Case Report

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Successful Conservative Management of Bayonet Fracture of the Lower End of Radius and Ulna in a 6-Year-Old Boy: A Case Report

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Abstract

Bayonet fractures of the lower end of both the radius and ulna in paediatric patients are exceedingly rare, posing unique challenges in their management and follow-up. In many of the instances these fractures are treated by open reduction and internal fixation under anaesthesia. However recent studies have claimed that these fractures in children can be immobilized without reduction in an overriding position with good outcome. Paediatric patients presenting with bayonet fractures needs prompt diagnosis, appropriate immobilization, and meticulous long-term monitoring. However neurovascular abnormalities must be ruled out in patients in whom conservative management is being contemplated. Compromised neurovascular status is an indication of urgent exploration, open reduction and internal fixation. We present here a case of 6 years old boy with bayonet fracture of lower end of radius and ulna who was conservatively managed by above elbow cast for 1 month. An X-ray taken 18 months after the removal of cast showed complete remodelling of the bones. This case report highlights the exceptional potential for bone remodelling and functional recovery in young patients when managed with conservative management strategy.

Keywords: Bayonet fracture, Above Elbow Case, Remodelling, Functional Recovery.

INTRODUCTION

Bayonet fractures in children are relatively rare and require special attention due to their unique characteristics. Bayonet fractures involving both the radius and ulna in children are uncommon, accounting for a small proportion of paediatric fractures.[1] The majority of cases occur in the age group of 4 to 7 years, which coincides with the period of increased physical activity and exploration.

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IN children these fractures are often the result of high-energy trauma, such as falls from height, sports-related accidents, or motor vehicle collisions. In some cases, it may result from a direct blow to the forearm during play or accidents. Bayonet fractures occur when the force applied to the forearm results in the radius and ulna overriding each other while remaining in contact. This displacement is typically the result of a rotational or bending force applied to the forearm, causing the interosseous membrane to rupture, leading to radial and ulnar shafts displacement.[2]

The usual clinical features include restricted range of motion at the elbow and wrist, deformity of the forearm, with the radius and ulna appearing to overlap and tenderness and crepitus at the fracture site. It is important to rule out neurovascular status of the affected limb to assess for potential nerve or vascular injury. The diagnosis is usually confirmed by radiographic evaluation which is essential for confirming the diagnosis and assessing the extent of the fracture. Standard imaging includes anteroposterior and lateral views of the forearm. The images will reveal the characteristic bayonet deformity, with the radius and ulna overlapping. Computed tomography (CT) may be considered in complex cases to aid in surgical planning.[3]

The primary goal of treatment for a paediatric bayonet fracture is to restore and maintain forearm alignment while allowing for bone healing. Management options include closed Reduction and casting, open reduction and internal fixation by percutaneous pinning followed by above-elbow cast for approximately 4-6 weeks or simple cast immobilization in bayonet position. Regular radiographic follow-up is necessary to ensure maintenance of reduction. Recently many studies have reported excellent functional outcome in children with bayonet fractures managed conservatively by immobilisation in above elbow cast for 6 weeks.[4]

With appropriate treatment, paediatric bayonet fractures typically have favourable outcomes. The cast is usually removed after 4-6 weeks after which physical therapy is initiated to restore range of motion and strength. Long-term follow-up is essential to monitor for any potential complications, such as malunion, growth plate disturbances, or refracture.[5]

We present a case of a 6-year-old boy with a bayonet fracture of the lower end of the radius and ulna treated successfully by simple above elbow cast for 6 weeks.

CASE REPORT

A 6-year-old boy presented to orthopaedics department with a history of a fall onto his outstretched hand. Clinical examination revealed marked deformity, swelling, and localized tenderness at the fracture site on right hand. Neurovascular status was intact. The presumptive diagnosis of bayonet fracture was made and imaging studies were ordered. Initial radiographs confirmed the presence of a bayonet fracture with partial displacement of fractured ends of both the radius and ulna. The fracture was associated with an anterior angulation of approximately 40 degrees, as well as a shortening of approximately 8 mm in the sagittal plane.

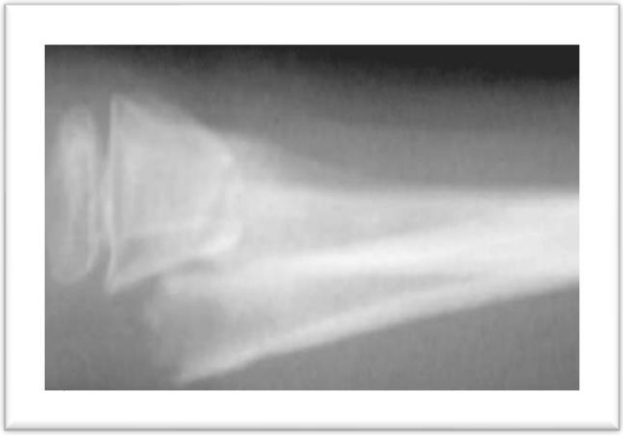

Figure 1: - Pre operative x ray showing Bayonet Fracture of lower end of Radius and Ulna.

Considering the patient's age, the potential for remodelling, and the absence of significant displacement, a conservative approach was chosen. An above-elbow cast was applied for a duration of one month, immobilizing both the elbow and wrist joints to maintain alignment and provide stability to the fractured bones. Subsequent clinical and radiographic follow-up examinations were performed at regular intervals over an 18-month period. During this time, the patient exhibited no complications or signs of neurovascular compromise. Radiographic assessments revealed gradual improvement in the alignment of the radius and ulna, as well as evidence of bone remodelling.

At the 18-month follow-up, a final X-ray demonstrated complete remodelling of the fractured bones, with the restoration of normal anatomical alignment.

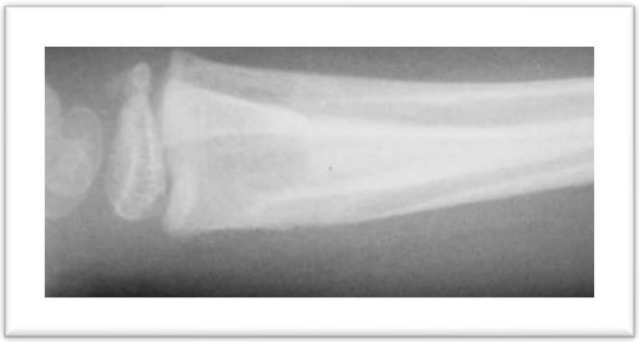

Figure 2: - Follow up X-Ray at 18 months showing complete Remodelling of bones.

The patient had regained full range of motion and strength in the affected forearm, with no functional deficits or discomfort. The absence of complications, such as growth plate disturbances or non-union, confirmed the success of the conservative treatment approach. Functional assessment was done using Quick DASH (disabilities of the arm, shoulder and hand questionnaire) Score. The Quick DASH score of the patient was 9 which meant insignificant disability. There was no pain at the time of final follow up visit at 18 months (VAS=0).

DISCUSSION

Bayonet fractures of the lower end of both the radius and ulna in paediatric patients are relatively rare but present unique challenges in terms of management. Treatment options for bayonet fractures in children encompass a spectrum of approaches. Conservative management involves immobilization of the affected limb using casting or splinting techniques. This approach is often considered when the fracture is minimally displaced, and there is potential for remodelling. The goal is to provide stability while allowing for natural bone healing.[6]

In some cases, especially when there is significant displacement and angulation, closed reduction and percutaneous pinning may be warranted. This involves realigning the fractured bones under anaesthesia and securing them with pins to maintain proper alignment during the healing process. In more severe cases where conservative measures and closed reduction fail to achieve and maintain proper alignment, open reduction and internal fixation (ORIF) may be necessary.[7]

Over the years, management strategies for bayonet fractures in children have evolved based on a deeper understanding of paediatric bone physiology and fracture healing. Historically, many fractures were treated with aggressive surgical interventions, believing that precise anatomical reduction was necessary for optimal outcomes. However, with advancements in paediatric orthopaedics, there has been a notable shift towards conservative management for certain fractures, particularly those with a high potential for remodelling. This shift has been supported by studies demonstrating that children's bones have a remarkable capacity to correct angulations and shortenings over time. The modern approach to bayonet fractureacknowledges the heterogeneity of these injuries, and treatment decisions are now based on the specific characteristics of each fracture, such as displacement, angulation, age of the patient, and potential for remodelling.[8]

In this case, the successful conservative management with an above-elbow cast highlights several advantages. Avoiding surgery in young children reduces the potential risks associated with anaesthesia and surgical procedures. Paediatric bones have a remarkable ability to remodel, allowing for correction of deformities over time. An above-elbow cast can facilitate this process by providing stability.[9] Additionally, conservative management preserves joint motion and muscle strength, contributing to better functional outcomes. From a cost perspective, conservative management is often more cost-effective compared to surgical interventions, making it an attractive option, especially in resource-limited settings. However, treatment decisions should always be tailored to the specific characteristics of each fracture, and regular follow-up is essential to monitor progress and ensure optimal outcomes.[10]

CONCLUSION

The management of bayonet fractures in children has evolved over time, moving towards a more individualized and conservative approach. Our case report demonstrates the successful outcome of conservative management with an above-elbow cast in a paediatric patient who presented with bayonet fracture of lower end of radius and ulna. This approach offers several advantages, including minimized surgical risk, potential for bone remodelling, better functional recovery, and cost-efficiency

Conflict of interest

None

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