Case Report

Impacted Third Molars - A Risk Factor in Isolated Bilateral Angle Fracture of the Mandible – A Case Report

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Abstract

The incidence of maxillofacial trauma has increased manifold in the past two decades due to increase in road traffic accidents, with higher prevalence in the younger age group. Mandible is more vulnerable to fracture in the maxillofacial skeleton due to its mobility, presence of impacted third molars and muscular attachments. It is imperative for the general dental practitioner to be mindful about, the most common maxillofacial fractures, clinical findings, elementary management techniques, principles on fracture management and the referral to a specialist for definitive management. This is a case report of a bilateral angle fracture of the mandible, with bilateral impacted mandibular molars, a rare clinical entity, treated by open reduction and internal fixation.

Introduction

Maxillofacial trauma though seldom life threatening is a serious concern in terms of facial disfigurement and loss of function for an individual. Increased number of vehicles, geographical location, culture, socioeconomic status, gender, and many other factors are attributed to the aetiology of maxillofacial trauma. The most common causes include road traffic accidents, interpersonal violence, fall, sports and occupation related injuries. (Subhashraj, 2007)

Mandible is the most commonly fractured facial bone [24-80%], next to nasal fractures, despite being the strongest and longest in the maxillofacial skeleton (Subhashraj, 2008).The dynamics influencing mandibular fractures include the site, direction, magnitude and severity of the force of impact, mouth opening, impacted M3 molars, muscle pull exerted on fracture segments and intrinsic bony characteristics (Zhou, 2016).

Mandible is a horseshoe shaped bone with potentially vulnerable areas prone for fracture following trauma. The junction of alveolar and basal bone, symphysis, lateral to parasymphysis, impacted mandibular teeth near angle region, slender neck of the mandibular condyle, all which serves as a protective mechanism preventing injury to the middle cranial fossa.

Mandibular fractures can be classified as simple or closed, compound or open, comminuted, complex, impacted, greenstick, and pathological fractures. Anatomically mandibular fractures can be classified according to the location and frequency of occurrence as fractures of the Parasymphysis (35%), Condyle (22%), Angle (12%), Dentoalveolar (11%), Symphysis (10%), Ramus (3%) and Coronoid (1%).

Clinically, the fracture mandible presents with pain, swelling, step deformity, deranged occlusion due to premature contact, facial asymmetry, paresthesia, if involving the inferior alveolar nerve, sublingual ecchymosis [Coleman's sign]. The fracture segments in turn are influenced by the muscular attachments, direction of the fracture line and teeth in line of fracture which determines the favourability of fracture reduction and fixation.

Case Report

A 19 year old female reported, with history of road traffic accident, she jerked on the floor with her chin, hit by a heavy vehicle from behind while riding a motor cycle, There was no associated head injury, loss of consciousness, lucid interval, and incidence of vomiting, ear or nasal bleed.

Clinically, bilateral edema was present at the angle region of the mandible, contusion in the chin without any skin laceration and lower facial third appeared elongated. Mouth opening was severely restricted with anterior open bite due to premature occlusal contact in the posterior region and no accompanying dentoalveolar fractures.

Thorough extra oral examination revealed a step deformity at the bilateral angle region with tenderness of the bony segment. The PA view skull revealed unfavourable fracture of both the left and right angle of the mandible and impacted tooth in line of fracture bilaterally. The patient required a definitive surgical intervention without any delay to avoid malunion of the fracture segment.

Under General anesthesia, both the fracture sites were exposed through a modified ward's incision placed distal to the second molar. The deep seated mesioangular impacted tooth (Pederson's Class I position B) was removed with minimal bone loss. A prefabricated acrylic splint was used to aid in intermaxillary fixation (IMF) and restoring occlusion. The proximal segment was manipulated using a coronoid retractor. The reduced segment was stabilized and plated using a 2mm four hole miniplate along the external oblique ridge according to champy's line of osteosynthesis. Patient followed up at regular intervals with no specific complaints.

Discussion

Mandibular angle fractures have been commonly attributed in dentate rather than edentate patients due to the presence of impacted mandibular third molars. Bone density and mass, severity, direction and point of impact influences the fracture site.

Variations in standard fractures occur due to two general reasons;
1. Firstly, due to wide range in magnitude and direction of the impact and shape of the object delivering the impact.
2. Secondly, the presence of dentition, position of the mandible and influence of associated soft tissues.

The irregularities in the anatomy due to the oblique ridges, sharp bends, foramens and regions of reduced cross sectional dimension results in greater absorption of force and increased concentration in tensile strain. Impacted third molars when present changes the concentration and stress transmission favouring angle fracture. The angle region is influenced by strong masticatory forces and the thinner cross section area tends to receive more force distribution than the neighbouring areas.

The presence of impacted third molar is known to absorb substantial amount of force creating an inherent zone of weakness thus minimizing the fracture at the condylar level. Usually when a direct blow occurs in the symphysis region, the force is distributed directly along the arch of the mandible and fracture occurs bilaterally in the area of least stability, the condylar neck and in the symphysis region due the tension from the blow. The impacted molar further interferes with the fracture reduction by decreasing the bony contact, alters the vascularity of the region and acts as a source of pathogenic organisms.

Statistically significant association have been found between the impacted third molars and angle fractures and mandibles with missing third molars are more susceptible for fracture condyle. Finite element analysis (S. Antic, 2016), biomechanical and varied literature evidences have shown that angle with impacted third molars remains as areas of weakness susceptible to fracture.

The biomechanical studies done by Meisami et al have shown that the cortical, not medullary integrity of the mandible is a major determinant in the transmission of stresses upon impact, making it susceptible to fracture. This explains the fact that superficially placed impacted third molars commonly, causes break in the cortical integrity than deep seated impacted tooth, jeopardising the angle of the mandible.
On the contrary, studies also advocates (S. Antic, 2016) against the removal of mandibular third molars as a preventive measure against angle fracture. Surgical removal of mandibular third molars by itself poses risk of angle fracture and its absence transmits the stresses to the condyle making it more vulnerable to fracture and carries its own complications like facial nerve damage.

As practitioners we must be aware and every patient should be properly evaluated and removal should be advocated if necessary which may act as a line of weakness making the mandible prone for fracture following maxillofacial trauma

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