture is early weight bearing in 84% of patients in less than three weeks.

In most cases, the duration of the operation was less than one hour, and the number of gauzes used during the operation was less than 5 in about 70% of cases. In our study, we found there is no relation between non-union and comorbidity, while there is

a relation between cut throw and comorbidity in 2% and the same percentage of the relation between Varus malunion and comorbidity. Because most cases were elderly with more risk of chronic disease, it may affect the outcome of cut throw and mal union. The study shows there is zero AVS.

[Hu, S. J. *et al.*, 2012; Aly, T. A. *et al.*, 2013] studied the intertrochanteric femur fracture fixation by dynamic hip screw versus Gamma nail in 40 patients. 20 were treated by GN and others by DHS. They found that fractures are common among the elderly and most patients with a history of simple trauma. They found GN is superior to DHS in shorter operation duration, less blood loss, and earlier weight bearing [Floyd, M. W. *et al.*, 2013].

This study evaluated 121 patients for a 3-month follow-up with full clinical and radiological outcomes. The study found there were 88 women and 33 men the average age was 78 in women and

66 in men. The total operating time was 41 minutes, and the study found significantly less blood loss (148 ml) in compared with other procedures. Time taken to weight it was bearing 83.4 % of the patients by the end of the first week. Here lies one of the indisputable strong points of the treatment method: the degree of fracture instability does not factor into return weight bearing; this makes it better than other open and closed methods. The infection rate (superficial and deep infection) was 2.4%. There was 14 cases of Varus malunion, and 11.5% of the data lack precision because shortening is not included in this method, but it automatically produces Varus displacement. No cases of femoral head avascular necrosis, but the follow-up was not truly long enough to detect this complication because these elderly patients could not be followed for a long time; most do not return to see us once the fracture was healed.

[Gotfried, Y. et al., 2004] Studied the treatment of intertrochanteric fracture by intermediary fixation in 61 patients. They found the fracture more common among males than females and the left side is more common than the right side.

Walking ability was restored in 80% of patients. However, we found the parameter of operation and the complication with morbidity were the most useful in comparing our findings to those of previous research, which looks similar to our findings.

CONCLUSION

Among the elderly, one of the most common injuries is Intertrochanteric fracture. We have concentrated on GN since there are many ways of fixation, according to our study. Fracture fixation utilizing the Gamma nail system is not problem-free but can be done in almost all cases without supplementary materials and an open fracture site. In most instances, it may permit early weight bearing owing to its mechanical stability.

REFERENCES

1. Celiktas, M., Togrul, E. & Kose, O. "Calcar Preservation Arthroplasty for Unstable Intertrochanteric Femoral Fractures in Elderly." *Clin Orthop Surg*, 7.4 (2015): 436–442.
2. Zhang, L., et al. "Treatment of unstable intertrochanteric femoral fractures with locking gamma nail (LGN): A retrospective cohort study." *Int J Surg*, 26 (2016): 12–17.
3. Lee, W. T., Murphy, D., Kagda, F. H. & Thambiah, J. "Proximal femoral locking compression plate for proximal femoral fractures." *J Orthop Surg (Hong Kong)*, 22.2 (2014): 287–293.
4. Chen, T., Li, K., Wang, X., Lan, H. & Zhang, J. "Revision cause and effect of gamma nail fixation." *Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi*, 24.1 (2010): 78–81.
5. Valverde, J. A., et al. "Use of the Gamma nail in the treatment of fractures of the proximal femur." *Clin Orthop Relat Res*, (1998): 56–61.
6. Anglen, J. "American Board of Orthopaedic Surgery Research Committee. Nail or plate fixation of intertrochanteric hip fractures: Changing pattern of practice. A review of the American Board of Orthopaedic Surgery database." *J Bone Joint Surg Am*, 90 (2008): 700–707.
7. Anglen, J. O. & Weinstein, J. N. "Nail or plate fixation of intertrochanteric hip fractures: changing pattern of practice. A review of the American Board of Orthopaedic Surgery Database." *J Bone Joint Surg Am*, 90 (2008): 700–707.
8. Bohl, D. D., et al. "Extramedullary compared with intramedullary implants for intertrochanteric hip fractures: thirty-day outcomes of 4432 procedures from the ACS NSQIP database." *J Bone Joint Surg Am*, 96 (2014): 1871–1877.
9. Shen, J., Hu, C., Yu, S., Huang, K. & Xie, Z. "A meta-analysis of percutaneous compression plate versus intramedullary nail for treatment of intertrochanteric hip fractures." *Int J Surg*, 29 (2016): 151–158.
10. Jones, H. W., Johnston, P. & Parker, M. "Are short femoral nails superior to the sliding hip screw? A meta-analysis of 24 studies involving 3,279 fractures." *Int Orthop*, 30 (2006): 69–78.
11. Knoke, M., Drescher, W., Heussen, N., Sellei, R. M. & Pape, H. C. "Is helical blade nailing superior to locked minimally invasive plating in unstable pertrochanteric fractures?" *Clin Orthop Relat Res*, 470 (2012): 2302–2312.
12. Hu, S. J., Zhang, S. M. & Yu, G. R. "Treatment of femoral subtrochanteric fractures with proximal lateral femur locking plates." *Acta Ortop Bras*, 20 (2012): 329–333.
13. Aly, T. A. & Hamed, H. "Posterior acetabular column and quadrilateral plate fractures: fixation with tension band principles." *Orthopedics*, 36 (2013): e844–848.

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14. Floyd, M. W., France, J. C. & Hubbard, D. F. "Early experience with the proximal femoral locking plate." *Orthopedics*, 36 (2013): e1488–1494.
15. Gotfried, Y. "The lateral trochanteric wall: a key element in the reconstruction of unstable pertrochanteric hip fractures." *Clin Orthop Relat Res*, (2004): 82–86.

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