Extracorporeal Fixation of Displaced Mandibular Condylar Fracture : Viable Option

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Abstract

Background: To present a series of eighteen cases of displaced mandibular condylar fracture managed by extra-corporeal fixation. To evaluate the post operative results in terms of occlusal stability, temporomandibular joint function and radiological findings. **Methods:** A series of 18 cases were treated with extra corporeal fixation with mini plate and screws for displaced mandibular condylar fracture. Ramus was exposed through sub mandibular approach. A wire was passed through the angle of mandible to pull the mandible inferiorly. The displaced condyle was retrieved. A suitable bone plate was fixed to the condylar segment and it was repositioned and stabilized with screw with the distal segment. In three cases vertical sub-sigmoid osteotomy was carried out to retrieve the condylar head. After assembling the osteotomised segment and condylar segment, it was repositioned and stabilised in predetermined position. Post operatively the patients were on inter maxillary fixation for a week followed by active physiotherapy. **Result:** The follow up period was between 2-11 years. In nine cases occlusion and mandibular function was good. There was no resorption of the condylar head. One case had complete resorption of the condylar head. Other case had fracture of the bone plate. **Conclusion:** Extracorporeal fixation is an effective method for management of displaced and dislocated condylar fracture.

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Key Words : Extracorporeal fixation; Condylar fracture

Introduction

Though the incidence of condylar fracture is as high as 30%, the management is always controversial [1]. Essentially there are three modalities of treatment, observation, closed reduction with inter maxillary fixation and open reduction with internal fixation. Following the displacement of condylar fragment the ramus of mandible is telescoped into the glenoid fossa. Hence even in case of open reduction, it is difficult to locate and manipulate the displaced fragment in most cases. The second problem is to hold it in reduced position and fixation due to its proximity to important anatomical structures.

We have managed 18 cases of displaced mandibular condylar fracture by extracorporeal fixation. In fifteen cases the condylar fragment was removed and fixed with bone plate and screws and repositioned in the glenoid fossa and fixed with ramal fragment with two screws. In three cases sub sigmoid osteotomy was carried out to retrieve the condylar fragment.

The follow up period was 2 to 11 years. In our series of 18 cases we observed that extracorporeal fixation carries low morbidity with satisfactory occlusal stability and functional benefit.

Material and Methods

Thirteen cases reported to our hospital following road traffic accident and five cases were referred to our hospital following failure of closed reduction (Table 1). All the cases had multiple mandibular fractures. Four cases had bilateral displaced condylar fracture (Fig. 2).

The mandibular ramus was exposed by submandibular approach. A wire was passed through the angle of mandible and ramus was pulled inferiorly. In 15 cases the condylar fragment was visualized but could not be mobilized. It was held with a curved Kocher's forceps. The lateral pterygoid muscle was detached and condylar fragment freed. A four hole mini plate was fixed to the lateral aspect of condylar fragment with two screws. The fragment was repositioned and fixed to ramus with two screws while maintaining the IMF.

In three cases where the condylar fragment could not be visualized, vertical subsigmoid osteotomy was carried out. Before the completion of osteotomy a four hole bone plate was fixed and the position determined. The posterior part of vertical ramus was removed and the condylar fragment retrieved. Both the fragments were held manually in reduced position and stabilised with four hole bone plate and screws (Figs. 3,4). The assembled fragments replaced in situ and fixed to the distal segment in predetermined position (Fig. 5). The surgical wound was closed in multiple layers.

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Fig. 1 : Pre operative occlusion

Fig. 2 : Pre operative CT Scan

Fig. 3 : Subsigmoid osteotomy with Extracorporeal Fixation

Fig. 4 : Subsigmoid osteotomy with extracorporeal fixation Fig. 5 : Fixation with Ramus

Fig. 6 : Post operative radiograph

Fig. 7 : Post operative Occlusion

In all the cases inter maxillary fixation (IMF) was maintained for one week which was followed by active jaw exercise.

Results

The follow up period was from 2 to 11 years. In one case which was followed for 11 years, complete resorptions of both the condyles were noticed though the occlusion and jaw movements were satisfactory. In other case, bone plate was fractured through the screw hole but the healing was satisfactory. In all the cases, the occlusion was stable and jaw movements were satisfactory.

Discussion

The indications for open reduction are extracapsular displacement of condyle, displacement into cranial fossa, presence of foreign body and failure of closed reduction

[2,3]. In our series of 18 cases, 13 cases have reported to us following road traffic accidents (RTA). The remaining five cases were referred to us following failure of closed reduction by IMF for 4-8 weeks. The patients had persistent open bite and mouth opening was restricted to 8 -11mm. In all the cases the condylar fragment was displaced antero-medially into the pterygo mandibular space. During surgical manipulation the displaced segment could not be manipulated and reduced, hence extracorporeal fixation was carried out.

The criteria for evaluation of surgical outcome are described by Walkar et al [4]. We included three broad criteria for post operative evaluation following extracorporeal fixation, occlusal stability,

Table 1**Patients database**

Age (Years)	Mode of Injury	Diagnosis	Mean time between injury and surgery	Follow up	Remarks
24	RTA	B/L condylar fracture	02 days	02 years	Healing satisfactory
36	RTA	Rt condylar fracture	04 days	02 years and 03 months	Healing satisfactory
20	RTA	B/L condylar fracture	01 month	01 years and 06 months	Healing satisfactory
18	RTA	Rt condylar fracture	10 days	03 years	Healing satisfactory
06	Sports	Rt condyle with Lt parasymphysis fracture	07 days	02 years and 08 months	Healing satisfactory
22	RTA	Rt condylar fracture	01 day	02 years	Healing satisfactory
30	Assault	B/L condylar fracture	04 days	11 years	Resorption of both condyles
09	RTA	Lt condylar fracture	01 month 15 days	02 years 08 months	Healing satisfactory
19	Sports	Rt condylar fracture	07 days	02 years 02 months	Healing satisfactory
15	RTA	Rt condylar fracture	01 days	02 years	Healing satisfactory
32	RTA	B/L condylar fracture	02 days	02 years 05 months	Healing satisfactory
28	Sports (Boxing)	Rt condyle with Lt body fracture	43 days	01 years 06 months	Healing satisfactory
26	RTA	Lt condylar fracture	05 days	02 years 02 months	Healing satisfactory
27	RTA	Lt condylar fracture	13 days	02 years	Healing satisfactory
23	RTA	Rt condyle with Lt parasymphysis fracture	38 days	01 years 08 months	Healing satisfactory
29	RTA	Lt condylar fracture	04 days	03 years	Healing satisfactory
32	RTA	Lt condylar fracture	11 days	01 years and 05 months	Bone plate fractured
33	RTA	Rt condylar fracture	06 days	03 years	Healing satisfactory

temporomandibular joint (TMJ) functions and six monthly radiographic evaluations (Fig. 6). Post operative follow up lasted from 2 to 11 years. Two cases had minor occlusal discrepancy which was corrected by light occlusal traction for one week. All the 18 cases had satisfactory occlusion (Fig.7). Our cases were subjected to physiotherapy one week post operatively. After six months the mouth opening was between 35-43 mm and the mandibular movements like protrusion, retrusion and lateral excursion were satisfactory.

Boyne et al [5] reported slight resorption leading to flattening of condyle in a follow up period of two years. Since the condyle is used as a free graft, the possibilities of resorption and avascular necrosis are always there [6]. One case during 11 years follow up had complete resorption of the condylar head but occlusion was stable.

Hence we feel the option for extracorporeal fixation should be taken only when the other options fail. It is a difficult but viable option in cases of displaced condylar fragment.

Conflicts of Interest

None identified

Intellectual Contribution of Authors

Study Concept : Col NK Sahoo

Drafting & Manuscript Revision : Col NK Sahoo, Maj V Gupta

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