Airway Obstruction After Bilateral Mandibular Parasymphyseal Fracture: A Case Report

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Abstract
Bilateral mandibular parasymphyseal fractures may compromise airway maintenance. The aim of the present study is to report the case of a patient with bilateral parasymphyseal fracture who developed some degree of airway obstruction and required urgent surgical treatment. A 19-year-old female motorcycle accident victim presenting bilateral mandibular parasymphyseal fractures evolved with difficulty breathing, 5 hours after trauma. To improve the patient’s clinical condition, urgent surgical treatment 12 hours after the trauma was opted. The fractures were fixed with two 2.0-mm plate and screw systems at each fractured site. After surgery, the patient evolved with good oxygen saturation and no difficulty in breathing. Occlusion obtained during surgery remained satisfactory and stable over the 2-year postoperative follow-up. Emergency surgical treatment of the bilateral mandibular parasymphyseal fracture was imperative in the present case since the patient developed respiratory distress after the trauma.

Keywords
mandibular fractures, airway obstruction, fracture fixation

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Mandibular fractures are injuries that can affect any mandibular segment, invariably involving the teeth or occlusion, and are one of the most common facial fractures.¹ The main causes of mandibular fractures worldwide are traffic accidents, physical aggression, falls, and sport-related fractures. Bilateral mandibular fractures are common and may cause airway obstruction.²

Several classifications of mandibular fractures using nonstandard terminology are available. One of these classifications is related to the anatomical site involved: symphysis, body, angle, branch, condylar process, coronoid process, and alveolar process. The symphysis is bound by vertical lines distal to the lower canines. Fractures in this region, when not located in the midline, are commonly referred to as parasymphyseal fractures. Together they can be referred to as the chin or mental region.²³

Bilateral mandibular parasymphyseal fractures may cause airway obstruction due to the concomitant loss of tongue muscle support, rendering the symphysis a free fragment that would retract posteriorly. The mylohyoid, digastric, genius-hyoid, and genioglossus muscles can...
displace the bone fragments and cause this obstruction. In addition, the base of the tongue may drop back in the supine patient and thus block the oropharynx. Although uncommon, this situation requires urgent treatment. Other symptoms such as sublingual hematoma, soft tissue edema, aspiration of foreign bodies such as teeth or bone fragments, and the accumulation of blood in the mouth and oropharynx may further compromise the airways of patients with bilateral parasymphyseal fracture.

The aim of the present study is to report the case of a patient with bilateral parasymphyseal fracture who developed some degree of airway obstruction and required urgent surgical treatment.

Case Report
A 19-year-old female motorcycle accident victim was treated in the emergency room of a private hospital in Recife-PE. Initial evaluation revealed facial trauma and mild head injury in the absence of other associated injuries and no significant impairment of other organs. After examination and release by the neurology and general surgery team, the patient was attended by the oral–maxillofacial surgery team. At this time, the patient reported severe jaw pain during movement and abundant intraoral bleeding was observed. Physical examination revealed the presence of mandibular mobility caused by fracture in the bilateral symphysis and active bleeding from the fractured sites, associated with malocclusion and limited mouth opening. A clinically computed tomography scan of the face with axial, coronal, and 3-D reconstruction was performed, which showed bilateral parasymphyseal fracture (Figures 1 and 2). Based on the clinical findings, the fracture was immobilized with stainless steel circumdental wires to reduce pain and bleeding from the fractures. Five hours after trauma, the patient began to report difficulty breathing when in the supine position, maintaining oxygen saturation (SpO₂) at about 88. Using a Venturi mask, the patient’s saturation improved and remained above 97. However, to improve the patient’s clinical condition, urgent surgical treatment 12 hours after the trauma was opted.

Surgery was performed under general anesthesia with nasotracheal intubation to secure the airway. After local infiltration with 2% of lidocaine with vasconstrictor, a transoral vestibular approach below the mucogingival junction was performed. Retroposition of the fractured mandibular symphysis (Figure 3), together with the amount of blood accumulated in the mouth and oropharynx, possibly caused the breathing difficulty reported by the patient. After access, mandibulomaxillary fixation was performed to ensure satisfactory occlusion after adequate fragment reduction. The fractures were properly fixed with two 2.0-mm plate and screw systems at each fractured site (Figure 4). After reduction and fixation, the surgical wound was abundantly rinsed with saline and closed with absorbable 3-0 Vicryl suture. After surgery, patient evolved with good oxygen saturation and no difficulty breathing.

After 10 days, the patient returned for the postoperative follow-up. The surgical wound was maintained, without dehiscence, with good appearance and good oral hygiene.
The occlusion obtained during surgery by mandibulomaxillary fixation remained satisfactory and stable over the 2-year postoperative follow-up (Figure 5). Postoperative panoramic radiography revealed adequate reduction of the fractured fragments (Figure 6).

Discussion

Mandibular fractures are one of the most common injuries in the face, a fact that can be explained by the greater exposure of the mandible to traumatic events. In several studies, the most affected regions were the condyle and mandibular body. However, recent studies have shown a higher prevalence of parasymphyseal fractures. The possibility of airway obstruction associated with these fractures, although uncommon, highlights the need for adequate management of this type of fractures.

This present study reported a case of bilateral fracture of the mandibular parasymphysis in a young female motorcycle accident victim. However, a male predominance among motorcycle accident victims has been reported in the international literature. High rates of traffic accidents are observed in Recife, a city in the state of Pernambuco, Brazil, which also predominantly involve male motorcyclists.

The diagnosis of fractures in the mandibular body and symphysis is based on clinical examination and image analysis such as radiographs and computed tomography scans of the face. During anamnesis, it is important to investigate the cause of trauma, as well as its magnitude, strength, and direction, since the injury mechanism can provide valuable insights into the type of fracture suffered. Evidence shows that motorcycle accidents tend to result in high rates of mandibular fractures in the parasymphysis region.

Airway management of patients with maxillofacial trauma is complex and crucial because it can dictate a patient’s survival. Securing the airway of patients with maxillofacial trauma is often extremely difficult because the trauma involves the patient’s airway and their breathing is compromised. Airway maintenance with immediate cervical spine control is a priority when assessing and managing trauma patients, as recommended by the Advanced Trauma Life Support concept for managing patients who sustained life-threatening injuries. Management of maxillofacial injuries is required mainly in the case of impending or existing upper airway compromise and/or profuse hemorrhage. A bilateral fracture in the parasymphysis region causes the fractured symphysis to slide posteriorly along with the tongue attached to it via its anterior insertion. Infracanal bleeding and edema were factors aggravating the airway impairment reported in this case.

As the patient arrived at the hospital awake and breathing, immediate intubation to ensure airway permeability was not required. The patient’s ability to breathe and swallow secretions decreased as a result of the unstable parasymphyseal fracture, edema, and intraoral bleeding, similar to another case reported in 2017. The systematic analysis of the airways may decrease the risk of late compromise due to tissue dislocation, intraoral bleeding, or even in cases of edema in the oropharynx. In view of the patient’s condition, urgent surgical treatment of the fractures was performed.

Facial bone plating continues to be the gold standard and is a feasible and effective treatment option associated with a small number of complications. The treatment of parasymphyseal fractures by open reduction aims to improve the position of the fractured bone fragments, avoiding medial rotation of the mandibular bodies, which could cause important facial changes and reduce masticatory efficiency. In this case, two 2.0-mm miniplates with 4-hole systems were used to fix each parasymphysis fracture. Two plates were placed directly above the inferior border. The other plates were placed considerably higher in the central portion of the mandible underneath the tooth roots, following the recommended guidelines for the fixation of these fractures.
types of fractures. Stainless steel circumdental wires were first used to reduce the displacement of the fractured fragment. Nevertheless, posterior displacement of the fragment occurred in the patient, which caused airway obstruction. After installation of the titanium miniplates, the wires were removed.

Some types of mandibular fracture can severely disrupt upper airway integrity and, together with other adverse factors, may develop into emergencies. Airway management of the maxillofacial trauma patient is complex and requires sound judgment, considerable experience, and technical skills to have an outcome with minimal risks and maximal success.

Conclusion
Emergency surgical treatment of the bilateral mandibular parasymphysis fracture was imperative in the present case since the patient developed respiratory distress after the trauma. Surgery allowed better positioning of the bone fragments, decreased intraoral bleeding, and significantly reduced pain, resulting in definitive resolution of the case.

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