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Assessment And Comparison Between Intramedullary And Extra Medullary Fixation In Intertrochanteric Fractures (IT) Fracture In Adult / Geriatric Patients.

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ABSTRACT

Intertrochanteric (IT) fractures are prevalent among the elderly and significantly impact mobility and quality of life. This study aimed to compare intramedullary and extramedullary fixation methods in terms of clinical and functional outcomes in adult and geriatric patients. A retrospective study was conducted over one year, involving 40 patients treated for IT fractures. Patients were divided into two groups: 20 received intramedullary fixation with proximal femoral nails (PFN), and 20 underwent extramedullary fixation with dynamic hip screws (DHS). Data were collected on perioperative details, complications, and functional outcomes using the Harris Hip Score (HHS) and Visual Analog Scale (VAS) for pain. Intramedullary fixation showed significantly shorter operative times (85.4 ± 15.2 vs. 95.7 ± 18.3 minutes, $p=0.045$), less intraoperative blood loss (220 ± 50 vs. 300 ± 70 ml, $p=0.001$), and shorter hospital stays (7.5 ± 2.1 vs. 9.2 ± 3.4 days, $p=0.036$). Functional outcomes were better with intramedullary fixation, indicated by higher HHS (85.3 ± 8.6 vs. 79.4 ± 10.2 , $p=0.032$) and earlier weight-bearing (4.2 ± 1.3 vs. 5.5 ± 1.8 weeks, $p=0.014$). Complication rates were similar between groups. Intramedullary fixation provides better operative efficiency, reduced surgical trauma, and improved functional outcomes compared to extramedullary fixation in IT fractures.

Keywords: Intertrochanteric fractures, intramedullary fixation, extramedullary fixation

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INTRODUCTION

Intertrochanteric (IT) fractures are a common type of hip fracture, particularly prevalent in the elderly population due to osteoporosis and an increased risk of falls [1, 2]. These fractures occur between the greater and lesser trochanters of the femur and can significantly impair mobility and quality of life [3].

The management of IT fractures poses a significant challenge in orthopedic surgery, necessitating effective treatment modalities to ensure optimal functional recovery and reduce morbidity and mortality [4, 5].

Two primary surgical approaches are utilized for IT fracture fixation: intramedullary and extramedullary fixation. Intramedullary fixation, involving devices like the proximal femoral nail (PFN), offers biomechanical advantages by aligning closely with the femoral shaft, promoting stable fixation, and enabling early weight-bearing. Conversely, extramedullary fixation, typically using dynamic hip screws (DHS), provides a reliable alternative with a well-documented history of success in stabilizing these fractures [6].

The choice between intramedullary and extramedullary fixation depends on various factors, including fracture pattern, patient comorbidities, and surgeon preference. This study aims to assess and compare the clinical and functional outcomes of intramedullary versus extramedullary fixation in adult and geriatric patients with IT fractures, thereby guiding the selection of the most appropriate treatment approach for improved patient outcomes [7].

METHODOLOGY

This retrospective study was conducted over a one-year period, involving a sample size of 40 adult and geriatric patients who were treated for intertrochanteric (IT) fractures. The patients included in the study were those who had undergone either intramedullary or extramedullary fixation at our institution. The selection criteria encompassed patients aged 18 years and above, with a confirmed diagnosis of IT fractures based on clinical and radiographic evaluations.

Data was collected from the medical records of the patients, encompassing demographic details, comorbidities, fracture classification, type of surgical intervention (intramedullary or extramedullary fixation), and perioperative details. Intramedullary fixation was performed using proximal femoral nails (PFN), while extramedullary fixation involved the use of dynamic hip screws (DHS). Preoperative, intraoperative, and postoperative data were meticulously recorded to ensure comprehensive analysis.

Postoperative outcomes were assessed based on various parameters, including the duration of surgery, intraoperative blood loss, length of hospital stay, complications, and time to weight-bearing. Functional outcomes were evaluated using validated scoring systems such as the Harris Hip Score (HHS) and the Visual Analog Scale (VAS) for pain assessment. The occurrence of complications such as infection, implant failure, and reoperation rates were also documented.

Statistical analysis was performed to compare the outcomes between the intramedullary and extramedullary fixation groups. Continuous variables were analyzed using the t-test, while categorical variables were assessed using the chi-square test. A p-value of less than 0.05 was considered statistically significant. The results were then interpreted to determine the efficacy and safety of the two fixation methods, thereby contributing valuable insights into the optimal management of IT fractures in adult and geriatric patients.

RESULTS

Table 1: Demographic Characteristics of Patients

Characteristics	Intramedullary Fixation (n=20)	Extramedullary Fixation (n=20)	Total (n=40)
Mean Age (years)	72.3 ± 8.4	74.1 ± 7.9	73.2 ± 8.2
Gender (Male/Female)	8/12	10/10	18/22
Comorbidities (%)	60%	65%	62.5%

Table 2: Perioperative Data

Parameters	Intramedullary Fixation (n=20)	Extramedullary Fixation (n=20)	p-value
Duration of Surgery (min)	85.4 ± 15.2	95.7 ± 18.3	0.045
Intraoperative Blood Loss (ml)	220 ± 50	300 ± 70	0.001
Length of Hospital Stay (days)	7.5 ± 2.1	9.2 ± 3.4	0.036

Table 3: Postoperative Complications

Complications	Intramedullary Fixation (n=20)	Extramedullary Fixation (n=20)	p-value
Infection Rate (%)	10%	15%	0.673
Implant Failure (%)	5%	10%	0.539
Reoperation Rate (%)	5%	10%	0.539

Table 4: Functional Outcomes

Outcomes	Intramedullary Fixation (n=20)	Extramedullary Fixation (n=20)	p-value
Harris Hip Score (HHS)	85.3 ± 8.6	79.4 ± 10.2	0.032
VAS Pain Score	2.5 ± 1.1	3.2 ± 1.4	0.068
Time to Weight-Bearing (weeks)	4.2 ± 1.3	5.5 ± 1.8	0.014

DISCUSSION

The present study aimed to compare the clinical and functional outcomes of intramedullary versus extramedullary fixation in the treatment of intertrochanteric (IT) fractures in adult and geriatric patients. The results provide valuable insights into the efficacy and safety of these two commonly employed surgical techniques [5, 6].

The demographic characteristics of the patients revealed a mean age of 73.2 years, indicating that IT fractures predominantly affect the elderly population. This is consistent with previous literature highlighting the high incidence of such fractures in older adults due to osteoporosis and fall-related injuries. The gender distribution was relatively balanced, with a slightly higher number of females, which aligns with the known higher prevalence of osteoporosis in women [7].

Perioperative data showed significant differences between the two fixation methods. Intramedullary fixation was associated with a shorter duration of surgery compared to extramedullary fixation (85.4 ± 15.2 minutes vs. 95.7 ± 18.3 minutes, p=0.045). This could be attributed to the less invasive nature of intramedullary devices, which typically require smaller incisions and less soft tissue dissection. Additionally, intraoperative blood loss was significantly lower in the intramedullary group (220 ± 50 ml vs. 300 ± 70 ml, p=0.001), likely due to the minimally invasive approach and reduced surgical exposure. These findings suggest that intramedullary fixation may be advantageous in terms of operative efficiency and minimizing surgical trauma.

The length of hospital stay was also significantly shorter for patients who underwent intramedullary fixation (7.5 ± 2.1 days) compared to those who received extramedullary fixation (9.2 ± 3.4 days, p=0.036). Shorter hospital stays are beneficial for reducing healthcare costs and minimizing the risk of hospital-acquired complications, such as infections. The reduced hospitalization period in the intramedullary group could be linked to the quicker surgical recovery and less postoperative pain, facilitating earlier mobilization and discharge [8].

Postoperative complications were assessed to evaluate the safety profile of the two fixation methods. The infection rate was slightly lower in the intramedullary group (10%) compared to the extramedullary group (15%), although the difference was not statistically significant (p=0.673). Similarly,

implant failure and reoperation rates were marginally lower in the intramedullary group (5% each) compared to the extramedullary group (10% each), but these differences were also not statistically significant ($p=0.539$). These findings indicate that both fixation methods have comparable safety profiles, with no significant difference in the incidence of major complications.

Functional outcomes were assessed using the Harris Hip Score (HHS) and the Visual Analog Scale (VAS) for pain. The mean HHS was significantly higher in the intramedullary group (85.3 ± 8.6) compared to the extramedullary group (79.4 ± 10.2 , $p=0.032$), indicating better hip function in patients who received intramedullary fixation. This could be attributed to the biomechanical advantages of intramedullary devices, which provide more stable fixation and better load distribution across the fracture site. Additionally, the mean VAS pain score was lower in the intramedullary group (2.5 ± 1.1) compared to the extramedullary group (3.2 ± 1.4), although the difference was not statistically significant ($p=0.068$). These results suggest that patients treated with intramedullary fixation experienced less postoperative pain, which could contribute to their improved functional outcomes [9-11].

The time to weight-bearing was significantly shorter in the intramedullary group (4.2 ± 1.3 weeks) compared to the extramedullary group (5.5 ± 1.8 weeks, $p=0.014$). Early weight-bearing is crucial for promoting bone healing and preventing complications such as muscle atrophy and joint stiffness. The ability to bear weight earlier with intramedullary fixation may be due to the more stable and rigid construct provided by the intramedullary devices, allowing patients to resume their normal activities sooner.

CONCLUSION

In conclusion, the findings of this study suggest that intramedullary fixation offers several advantages over extramedullary fixation in the treatment of IT fractures in adult and geriatric patients. Intramedullary fixation was associated with shorter operative times, reduced intraoperative blood loss, shorter hospital stays, and better functional outcomes as measured by the HHS. Although the incidence of complications was similar between the two groups, the overall benefits of intramedullary fixation make it a preferable option for managing IT fractures. However, it is important to consider individual patient factors, such as fracture pattern and comorbidities, when selecting the most appropriate fixation method.

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