

Decision-Making in Treatment of Mandibular Fracture - Case Report

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Abstract: Mandible is a part of maxillofacial skeleton that is the second most often fracture due to its position and prominent shape. The location and pattern of the fracture is determined by the mechanism of the injury and the direction of the trauma force vector. In addition, the age of the patient, the presence or absence of teeth, and the causes of trauma also have a direct effect on the characteristics of the fracture. A 26-year-old man complains about pain and difficulty moving of his jaw after falling from motorcycle. 3D head CT scan showed close fracture in the right-left alveolar mentalis of mandible classified as symphysis fracture. Initial treatment is stabilization of airway, breathing and circulation. Decision-making of fracture management is classified according to the location of malocclusion. As a symphysis fracture, the correct handling is Open Reduction and Internal Fixation (ORIF). The materials used in open repositioning are wire, wire mesh, titanium mini plate and screw. A post-surgical examination showed a good result without any complication.

1. Background

The mandible is the lower jaw bone in humans as a place of attachment to the lower jaw teeth. The loss of continuity in the mandible includes 40% - 62% of all facial fractures. According to a survey at the District of Columbia Hospital, of 540 fracture cases, 69% of cases occurred due to physical violence (fights), 27% due to traffic accidents, 12% due to work accidents, 2% due to sports accidents and 4% due to pathology.^{1,2} The gold standard of diagnosing mandibular fractures is by clinical examination including radiography for therapeutic planning. In particular, treatment of mandibular and facial fractures on the face (maxillofacial) was introduced by Hippocrates (460-375 BC) using occlusion guidance (the ideal relationship between the lower teeth and maxillary teeth), as a rationale and diagnosis of mandibular fractures.^{1,2}

The initial stages of mandibular fracture handling are emergencies, such as airway, breathing, blood circulation including handling of the circulation, temporary immobilization, and evaluation of possible brain injury. The next step is definitive fracture handling, namely reduction / repositioning of fracture fragments in closed (close reduction) and open (open reduction), followed by fixation techniques such as the use of head bands. This principle must be applied to mandibular fractures in order to restore normal stomatognathic function as early as possible. This case report aims to determine the management of mandibular fractures with Open Reduction and Internal Fixation (ORIF) using miniplate.^{1,2}

2. Case Report

A 26-year-old man came to Hospital Emergency Room (08/07/2018) with chief complaints of pain and difficulty of moving his jaw after falling while riding a motorcycle ±20 minutes before entering the hospital ER. According to witnesses, the patient drove at low speed, did not wear a helmet and fell down with the chin hit the asphalt first, then rolled over. Complaints of fainting, dizziness, tingling, nausea and vomiting are denied. In the primary survey, there was a free airway and spontaneous breathing. The patient's circulation is in the form of vital signs, namely blood

pressure 120/80 mmHg, pulse 108 times per minute, axillary temperature 36°C, respiration rate 22 times per minute and patient disability alert. In the secondary survey, GCS 15 (E4V5M6) with a general status is within normal limits.



Figure 1: Patient's Mandible before operation (deformity & malocclusion)

Local status in the mandibular region of the patient was seen to be torn 5cm in length with active bleeding, deformity and malocclusion. Palpation, tenderness and crepitation is obtained. Trying to move, get limited movement due to pain. There is no trauma in other areas of the patient. Supported examination in the form of a 3D head CT scan with the impression of fracture in the right-left alveolar mentalis.

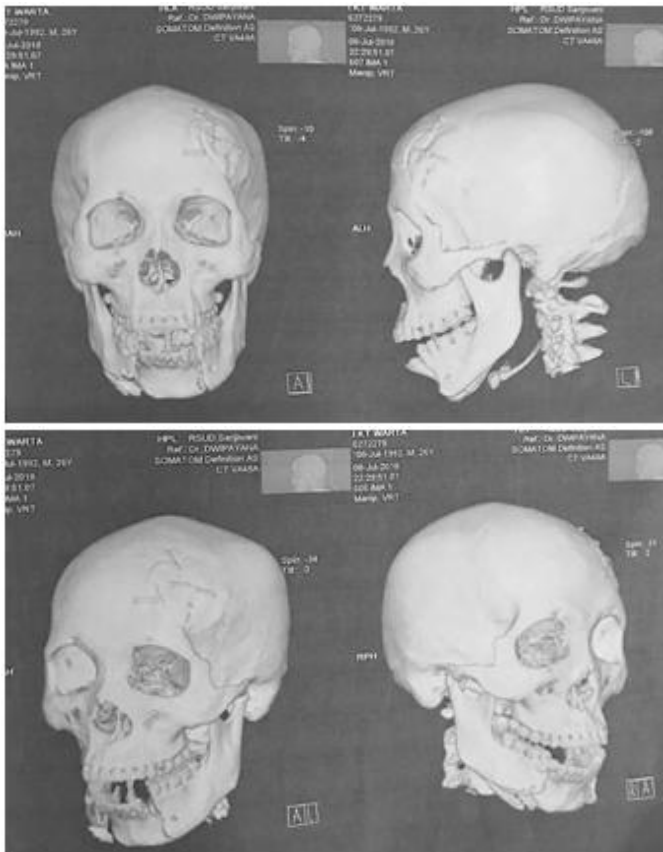


Figure 2: Patient's 3D Head CT-Scan (Segmental fracture in the right-left alveolar mentalis)

Based on history, physical examination and investigations, patients are diagnosed with segmental closed fractures of the mandible region. Initial treatment in the Hospital Emergency Room are airway stabilization, breathing, circulation with normal saline intravenous line 20 drops / minute. Then treatment and suturing of the wound situation under local anesthesia are carried out, then fracture fixation with head bandage installation. Patients were given intravenous Paracetamol analgesic therapy at a dose of 1 gram every 8 hours and intravenous Ceftriaxone prophylactic antibiotics at a dose of 2 grams every 24 hours. In this case, Open Reduction and Internal Fixation (ORIF) was performed using miniplate under general anesthesia.

3. Discussion

Diagnosis of upright mandible fractures based on history, physical examination and investigations. The mechanism of trauma and the time of occurrence is important information so that it can describe the type of fracture that occurs. The patient experiences trauma with the chin striking the asphalt first, then rolling over. If the history of trauma is doubtful or absent, then the possibility of a pathological fracture needs to be considered. After a physical examination of the patient, there was deformity and edema in the mandibular region. On palpation, tenderness and crepitation are obtained. The range of movement is limited due to pain. The clinical sign strengthens the suspicion of mandibular fracture so that the next step is a supporting examination in the form of a CT-3D head scan to make the diagnosis. A CT scan showed the location of the fracture in the right-left mandibular mentalis corresponding to the symphysis fracture classification,

which is a fracture that occurs in the middle incisor that runs from the alveolar through the inferior border of the mandible.^{2,3}

Decision Making Algorithm

History and clinical examination

- trauma, pain, edema, paresthesia
- malocclusion, deformity, unstable

Laboratory/X-Ray/CT-Scan

Mandible Fracture

Good Occlusion

- Non-Displaced

- Stable

Soft Diet

Malocclusion

Location

Condyles, Ramus

Close Reduction + Arch bar

Condyles, Ramus, Symphysis, Corpus, Angulus

Open Reduction

Wire

Plate

Figure 3: Decision-Making Algorithm in Treatment of Mandible Fracture

Based on the decision-making algorithm, if it is classified as a Symphysis fracture, the correct handling is open reduction (ORIF). Before performing surgery, an explanation is given to the patient and his family regarding the surgery to be performed and the risk of surgical complications. Fasting patients at least 6 hours before surgery.⁴

The surgery is then performed after the patient is anesthetized publicly. In this patient an intra-oral incision is performed, the mandibular region is achieved through a vestibular incision in the mucosa. The materials used in open repositioning are wire, wire mesh, titanium mini plate and screw.^{7,8}



Figure 4: Intra-oral incision



Figure 5: Mini Plate installation

Wire installed before the incision. The wire made like an eye, then the eye is placed around two teeth or molars in the upper or lower jaw. The broken lower jaw is fixed in the upper jaw through the eyes in the upper and lower wire. If necessary this wire bond is installed in various places to obtain strong fixation. Then a vestibular incision is made on the mucosa. After that, plating (mounting plate) is done to give the prisoner the fracture area, so that it can unite the fracture with the superior alveoli.⁴

After installing the plate, maxillary fixation is no longer needed. Mounting the screw to the plate not too strong, because with the installation of a screw that is too strong will cause trouble during release, therefore, installation with a less stressful technique is preferred in the mounting of the plate to the mandible fracture. If the fixation has not failed and continues to provide stabilization of the fracture, the plates and screws are left in place.^{1,4,5}

A radiological examination repeated after complete the surgery to confirm the fixation condition, besides the most important thing to note is the risk of postoperative complications. Complications after repair of a mandibular fracture are generally rare. The most common complication of mandibular fractures is infection or osteomyelitis, which can later cause various other possible complications. Postoperative X-Ray results in patients showed good internal fixation and no signs of osteomyelitis.^{4,5}



Figure 6: Post-Operative X-Ray

4. Conclusion

Loss of continuity in the mandible caused by trauma to the face or pathological conditions, can be fatal if not treated properly. The principle of handling mandibular fractures in the initial step is emergency. Furthermore, fractures are handled definitively through reduction / repositioning of fracture fragments in a closed (close reduction) or open (open reduction) aiming to restore normal stomatognathic function as early as possible. The choice of open reduction must be based on the decision-making algorithm, with the use of materials including wire, wire mesh, plate and screw. Postoperative evaluation is very important to determine the condition of fixation and possible complications.

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