Condylar Segment Removal in the Management of Diacapitular Mandibular Fractures

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Abstract

Introduction Contemporary opinion strongly concurs that isolated intracapsular fractures, in almost every instance, should be treated solely with physical therapy. Based on the premise that although these fractures can result in significant anatomic/radiologic changes in the appearance of the condyle itself, most patients with these fractures recover very well if adequately rehabilitated. However, in our study four cases of high condylar head (diacapitular) fractures were managed by surgically removing the fractured condylar head as it was obstructing mandibular function.

Materials and Methods The retrospective analytical study was carried out at the Division of Oral & Maxillofacial Surgery, Department of Dental Surgery, INHS Kalyani, Vishakhapatnam from Jul 2008 to Aug 2010. Patients who were clinically and radiologically diagnosed with high condylar head/neck fracture who did not respond to conservative management of active mouth opening exercises even after 2–3 weeks of physiotherapy and continued to have no improvement in mouth opening although the occlusion was stable were included in this study. The fractured condylar head was surgically removed and function restored.

Results A total of four cases, four males with high condylar head fractures were taken up for removal of the

fractured condylar segment. In all cases satisfactory mouth opening was achieved intraoperatively. One case presented with troublesome intraoperative bleed.

Discussion The decision influencing open reduction and internal fixation versus closed reduction is based on the ability to restore function and esthetics. There are strong recommendations for conservatively managing the so called intracapsular or Neff's fractures. However, if the fracture segment is small and yet is causing restriction in mouth opening and inability to achieve desired occlusion we recommend removal of the fractured condylar segment. In this procedure the proximal segment is removed surgically and mouth opening is assessed. The occlusal discrepancy if any is managed subsequently using elastic traction on previously placed arch bars.

Conclusion In our experience in those cases where the mouth opening continues to be restricted even after physiotherapy and a radiologically wedged segment is observed, removal of the fractured condylar segment to achieve mouth opening and subsequently managing the occlusion may prove to be beneficial to the patient.

Keywords Intracapsular · Diacapitular · Mouth opening · Conservative management

Introduction

Condylar region fractures constitute a large number of mandible fractures. Due to the unique shape of the mandible and the complex nature of the temporomandibular joints, these fractures can result in marked discomfort, dysfunction, and deformity if not diagnosed and managed correctly. Also, these fractures may be associated with other injuries that by themselves have significant morbidity

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e.g., facial nerve injuries, cervical spine injuries, middle cranial fossa injuries and injuries to the external auditory canal [1]. A thorough understanding of the anatomy and physiology of the stomatognathic system is therefore essential in understanding and managing fractures of the condylar region as the clinical presentation of condylar/subcondylar injuries may either be very obvious or quite subtle. An awareness of the mechanism of potential injury, as well as the specific signs and symptoms that should raise the index of suspicion is helpful to the clinician.

The contemporary medical opinion strongly agrees that isolated intracapsular fractures, in almost every instance, should be treated solely with physical therapy [2, 3] which is based on the premise that although these fractures can result in significant anatomic and radiologic changes in the appearance of the condyle itself, most patients with these injuries tend to do well if correctly rehabilitated. However, conservative management requires prolonged periods of intermaxillary fixation and the results may be less than ideal in some cases [4, 5, 10]. In our study four cases of condylar head fractures were managed by removing the fractured condylar head as it was restricting the mouth opening despite attempts to conservatively achieve function.

Aim

To evaluate the efficacy of surgical removal of the condylar segment to achieve function in the management of condylar head fractures.

Materials and Methods

The retrospective analytical study was carried out at the Division of Oral & Maxillofacial Surgery, Dental Centre, INHS Kalyani, Eastern Naval Command, Vishakhapatnam, (AP) India from Jul 2008 to Jan 2011. Patients were selected from those reporting with craniofacial trauma to the OPD of Division of Oral & Maxillofacial Surgery, Department of Dental Surgery, INHS Kalyani, Vishakhapatnam, (AP) India. The selection criteria included those patients who were radiologically diagnosed with condylar head fracture which did not respond to conservative management of active mouth opening exercises. Those patients who after 3 weeks of physiotherapy continued to have no improvement in mouth opening although the occlusion was stable in some cases were included in this study.

Thorough preoperative assessment including routine hematological and urine investigations was carried out for all patients in the preparation for surgery under general anesthesia (nasotracheal intubation). Following part preparation using strict aseptic protocol, Hind's approach

was used to gain access to the fractured condylar segment. 2 ml of 1:200,000 adrenaline solution was infiltrated under the marked incision after having positioned the patients head facing in the opposite direction. Incision placed and blunt dissection was done to expose the posterior border of the mandible. Periosteum was incised and subperiosteal dissection was done to approach the condylar region. The fractured condylar head was located antero-medial to the ramus of the mandible in the infratemporal fossa by palpation using the index finger. The operating table was positioned at a higher level. A Langenback's elevator was placed under the ramus of the mandible, the mandible was retracted superiorly and simultaneously downwards using a wire cable through a hole drilled at the angle of the mandible. Using a suitable light source the fractured condylar head segment was visualized and held using a Kocher clamp. The fractured condylar head segment was freed from the muscular and capsular attachment and removed. Mouth opening verified. Hemostasis achieved. Suction drain inserted, incision closed in layers and pressure dressing done.

Postoperatively Inj Ampicillin 500 mg iv 8 hours, Inj Metronidazole 500 mg iv 8 hours, Inj Dexamethasone 4 mg iv 12 hours tapered over 4 days, Inj Pentazocine 30 mg im 12 hours for 1 day, Inj Ondencetron 4 mg iv 12 hours for 1 day, Tablet Ibuprofen 400 mg + Tablet Paracetamol 325 mg tid from second day for 5 days and Tablet Chymotrypsin 200,000 AU tid for 5 days were prescribed. The patients were reviewed clinically daily for the next 5 days, drain removed on the second to third post operative day. Active mouth opening exercises were started on the second to third post operative day. Where indicated class I elastics on previously placed arch bars were used to guide the teeth in occlusion. Patients were discharged with home care instructions and subsequently reviewed at four to six weeks recall visit. One case was followed up for 1 year and one case for 6 months. Two cases were lost to follow up after the 6 weeks post operative review.

Results

A total of four cases, all males (Table 1) in an age range of 24–44 years (mean age 32 years) with condylar head fracture which continued to present with restricted mouth opening 2–3 weeks post trauma despite having been put on active mouth opening exercises were taken up for removal of the fractured condylar segment (Fig. 1). All cases had sustained injury in an alleged road traffic accident and had been clinically and radiologically diagnosed as condylar head fractures. Based on the clinical finding of a definite stop resulting in restricted mouth opening and an antero-medial position of the displaced fractured condylar head segment radiologically (Fig. 2), the decision to remove the

Table 1 Characteristics of the patients in the study group

S. no.	Name	Age/gender	Side involved	Concomitant maxillofacial injuries	Complications
1	DC Sharma	26/M	Left	# Parasymphysis (R)	Intraoperative hemorrhage
2	Appala Rao	24/M	Right	None	None
3	Govind Kumar	44/M	Left	None	Smaller segment abandoned
4	SM Rao	34/M	Left	# Parasymphysis (R)	Postoperative deviation on opening

Fig. 1 Restricted mouth opening

wedged segment was taken approximately 3 weeks after the injury (Fig. 3). Two cases had concomitant fracture of the contralateral mandibular parasymphysis region which was reduced and fixed prior to exploration of the condylar region. In all cases satisfactory mouth opening was achieved intraoperatively. Suction drain was placed in two cases post operatively as the hemostasis achieved was not very satisfactory.

In one case problematic intraoperative hemorrhage was encountered while dissecting out the fractured displaced condylar segment. The hemorrhage was controlled by pressure packing intraoperatively and the fractured condylar head segment removed; however, the patient developed a hematoma on the second postoperative day which

Fig. 2 CT showing wedged fractured segment **Fig. 3** Removed condylar segment

was evacuated under general anesthesia. Thereafter the recovery was uneventful (Table 1).

In one case the fractured condylar head segment was more than one piece (Fig. 5). The large fragments were removed intraoperatively resulting in satisfactory mouth opening; however, the smaller fragments were abandoned due to difficulty in location and exploration (Fig. 6, Table 1). The patient initially complained of mild pain for about six months and later changed to clicking in the involved side. The symptoms resolved spontaneously after a year.

In one case the patient developed a tendency to severe deviation of the mandible to the involved side while opening

Fig. 4 Post operative mouth opening

Fig. 5 CT showing comminuted fractured segment

Fig. 6 Multiple fractured segments removed

the mouth. Guiding elastics placed on arch bars could rectify the condition within 1 week. In all cases centric and excursive mouth opening and occlusion was satisfactory within 2–3 weeks post operatively (Fig. 4, Table 1).

Discussion

In the recent past with the general increase in maxillofacial trauma there has been an increase in the number of fractures of the condylar region of the mandible which have been managed either conservatively or surgically primarily based on the established norms. Although, there are strong recommendations for conservatively managing the so called intracapsular or Neff's fracture's [6], contemporary opinion at least in the case of subcondylar fracture suggests equivocal benefits of ORIF which also appears to be

affording the advantage of an anatomical reduction of the fractured segment, immediate active mouth opening, mastication and early rehabilitation. In the recent past there has been a change in the nomenclature of fractures of the condylar head. Previously these fractures were designated as intracapsular fractures [7] however, it was realized that in large number of condylar head fractures, that the fracture extended outside and inferior to the capsule on the medial aspect on to the condylar neck. Therefore, prompting a more appropriate nomenclature of diacapsular fracture [7].

The decision influencing open reduction and internal fixation versus closed reduction is based on the ability to restore function and esthetics. Absolute indications for ORIF in cases of condylar region/subcondylar injury are, firstly, limitation of function secondary to the following: (i) fracture into middle cranial fossa (ii) foreign body within the joint capsule (iii) lateral extracapsular dislocation of condylar head (iv) other fracture dislocations in which a mechanical stop is present on opening, which is confirmed radiographically. Secondly, inability to bring the teeth into occlusion for closed reduction [8]. The goals here are the restoration of both normal range of motion and a stable occlusion. Whether the fracture must be fixed and how stable that fixation should be have been debated much in the past [9]. But in the case of condylar or very high subcondylar fractures, it has been strongly advocated that these so called intracapsular fractures be managed conservatively [8]. However if the fracture segment is small and yet is causing restriction in mouth opening and inability to achieve desired occlusion we recommend removal of the fractured condylar segment. In this procedure the proximal segment is removed surgically and mouth opening is assessed. The occlusal discrepancy if any is managed subsequently using elastic traction on previously placed arch bars. The patient participates in post operative physiotherapy for achieving full range of mandibular motion and also trains to correct the deviation for which preoperative counseling is recommended. Conventionally it would have been recommended to complete the four to six weeks of conservative management and then consider the surgical options to cater for the restricted mouth opening secondary to TMJ ankylosis warranting a condylectomy resulting in a greater than existing reduction of ramal length thus risking a derangement of occlusion. Also the fact that conservative management does not guarantee a favorable result in all cases [10] indicates an early intervention in specific cases.

Conclusion

The collective experience of the many surgeons based on the diagnostic and surgical facilities and trends in the past

has strongly advocated closed management for intracapsular fractures. However, in our experience in those cases where the mouth opening continues to be restricted even after physiotherapy and a radiologically wedged condylar segment is observed, removal of the fractured condylar segment to achieve mouth opening and subsequently managing the occlusion may prove to be beneficial to the patient.

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