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Prevalence, outcome and complications of Intertrochanteric Femur Fracture In Patients Admitted to AL Sammad General Hospital-from MAY 2020 to MAY 2022 Amran-Yemen

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Abstract

Background Intertrochanteric fractures are common injuries, especially in elderly, and require effective management to minimize complications. This study aimed to evaluate the demographic characteristics, treatment modalities, and early postoperative complications of patients with intertrochanteric fractures admitted to the Al Sammad General Hospital, Amran, Yemen, from May 2020 to May 2022.

Methods A retrospective analysis was conducted on 90 patients diagnosed with intertrochanteric fractures during the study period. Data on age, sex, mechanism of injury, fracture type, treatment methods, and postoperative complications were collected and analyzed.

Results Among the 90 patients, 51% were male and 49% female, with the highest incidence in those aged > 60 years (46.7%). The primary mechanism of injury was falling from a standing height (73.4%). Fracture classifications included 46.7% stable , 44.4% unstable , and 8.8% reverse oblique. Surgical treatment was performed in 96.7% of the cases, predominantly using dynamic hip screws (53.3%). Early postoperative complications were noted in 9.9% of the patients, with deep vein thrombosis (DVT) being the most common (3.3%).

Conclusion Intertrochanteric fractures are more common in males aged > 60 years, with falls from standing height being the leading cause. Surgical treatment is preferred, and the complication rate is relatively low. Continued efforts to improve surgical outcomes and manage complications are vital to enhance patient recovery.

Article Info

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DHS, fragility fractures, hip fracture, Intertrochanteric fractures, osteoporosis

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1. INTRODUCTION

Hip fractures are a significant public health issue, leading to disability, reduced quality of life, and increased mortality. Annually, approximately 1.5 million individuals worldwide sustain hip fractures, with the highest incidence in Scandinavia and the lowest in Africa [1]. Intertrochanteric fractures account for approximately half of all hip fractures, with mortality rates within the first year ranging from 10% to 30% [2]. Patients with trochanteric and subtrochanteric fractures are often fragile and face increased risks of morbidity and mortality [3]. Despite comprising only 14% of all fragility fractures, hip fractures impose a substantial economic burden, costing an estimated 15 billion $ each year [4]. In 2011, hip fracture treatment was the 13th most costly diagnosis for Medicare [5], with initial hospitalization averaging around 10,000$ and total healthcare costs potentially reaching 43,000 within a year [6]. Some patients may require long-term care, adding further costs ranging from 19,000$ to 66,000$ [7].

1.1. Anatomy and Biomechanics

Understanding the musculoskeletal anatomy of the hip is vital for comprehending the impact of joint forces on fracture healing. The hip joint is a synovial joint that consists of the femoral head and neck, with the femoral neck connecting to the shaft at an angle of approximately

127. The calcar femorale, a crucial anatomical feature, provides structural support and influences implant selection during treatment. The intertrochanteric region is characterized by dense trabecular bone, which facilitates stress transmission and serves as an attachment site for major muscle groups [8].

1.2. Mechanism of Injury

In younger individuals, intertrochanteric fractures usually result from high-energy trauma, while 90% of such fractures in the elderly are due to low-energy falls [8]. Factors influencing fractures include fall orientation, reflexes, shock absorption, and bone strength [9].

1.3. Clinical Presentation

Patients may present differently based on fracture type; displaced fractures cause significant pain and ambulation issues, while non-displaced fractures may allow for minimal painful ambulation [10]. An examination typically reveals external rotation and limb shortening.

1.4. Imaging

Standard X-rays, particularly AP and lateral views, are essential for diagnosing intertrochanteric fractures, and MRI is recommended for suspected occult fractures [11].

1.5. Classification

Fractures can be classified using the Boyd and Griffin system (type 1 to type 4 based on complexity) and Evans classification (based on stability) [12].

1.6. Current Treatment Options

1.6.1. Nonoperative Treatment

Historically involved prolonged bed rest, leading to high complication rates, but is now reserved for extremely medically unstable cases.

1.6.2. Operative Treatment

Stable internal fixation is aimed at enabling early mobilization, and key factors influencing fixation stability include bone quality, fracture pattern, and implant design [13]. Fixation methods included the following:

i. Sliding Hip Screw (SHS) is commonly used for both stable and unstable fractures, with a risk of cutout related to the tip-apex distance [14].
ii. Intramedullary Hip Screw (IMHS): Beneficial for fractures extending into the subtrochanteric area but not significantly superior to SHS in stable cases [15].
iii. Prosthetic Replacement: Employed when internal fixation fails, showing up to 94% success for unstable fractures [16].
iv. External Fixation: Rarely used due to complications like pin loosening [17]

1.7. Postoperative Management

Early mobilization is critical to prevent complications such as thromboembolic events [18]. Rehabilitation should begin within the first postoperative day, with prophylactic anticoagulation standard to reduce the risk of complications [18] Infection rates post-surgery are low (<7%), with loss of fixation occurring in less than 10% of cases requiring further intervention [19].

1.8. Outcomes

Mortality rates among elderly post-fracture patients can range from 14% to 36% within the first year. Functional recovery is influenced by age, pre-existing conditions, and rehabilitation efforts, with 50-65% regaining pre-fracture mobility [20]. Returning home after a fracture is affected by age, functional status prior to the injury, and family support [20]. A multidisciplinary approach has been shown to improve patient outcome.

1.9. Complications

Loss of Fixation:More common in unstable fractures. **Nonunion**: Rare due to the vascular nature of the cancellous bone. **Malrotation Deformity**: Often linked to inadequate surgical techniques. **Other Rare Complications**: Include osteonecrosis of the femoral head and vascular injury.

This study aimed to evaluate the demographic characteristics, treatment methods, and early postoperative complications of patients with intertrochanteric fractures admitted to the Al Sammad General Hospital, Amran, Yemen, from May 2020 to May 2022.

2. PATIENTS AND METHODS

This study conducted a descriptive retrospective analysis of patients with intertrochanteric fractures admitted to the Al Sammad General Hospital, Amran, Yemen, from May 2020 to May 2022. Al Sammad General Hospital serves a broad segment of the population, particularly in the northern regions across various medical specialties. Data were extracted from patient charts and hospital registers, focusing on parameters such as age, sex, mechanism of injury, fracture type, treatment methods, and early postoperative complications. Age was categorized into four groups: < 20 years, 21-40 years, 41-60 years, and > 60 years. The mechanisms of injury were classified as low-energy (e.g., falls) or high-energy (e.g., motor vehicle accidents and gunshots). Fractures were classified according to the Evans system as type one (stable and unstable) and type two (reverse oblique). Treatment approaches included both conservative and opera-

tive methods, with internal fixation utilizing dynamic hip screws (135), dynamic condylar screws (95), trochanteric nails, Ender nails, and pinning as the standard practices.

2.1. Statistical analysis

All variables were initially reviewed and analyzed using the computerized database system SPSS, with descriptive analysis of results and variables predominantly analyzed as frequencies, tables, and percentages.

2.2. Ethical aspect

In this study agreement of the ethical committee at Al-Sammad General Hospital was obtained, and consent from patients was obtained for the use of data and study publication.

3. RESULTS

A total of 90 patients with a diagnosis of intertrochanteric fractures were admitted to Al Sammad General Hospital from May 2020 to May 2022(51 male and 49 female. The results obtained from the presenting study were plotted in tables and figures.

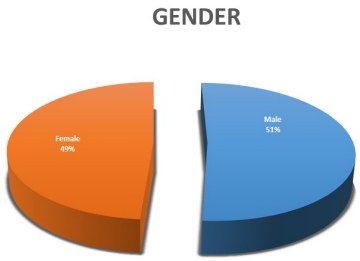

Figure 1. Gender distribution of 90 patients with intertrochanteric fracture: female to male ratio 0.96 : 1

Table 1. Age distribution of 90 patients with intertrochanteric fracture

Age Group	Patients	
	Number	Percent
<20	4	4.4%
20-40	17	18.9%
41- 60	27	30%
>60	42	46.7%
Total	90	100%

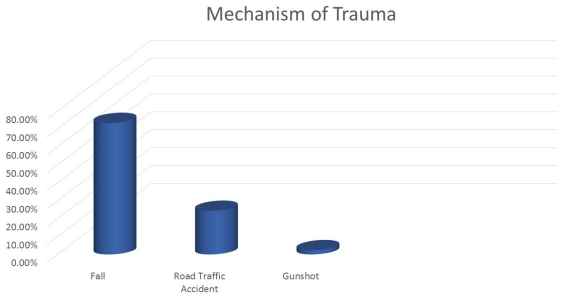

Figure 2. Distribution of 90 patients with intertrochanteric fracture by mechanism of trauma.

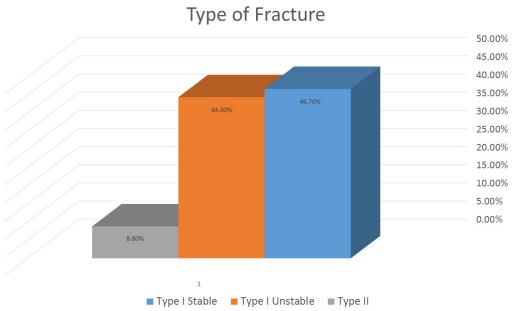

Figure 3. Distribution of 90 patients with intertrochanteric fracture by type of fracture

Table 2. Distribution of 90 patients with intertrochanteric fracture by method of treatment

Method Of Treatment	Patients	
	Number	Percent
Non Operative	3	3.3%
Ender	1	1.1%
Trochanteric (gama) Nail	8	8.9%
D.C.S	30	33.4%
D.H.S	48	53.3%
Total	90	100%

Table 3. Distribution of 90 patients with intertrochanteric fracture by early post operative complication

Early Post Operative Complication	Patients	
	Number	Percent
Death	1	1.1%
Infection	2	2.2%
D.V.T	3	3.3%
Unacceptable Reduction	3	3.3%
No Complication	81	90%
Total	90	100%

4. DISCUSSION

Intertrochanteric fractures are one of the most prevalent disabling injuries among the elderly, significantly affecting healthcare resources globally. In this study, 90 intertrochanteric fractures were analyzed from May 1, 2020, to May 31, 2022. Among these patients, 46 (51%) were male and 44 (49%) were female, resulting in a female-to-male ratio of 0.96:1, comparable to the 0.6:1 ratio reported by R Al-Nuaim and M. Kremli in Saudi Arabia [21][21]. In contrast, Lizaur-Urilla et al. reported a 1.7:1 ratio in Alicante, Spain [22] and Hani et al. noted a ratio of 7:3 [22]. The incidence of intertrochanteric fractures exhibited a marked increase in patients aged > 60 years, comprising 46.7% of the cases, with an average age of 57.2 years. This increase is largely attributed to factors such as osteoporosis [23], diminished vision, high caffeine consumption, low body weight [24], and a greater prevalence of medical conditions in this demographic [25]. Zuckerman et and Hebel JR reported that 90% of these fractures occurred in individuals over 50 years [26]. Moreover, Margaret et al. found that the incidence increased with age across all sexes [27]. Parker noted that most intertrochanteric fractures occur in individuals approximately 80 years old, with age-related declines in femoral bone strength contributing to fracture risk [28]. The primary mechanism of injury identified in this study was falling from a standing position (73.4%) (Figure 2). Although it is challenging to determine whether the fracture preceded or resulted from the fall, most studies suggest that falls typically lead to fractures [29]. Hani S corroborated these findings, indicating that low-energy trauma such as falls is a common cause of intertrochanteric fractures [30]. Melton L.J also noted that falls from standing height are prevalent among both sexes with reduced bone strength [30]. Similarly, SOSA reported that nearly all cases in Gran Canaria were caused by falls [31], while Lizaur-Urilla found that 77% of cases resulted from moderate trauma [32]. In terms of fracture classification, 46.7% (42 patients) had Evan type one stable fractures, 44.4% (40 patients) had Evan type one unstable fractures, and only 8.8% (8 patients) had type two fractures (Figure 3). The predominance of the stable type may be linked to the common mechanism of injury being simple falls. Surgical intervention was the primary treatment for 96.7% of patients, while only 3.3% were treated conservatively. Rowe found that osteosynthesis was the most common treatment, with conservative management in only 13% of cases [33]. Hani noted that 83% of patients underwent surgical treatment [34]. Regarding fixation methods, 53.3% (48 patients) received dynamic hip screws (DHS), one of the most common treatments currently [35]; 33.3% (30 patients) underwent dynamic condylar screw (DCS) treatment; and 8.9% (8 patients) were treated with intramedullary trochanteric nails, with one elderly patient receiving closed reduction and Ender nail treatment (Table 2). The overall complication rate in this study was 9.9% (Table 3), which aligns with Hani's findings in Jordan, where postoperative complications were noted in 15% of cases [34]. Major medical complications included deep vein thrombosis (3.3%), while orthopedic complications comprised unacceptable reduction in three patients (3.3%) and early wound infections in two patients (2.2%). The postoperative mortality rate was 1.1% (Table 3). Several studies have indicated that in-hospital mortality is associated with higher postoperative complication rates, particularly among older adults. Factors such as advanced age, male sex, poorly managed systemic diseases, mental instability, improper surgical timing, and postoperative complications have been shown to increase the risk of mortality. In this study, the mortality rate was 1.1%, whereas Nydegger and Hani found mortality rates of 8.2% and 7.4% during orthopedic ward stays, respectively [36, 34] . Kenzora et al. established a direct correlation between mortality rates and advancing age in patients with trochanteric fractures [37].

5. CONCLUSIONS

- The overall incidence of intertrochanteric fractures is more in male patients than in female patients.
- The most age groups exposed to intertrochanteric fractures were above 60 years.
- The predominant mechanism of trauma of intertrochanteric fractures was a fall from standing height.
- Evan type one stable fracture was the most frequent type.
- The majority of cases were treated surgically by DHS, DCS, and trochanteric nail, in decreasing order of frequency.
- DVT is the most common early post-operative complication.

RECOMMENDATIONS

- Promote awareness about osteoporosis and fall prevention to reduce the incidence of fractures.
- Continue educating surgical teams on the latest techniques, to optimize outcomes.
- Additional studies with larger samples and longer follow-up periods were conducted to assess the long-term outcomes and complications.

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- informed consent for publication was obtained from participants.
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