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Surgical management of nonunion mandibular angle fracture with osteomyelitic changes– A Case Report

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ABSTRACT

The anticipated complications arising from jaw fractures can affect both function and aesthetic, including issues like non-union, malunion, malocclusion, temporomandibular joint dysfunction, and facial asymmetry due to one or other reason. Non-union is an uncommon complication after mandibular fractures. Non-union of mandibular fractures is an unusual and complex condition requiring careful and deliberate surgical management.The purpose of this case report is to evaluate the outcome of patient with non united mandibular fracture who underwent general anaesthesia for comprehensive surgical treatment involving debridement, removal of necrotic bone tissue, and stabilization using a 2.7mm titanium 6 hole reconstruction plate.

INTRODUCTION

Fractures of the mandibular bone are common due to its prominent and central location in the face, making it susceptible to external injuries[1]. Treatment aims to achieve prompt healing and early mobilization through precise alignment and stabilization while minimizing complications and disability. Various methods have been developed in the past, such as maxillomandibular fixation using wires, lag screw fixation, external rigid fixation, and more recently, internal rigid fixation with metal plates[2].

Non-union of mandibular fractures is an uncommon sequalae of treatment but it may occur even in the most experienced hands.It's a rare occurrence following mandibular fractures and has been reported to have an incidence of 2.8 to 3.9%[5]. Non-union arises when the fracture fails to heal within a reasonable timeframe, resulting in infection, pain, restricted jaw movement, deranged occlusion, and difficulty in chewing. Haug and Schwimmer[4] described this timeframe as any fracture that remains mobile after 4 weeks without intervention or after 8 weeks with surgical treatment.

Various factors contribute to the development of mandibular non-union, including infection, insufficient stabilization of the fracture, poor alignment, fragmented or poorly nourished bone, inadequate soft tissue coverage, and delayed treatment. Additional risk factors encompass the presence of teeth along the fracture line, complex or fragmented fractures, surgeon's limited experience, and patient-related factors such as having an edentulous mandible, tobacco or alcohol use, compromised immune system, diabetes mellitus, or lack of compliance with treatment. The body and angle of the mandible are the mostcommonlyaffected sites of non-union.Management of mandibular non-union typically involves reoperation with debridement of soft tissue and non viable to create healthy bony surface bone followed by stabilization and application of rigid internal fixation with a locking reconstruction plate and immediate bone grafting if necessary[6].

The purpose of presentation of this case report is to introduce case in which surgery was necessitated for non-union occurring after a mandibular fracture and to discuss relevant outcome.

CASE REPORT

A 70-year-old male patient reported to the department of oral and maxillofacial surgery,PGIDS, Rohtak, expressing his discomfort on the left side of face with difficulty in chewing due to disturbed occlusion for the last6 months. He narrated an incident of physical assault a year back, after which he only resorted to painkillers without seeking further

medical treatment. During examination, intraoral mobility was present distal to 37 with overriding of fragments projecting on lingual side with poor oral hygiene. Extraorally,a swelling was observed around the left angle region of mandible which was febrile and tender upon palpation. The patient also had restricted mouth opening with deranged occlusion. Subsequent OPG (Fig.1) radiograph examination revealed a poorly healed bony non-union of the left angle fracture with necrotic bone.

Management

The patient was planned for open reduction and internal fixation under GA after routine PAC workup. On the day of surgery, the surgical site was approach through left submandibular incision and the dissection was done to expose the diseased part that is non union(Fig.2) angle fracture. After debridement the necrotic bone piece was removed and decortication was done followed by freshen up the bony edges. After checking the occlusion both the fragments fixed with 6 hole reconstruction plate (Fig.3). Postoperative (Fig.4) follow-up revealed significant pain relief, and subsequent imaging displayed successful bone healing with the aid of the reconstruction plate.

Fig1. An OPG depicting a nonunion of left angle fracture of mandible with a devitalized fragment present between two fracture fragments.

Fig2.Showing exposure of non-united left angle fracture of mandible through extraoral Risdon incision.

Fig3. Depicting after surgical debridement its fixation with 2.7mm 6hole titanium Reconstruction plate.

Fig4.Postoperative OPG showing satisfactory occlusion along with lower border alignment of left angle fracture of mandible fixed with 2.7mm 6 hole titanium reconstruction plate.

DISCUSSION

In general, fractures of bone heal by a bony union. This is a natural process where bone bridges defects of varying size under conditions of immobilization, direct apposition of bone fragments, and protection from infection. Healing of the mandible is no exception. Depending upon the age of a patient, union of a mandible takes place in about four to eight weeks. Usually this occurs in a child at four weeks; in an adult, at six weeks; and in an elderly person, at eight weeks. If a clinical bony union does not occur within these time periods, then by definition, there is a condition of delayed or nonunion. In most cases delayed fibrous union converts to a bony union with passing of time. When the fractures persist indefinitely without evidence of healing, this then is defined as nonunion[3].

Diagnosis of fibrous union is primarily clinical, involving the identification of mobility at the fracture site. This mobility may cause pain for the patient and can occur with or without infection. In some cases, infection may arise due to a smaller bone fragment becoming detached.Nonunion may persist indefinitely without evidence of bone healing unless surgical treatment is undertaken to repair the fracture. Nonunion is generally characterized by pain and abnormal mobility following treatment. Malocclusion may be present in dentate cases and mobility exists across the fracture line. Radiographs demonstrate no evidence of healing and in later stages show rounding off of the bone ends. Delayed and nonunion occur in about 3% of fractures[7].Cannell and Boyd showed a high incidence of delayed union and nonunion in a group of alcoholic patients[8].

Complications following jaw fracture are common in the mandible due to several factors. It is the only movable bone in the facial region and has less support compared to other facial bones, leading to increased instability post-fracture. Muscle attachments to the mandible may cause displacement despite reduction and fixation. Its position in the oral cavity heightens infection risk, while its comparatively lower blood circulation compared to the maxilla can lead to improper bone integration[4].

The treatment of non-union requires identification of the cause and its treatment. If there is an active infection it must be controlled.Debridement of any necrotic soft and hard tissue and re-stabilization of the fracture must occur. The fragments must be exposed and cleaned of any fibrous tissue. After the fragments have been freshened, the proper occlusal relationship must be re-established by maxillomandibular fixation (MMF). The segments are then stabilized by a reconstruction bone plate (load-bearing fixation), assuring passive placement on the segments.

In this case report, non-union after mandibular fracture led to pain over affected side and restricted mouth opening. An comprehensive surgical debridement under GA followed by reduction and fixation with reconstruction plate led to uneventful healing in postoperative follow ups.

CONCLUSION

Evidence of a non union of mandibular fracture fragments is diagnosed where there is continued mobility of fracture site with presence of eburnation and sclerosis of the bone ends on radiographs. This requires further surgery to freshen the bone and frequently the additional placement of a bone graft with rigid fixation to anchorage bone healing. The vast majority of patients with mandibular fracture can go on to bony union and return to pre morbid form and function very predictably by applying the principles of reduction, stabilization and fixation with modern titanium plates and screws.

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