

CASE REPORT

Triple Unilateral Fracture of Mandible – A Rare Occurrence

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Abstract

Most fractures of the mandible are contralateral owing to its unique shape and types of forces applied during fracture. Triple unilateral fracture of mandible is extremely uncommon and rarely reported in literature. Dentition free segment adds to the challenges of accurate reduction. This case report talks about a case of right parasymphysis, right angle and right subcondylar fracture of mandible in a 21 year old male and the methods employed for reduction. Non dentate segment is reduced first to maintain vertical ramus height followed by reduction of angle and parasymphysis. The difficulty inherent in treating these fractures can be alleviated with the use of proper sequencing and techniques of open reduction and internal fixation.

Key Words

Triple Unilateral fracture, Mandibular Fracture, Multiple Unilateral fractures

Introduction

Mandibular fracture is one of the most common fractures of the face [1]. Most of these fractures are solitary, but between 22% and 52% involve two or more sites in the mandible [2, 3]. Most fractures of the mandible are contralateral owing to its unique shape and types of forces resulting in fracture [4]. The incidence of multiple unilateral mandibular fracture is rarely reported [4]. Patients with triple unilateral fracture of mandible are difficult to treat and such incidence of fracture is not reported so far. Such fractures often involve a dentition free segment of bone adding to the challenges of fracture reduction. Sequencing, accurate anatomic and functional reduction and rigid internal fixation of these fractures are critical in restoring its form and function.

Case Report

A 21 year old patient presented to the emergency triage, with trauma to right side of the face due to road traffic accident in the form of a bike skid resulting from a fall on the sealed road. The patient did not have any other associated injury except for facial injuries. He was oriented with no signs of head injury but reported bleeding from the oral cavity at the time of accident. Vital signs were within normal limits and pupils were equally reacting to light. On extra-oral examination, the patient had restricted mouth opening of 15 mm with abrasion over right malar region and mild oedema in right pre-auricular region. Facial nerve functions were intact and there was no evidence of anaesthesia or paraesthesia over right side of face. There was deviation of mandible to the right side on mouth opening, with associated tenderness in pre-auricular, angle and parasymphysis region on the right side. A step defect was palpable in right angle and parasymphysis region. Mandibular protrusive movement and left lateral excursions were restricted with deviation towards right side.

Intra-oral examination revealed occlusal derangement with right posterior open bite (Fig 1). Sublingual hematoma was positive and mobility was present in relation to right angle and parasymphysis region of mandible. Radiographic evaluation in the form of orthopantomograph [OPG] and 3-Dimensional Computed Tomography[CT] of face was done which showed right parasymphysis fracture, horizontally unfavourable right angle fracture, right subcondylar fracture with displacement and lateral overlap of the proximal segment.(Figures 2 and 3) Primary treatment in the form of debridement of abrasion over the right malar region and inter-dental wiring under local anaesthesia in relation to 42, 43 was done in trauma triage, after which the patient was admitted for definitive treatment.

The patient was taken up for open reduction and internal fixation under general anaesthesia with nasal intubation. An extra oral approach was adopted for the angle and subcondylar fracture, a posteriorly extended submandibular incision was given and a layered dissection was done to expose the angle and subcondylar fractures. Following this, an intraoral vestibular incision was given to expose the parasymphysis fracture. Right subcondylar fracture was anatomically reduced and fixed with reverse T miniplate to achieve a stable craniomandibular articulation at one end which will guide subsequent fracture reduction and will prevent misalignment of ramal fragment. (Fig. 4). The right mandibular third molar which was decayed and in the line of fracture was extracted following which right angle fracture was reduced under direct visualization of both cortices. Then rigid fixation was done in the form of 2 miniplates of 2.0 mm thickness at superior and inferior borders. Occlusion was maintained manually by an assistant with minimal application of cranial and medial force on the right mandible. This manoeuvre prevents gonial widening and prevents flaring of inferior border which otherwise occurs on application of rigid intermaxillary fixation[IMF] on a dentate segment that is free floating due to fracture at both proximal and distal end. After fixation of nontentate areas patient was brought into final occlusion and secured with the help of rigid IMF and finally parasymphysis fracture was reduced and fixed with two miniplates according to Champy's lines of osteosynthesis. Closure was done in layers and IMF was released.

Patient's post operative recovery was uneventful and he was discharged with pre trauma occlusion (Figures 5, 6).

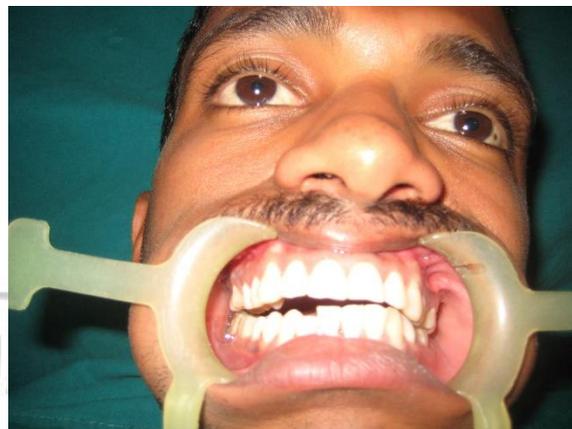


Fig. 1: The photograph showing preoperative view of the patient which is in deranged occlusion.



Fig. 2: Orthopantomograph(OPG) indicating (A) - Right parasymphysis fracture. (B) - Unfavourable right angle fracture (C) - Right subcondylar fracture with displacement and lateral overlap of proximal segment.

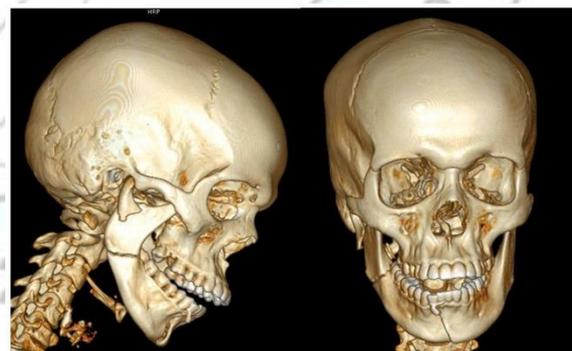


Fig. 3 a & b- 3-D recon images showing right mandibular subcondyle, angle and parasymphysis fracture

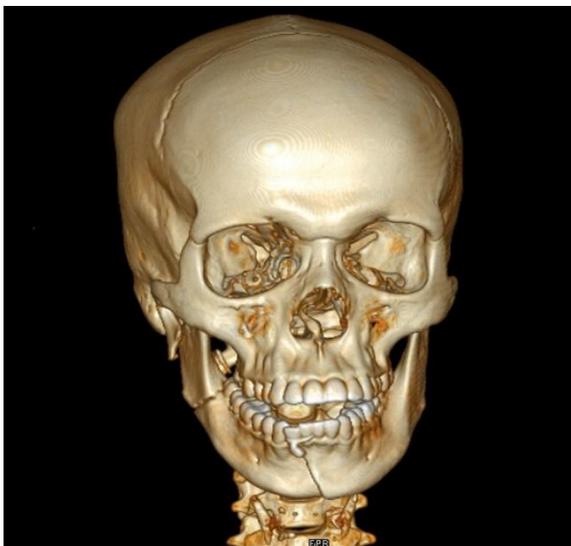


Fig. 3: Three dimensional Computed tomography image showing fractures.

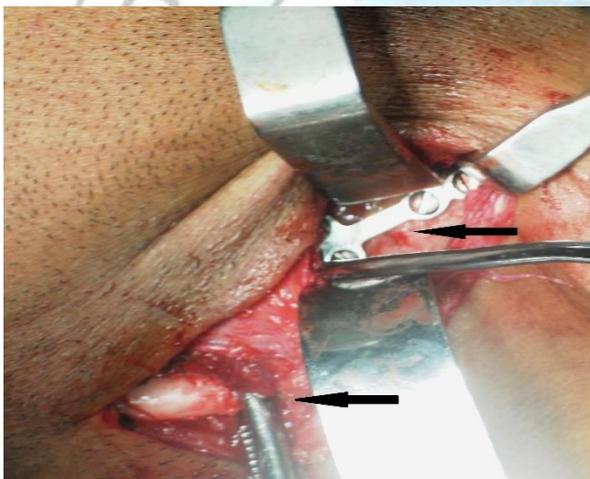


Fig. 4: Arrows indicating A) plating of condylar fracture and B) reduction of angle fracture.



Fig. 5: Postoperative view of the patient in occlusion.



Fig. 6: Postoperative OPG

Discussion

Mandibular fractures can be complicated, demanding and have a compelling impact on patients quality of life. Several factors influence the location of mandibular fractures, including force, direction of impact and presence of impacted teeth. Contralateral multiple fractures of the mandible occur commonly because of the unique anatomy of the mandible, with angle and body fractures being the most common combination, followed by symphyseal and condylar fractures [2, 3]. In general, this unique shape tends to make double unilateral mandibular fractures rare [4]. In this case direct impact of trauma on the right side of the mandible resulted in multiple fractures on the same side of impact. Such triple unilateral mandibular fracture is extremely rare and so far has not been reported in the literature.

In unilateral fracture of parasymphysis, angle and subcondyle, there is a small dentate segment that can be used to obtain proper occlusion during surgery. In such cases, alignment of the segment with the symphysis and ramus can be difficult, and lateral flaring of the gonial angle may be inadvertently produced [4]. The ramus segment becomes a free-floating segment without posterior support from the craniomandibular articulation with a tendency for lateral flaring of the inferior border of the mandible, following which the ramus segment may become malpositioned in space.

Perhaps this was the most difficult combination of triple unilateral fracture from the standpoint of proper reduction, with two free segments of bone.

Exposure of the most difficult part of the fracture first allows for proper intra operative planning for accurate reduction [4, 5]. Extra oral approach allows for visualisation of both the fractures simultaneously and at the same time it helps to avoid gonial angle flare at the time of fixation of the angle fracture [5,6]. In this combination of fractures, one should choose to treat the angle and condyle via an extraoral approach,

so the lingual cortex can be visualized and brought into proper apposition.

The fractures in the region of condyle and angle of the mandible should be anatomically reduced under direct visualization of buccal as well as lingual cortices and fixed prior to anterior dentate segment. This sequence would provide an added advantage of stabilizing the mandible at one end by craniomandibular articulation [4].

This would also prevent subsequent inferior border flaring and gonial widening at the time of application of IMF on buccal surface of teeth which otherwise always occurs on a free floating dentate segment [4].

The use of rigid fixation for the treatment of mandibular fractures has historically been a reliable and predictable treatment method. A prospective 10 year study by Ellis et al., clearly demonstrated that rigid fixation at one site is essential in double mandibular fractures, that too if possible should be in angle region because of torsional and multidirectional forces acting in this region [5]. However, treatment of triple unilateral fractures may result in a high complications, consisting of visible gonial flaring and malocclusion. Clinicians should be aware of these complications associated with this rare and difficult mandibular fracture, so that steps can be taken to minimize the latter. As evidenced in our case, the sequence used for the management of the triple unilateral mandibular fracture has so far proven to minimize postoperative complications.

Conclusion

Triple unilateral mandibular fracture is a rare event. It is a challenge for surgeons to treat such cases. Following the principles of open reduction and internal fixation meticulously, pre trauma occlusion can be achieved without any complications.

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