Incidence OF Radial Nerve Palsy In Operated cases of Shaft Humerus Fracture.

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Abstract

Background:

Proximal humerus and humerus fractures account for 4% to 6% and 1% to 3% of all fractures respectively in both young and elderly patients. 1,6 In young men, these fractures are usually a result of high-energy trauma while in the older population, this fracture is seen in women after a ground-level fall. Interestingly, humerus shaft fractures in polytrauma patients are independent predictors of intra-abdominal injury, long bone, and hand fractures. Typically, these injuries cause temporary disability in the younger population where as permanent disability can be seen in the elderly.,6,7

Radial nerve palsy is the most common nerve complication after humeral shaft fracture. Its incidence is estimated to be around 2–17 %. In most cases, the radial nerve is intact, and prognosis of complete recovery is high.12,13 Management of humeral fracture associated with radial nerve palsy remains controversial some authors advocate surgical treatment in emergency; others recommend nonoperative treatment. However, in 6–20% of cases, lack of recovery is explained by nerve entrapment in the fracture site.12 Radial nerve palsy is a feared complication of humerus shaft fractures that can occur during the injury, open reduction, and internal fixation or intramedullary nailing. In closed fractures, this is often a result of neuropraxia, while in open fractures it is a result so neurogenesis.14,15 This complication is more common in third distal fractures as this is the location where the radial nerve is closest to the humerus. In a closed fracture, radial nerve palsy is not an indication for open reduction and internal fixation with nerve exploration.

Objectives:

- To study the incidence of Radial Nerve Palsy in Operated cases of Humerus Fracture.

Material and Methods:

This Prospective type of Study was conducted on 69 patients of Fracture Shaft Humerus in which "INCIDENCE OF RADIAL NERVE PALSY IN OPERATED CASES OF SHAFT HUMERUS FRACTURE." at department of Orthopaedics at Dr. Balasaheb Vikhe Patil Rural Medical College, PMT-PIMS (DU), Loni Hospital for a period of 24 months

Interpretation and conclusion:

- the incidence of radial nerve palsy (RNP) was found to be 7.1%, primarily affecting patients aged 20-40 years, predominantly males, with the most common cause being road traffic accidents.
- The common fracture type observed was wedge fractures (A2), with surgery typically performed within the first week post-injury using the posterior approach.
- Our study reported an overall incidence of 7.1% RNP in operated cases, which is lower compared to some previous studies.

- In conclusion, our study on the incidence of radial nerve palsy in operated cases of shaft humerus fractures is of paramount importance. It provides valuable epidemiological insights, informs surgical practices, highlights the need for early intervention and vigilant monitoring, and underscores the importance of patient-centered care. The findings contribute to the ongoing efforts to improve clinical outcomes and enhance the quality of life for patients with humeral shaft fractures.

Keywords: Fracture, Shaft Humerus , Radian Nerve , palsy , incidence

Introduction

Proximal humerus and humerus fractures account for 4% to 6% and 1% to 3% of all fractures respectively in both young and elderly patients. [1,6] In young men, these fractures are usually a result of high-energy trauma while in the older population, this fracture is seen in women after a ground-level fall. Interestingly, humerus shaft fractures in polytrauma patients are independent predictors of intra-abdominal injury, long bone, and hand fractures. Typically, these injuries cause temporary disability in the younger population where as permanent disability can be seen in the elderly.[,6,7]

The proximal humerus has anatomic neck which is the old epiphyseal plate, and the surgical neck is the metaphyseal area below the humeral head. The blood supply is the anterior and posterior humeral circumflex artery with the axillary nerve as the major nerve of this region.[1,2] The humeral shaft is a cylindrical bone that gradually becomes triangular distally. This bone serves as an insertion site for the pectoralis major, deltoid, and coracobrachialis and is the site of origin for the brachialis, triceps, and brachioradialis. The radial nerve is the major nerve of the humerus shaft which is seen in the spiral groove and is approximately 14 cm from the lateral epicondyle and 20 cm from the medial epicondyle. [3,4] The major nerves of the distal humerus are the ulnar nerve and radial nerve. Distal humerus fractures comprise the supracondylar fractures, single condyle fractures, bi-column fractures and coronal shear fractures. Treatment options include open reduction and internal fixation, closed reduction and percutaneous pinning, and intramedullary nailing or bracing.[4,5]

Radial nerve palsy is the most common nerve complication after humeral shaft fracture. Its incidence is estimated to be around 2–17 %. In most cases, the radial nerve is intact, and prognosis of complete recovery is high.[12,13] Management of humeral fracture associated with radial nerve palsy remains controversial some authors advocate surgical treatment in emergency; others recommend nonoperative treatment. However, in 6–20% of cases, lack of recovery is explained by nerve entrapment in the fracture site.[12] Radial nerve palsy is a feared complication of humerus shaft fractures that can occur during the injury, open reduction, and internal fixation or intramedullary nailing. In closed fractures, this is often a result of neuropraxia, while in open fractures it is a result so neurogenesis.[14,15] This complication is more common in third distal fractures as this is the location where the radial nerve is closest to the humerus. In a closed fracture, radial nerve palsy is not an indication for open reduction and internal fixation with nerve exploration.

AIM AND OBJECTIVES

AIM:

The aim of this study will be to study incidence of radial nerve palsy following surgery for the treatment of shaft humerus fractures.

Objectives:

To study the incidence of radial nerve palsy in operated cases of humerus fracture.

MATERIALS AND METHODS

Inclusion criteria:

1. Patients with shaft humerus fractures.

2. Patients of either sex who has fracture humerus with no radial nerve palsy and managed surgically.

3. Patients without preoperative radial nerve palsy.

Exclusion criteria:

1) Concomitant fractures or ligament or tendon ruptures of the elbow or shoulder joints in conjunction with a humeral mid-shaft fracture.

2) Partial or complete disability of the elbow or shoulder joint on the affected side before occurrence of the humeral mid-shaft fracture.

3) Patient with pre operative radial nerve palsy.

4) Patients with proximal and distal humeral fracture.

RESULTS :

Radial Nerve Palsy Incidence Post-Surgery

Radial Nerve Palsy	**Number of Patients (n=70)**	**Percentage (%)**
Yes	5	7.1
No	65	92.9

Correlation of Radial Nerve Palsy with Surgical Approach

Surgical Approach	**Number of Patients (n=70)**	**Patients with Radial Nerve Palsy (n=5)**	**Percentage of Palsy in Approach (%)**	**p-value**
Posterior	45	3	6.7	
Anterolateral	25	2	8	
Overall	**70**	**5**		**0.80**

DISCUSSION:

Radial nerve palsy is a significant and potentially debilitating complication associated with fractures of the humeral shaft. The radial nerve, which runs along the humerus, is vulnerable to injury both at the time of fracture and during surgical intervention. Incidence rates of radial nerve palsy in operated cases of humeral shaft fractures vary widely in the literature, reflecting differences in patient populations, fracture patterns, and surgical techniques. Understanding the incidence and risk factors for radial nerve palsy in these cases is crucial for improving surgical outcomes and patient care. Early identification and appropriate management of radial nerve injuries are essential to minimize functional impairment and enhance recovery. Our study aims to evaluate the incidence of radial nerve palsy in patients undergoing surgical fixation for humeral shaft fractures, providing valuable insights into its prevalence and guiding strategies for prevention and treatment.

Inclusion criteria encompassed patients with shaft humerus fractures, irrespective of gender, without preoperative radial nerve palsy. Exclusion criteria involved patients with concomitant fractures or ligament/tendon ruptures in the elbow or shoulder joints, preoperative radial nerve palsy, and proximal/distal humeral fractures. Data collection was conducted after obtaining ethical approval, and 69 eligible patients were included. Analyzing the mechanism of injury, road traffic accidents emerge as the most common cause, consistent with global trends in trauma etiology .Falls represent another significant contributor, particularly among older adults, highlighting the importance of fall prevention strategies and geriatric care initiatives in reducing fracture incidence and associated morbidity. In examining the most common causes of radial nerve palsy (RNP) in operated cases of shaft humerus fractures, our study identified road traffic accidents as the predominant cause.The interval between injury and surgery demonstrates a varied pattern in medical consultation timing, with a significant proportion seeking care within the first week post-injury (Table 6). Early intervention is crucial for minimizing complications and facilitating timely fracture stabilization, emphasizing the importance of prompt diagnosis and referral pathways in fracture management.

Blood loss during surgery reflects the spectrum of hemorrhage severity, with the majority falling within the 100-200 ml bracket.Effective intraoperative hemostasis techniques and perioperative monitoring protocols are essential for mitigating the risk of complications associated with excessive blood loss and ensuring optimal surgical outcomes.

The preference for the posterior approach in surgical management aligns with established practices and provides insights into the choice of surgical techniques employed by orthopedic surgeons.The utilization of lag screws and the type of plate used underscore the versatility of fixation methods and the importance of anatomical considerations in fracture stabilization strategies.

The incidence of radial nerve palsy post-surgery, albeit relatively uncommon, underscores the importance of vigilant monitoring and prompt recognition of neurological complications.Timely intervention and rehabilitative measures are essential for optimizing nerve recovery and minimizing long-term disability.

The favorable functional outcomes and high patient satisfaction rates reflect the efficacy of surgical interventions and postoperative care protocols in restoring upper limb function and quality of life . Comprehensive rehabilitation programs tailored to individual patient needs are instrumental in maximizing functional recovery and minimizing disability. The correlation analyses provide valuable insights into the relationship between various factors and the incidence of radial nerve palsy.While no significant associations were found between age group or surgical approach and RNP occurrence, further research is warranted to explore potential risk factors and prognostic indicators associated with neurological complications in humerus fractures. The resolution of radial nerve palsy (RNP) and the unique recommendations provided by various studies highlight different approaches to managing this complication in humeral shaft fractures. In our study, we emphasized the importance of monitoring and prompt recognition of RNP, advocating for tailored surgical approaches and comprehensive patient education to optimize outcomes. Schwab et al. (2018) found that most primary palsies recovered spontaneously and recommended early nerve exploration for secondary palsy after

surgery. Belayneh et al. (2019) reported complete resolution of RNP in all patients, suggesting that radial nerve exploration may facilitate quicker resolution of the palsy. Łukasz et al. (2019) did not specify the resolution of RNP but recommended early surgical nerve exploration for certain fracture types. These variations underscore the importance of individualized treatment strategies and the need for further research to refine and improve management protocols for RNP in humeral shaft fractures.

In conclusion, the findings from our study contribute to the body of knowledge on radial nerve palsy in operated cases of shaft humerus fractures, shedding light on incidence rates, surgical techniques, and patient outcomes. The insights gained from these results have implications for clinical practice, guiding decision-making processes and informing evidence-based approaches to fracture management.

Conclusion

In conclusion, our study provides valuable insights into the incidence of radial nerve palsy (RNP) in operated cases of shaft humerus fractures. While RNP remains a relatively uncommon complication, its occurrence underscores the importance of vigilant monitoring and prompt recognition in postoperative care. The findings highlight the need for tailored surgical approaches and meticulous attention to anatomical considerations to minimize the risk of neurological complications. Moving forward, continued research efforts aimed at elucidating the underlying mechanisms and optimizing management strategies are essential for improving clinical outcomes and enhancing the quality of care for individuals undergoing surgical treatment for shaft humerus fracture.

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