



Retromandibular anteroparotid approach for mandibular condylar fracture

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ABSTRACT

The aim of this study was to present and review retromandibular anteroparotid approach and to evaluate its efficacy and safety in reduction and fixation of subcondylar fractures.

Materials and Methods: In the period between January 2013 to February 2014, 10 patients with the age range of 17 to 41 years with a diagnosis of subcondylar fracture at Sina General Hospital, Iran, underwent open treatment of subcondylar fractures by retromandibular anteroparotid transmasseteric approach.

Results: Occlusion status was evaluated by observing the dental contact by articulating paper and also as subjective by the patient, all patients had proper occlusion. 4 cases (40%) at the end of the first week after surgery complained of joint pain during the touch, at last follow-up, none of the patients had tenderness. All patients were normal at 6 months after surgical treatment in terms of mouth opening. Facial nerve was maintained in all patients except only one case (10%) that weakness was observed in buccal branch of the facial nerve after surgery which was resolved completely after the 6-month follow-up and had returned to normal status. Also, there were no signs of complications of salivary glands, such as salivary fistula, sialocele or postoperative infection. Scars caused by surgical incision were barely recognizable in patients..

Conclusion: Due to results of this paper, rigid fixation of subcondylar fractures can be performed best with transmasseteric anteroparotid method causing least complications and optimum results.

Key words: Mandibular condyle, Mandibular fractures.

Introduction

Condyle region in maxillofacial is the most common site of fracture constituting 25-50 percent of facial fractures. Failure to diagnose or inappropriate treatment of condylar fractures can lead to severe functional deficiencies, improper occlusion, limited mouth opening along with jaw deviation and restricted lateral movement [1,2]. These fractures can be either unilateral or bilateral or along with other areas of mandibular fractures as well as other facial bones [3,4]. Subcondylar fracture treatments have been debated for a long time and have been a major challenge in maxillofacial fractures.

Earlier discussions were mainly on the closed treatment like maxillomandibular fixation (MMF), although achieving anatomic reduction is very hard in this way [5,6], but today the general consensus is on the open reduction and internal fixation, especially concerning bilateral or unilateral fractures with major dislocation [4,5].

At present, several methods have been proposed for open treatment of subcondylar fractures, which are generally divided into two categories, intra- and extra-oral [5,7,8]. Intraoral method is performed as endoscope-assisted. Submandibular, retromandibular transparotid/anteparotid, periauricular and face lift approach are extraoral methods. The aim of this study was to present and review retromandibular anteroparotid approach and to evaluate its efficacy and safety in reduction and fixation of subcondylar fractures and also 10 cases with condylar fracture have been reported.

Material and Methods

This study is conducted in full accordance with ethical principles, including the WMA Declaration of Helsinki-Ethical Principles for Medical Research Involving Human Subjects (2008) and was registered in Tehran University of Medical sciences committee of ethics with the code of 32131. In the period between January 2013 to February 2014, 10 patients (9 males and 1 female) with the age range of 17 to 41 years (mean age 29.5 years) with a diagnosis of subcondylar fracture at Sina General Hospital, Iran, underwent open treatment of subcondylar fractures by retromandibular anteroparotid transmasseteric approach. 4 patients had bilateral fractures and the rest were with unilateral fracture (5 with fracture on the right side and 1 with fracture on the left) (Table 1). The patients were evaluated at 1 week, 2 weeks, 1 month and 6 months after treatment for occlusion, facial nerve damage, complications of salivary gland, infection and scarring at the incision site. Panoramic and Mandibular PA radiographs were taken immediately after treatment and at long-term follow-up (6 months after initial treatment) to check the status of fracture fixation and reduction. In patients with bilateral fractures, only one side was under ORIF, and the other side was left untreated. Informed consent was received from all patients for surgery and the patients were aware of all possible complications.

Surgical Procedure

All patients underwent surgery with general anesthesia. Fracture line and other anatomical areas surrounding were identified on the skin using marker. Also, incision line was marked with a length of 25 mm about 1 cm behind the posterior border of the ramus and parallel with ramus of mandible slightly below

the ear lobule. Then, lidocaine with epinephrine was injected into soft tissue of retromandibular areas and around the fracture line to obtain better hemostasis. The skin was incised over superficial muscular aponeurotic system. Then dissection was carried out along the anterior superior in order to expose masseter muscle fiber. Blunt dissection was performed after observing masseter muscle fiber parallel to the facial nerve branches toward mandibular ramus.

The main internal trunk of facial nerve and posterior trunk of the mandible are divided into two upper temporozygomatic and lower buccocervical branches. dissection was carried out anterior of parotid gland in the space between the upper and lower facial branches or between two buccal and marginal mandibular branches over mandibular ramus. After that, dissection was continued as completely secure through masseter muscle fibers, which is deeper than facial nerve. Then, the periosteum was elevated to observe the bone and fracture area was detected and exposed. To facilitate exposure of condylar broken pieces and movement toward the buccal, distal part can be pulled down from inside of the mouth with pressure in the molar teeth and broken pieces can be dislocated using periosteal elevator. After reduction of condylar segment, the teeth were placed in IMF in proper occlusion, and then fixation is carried out using two indented 4-hole plates. Finally, the area was rinsed plentiful, and the incisions were sutured in two layers. No drain was used in any of the cases.

Results

All patients were followed postoperatively at 1 and 2 weeks, 1 and 6 months. To check the status of plates and the quality of reduction, radiographs were taken for all patients once immediately after surgery and once in the last follow-up; in all cases, fracture reduction was observed adequately and the plates were placed in the correct location (Figure 1 and 2). Occlusion status was evaluated by observing the dental contact by articulating paper and also as subjective by the patient. At the end of the first week after surgery, all patients except 2 cases had similar preoperative occlusion. Light elastic therapy was carried out for these patients for a week and all patients had proper occlusion in next visits. 4 cases (40%) at the end of the first week after surgery complained of joint pain during the touch, which was reduced gradually in subsequent

meetings; at last follow-up, none of the patients had tenderness. After a month, three of the patients (30%) had still slight restrictions in the mouth opening that were referred to physiotherapist. All patients were normal at 6 months after surgical treatment in terms of mouth opening. Only in one patient who had bilateral fractures, mandibular deviation towards joint treated as closed was found. Facial nerve was maintained in all patients who were able to perform normal function of facial movements, except only one case (10%) that weakness was observed in buccal branch of the facial nerve after surgery which was resolved completely af-

ter the 6-month follow-up and had returned to normal status. Also, there were no signs of complications of salivary glands, such as salivary fistula, sialocele or postoperative infection. Scars caused by surgical incision were barely recognizable in patients (Table 2).

Case No.	Age	Sex	Fracture side	associated Mandibular fractures
1	34	M	Bilateral	Lts parasymphysis
2	24	M	Left side	Symphysis
3	26	M	Bilateral	Rts parasymphysis
4	32	M	Right side	Lts parasymphysis
5	29	M	Right side	
6	30	M	Bilateral	Bilat parasymphysis
7	17	F	Right side	
8	28	M	Right side	Symphysis
9	34	M	Right side	Lts parasymphysis
10	41	M	Bilateral	Lts parasymphysis

Table 1. Patients and mandibular fractures demographic information.

Complications	Time interval after operation		
	1 week	1 month	6 month
<i>TMJ function</i>			
MIO < 37mm	3	3	0
Occlusal stability	2	0	0
Tenderness	4	2	0
<i>Salivary gland</i>			
Salivary fistula	0	0	0
Silocele	0	0	0
Infection	0	0	0
<i>Facial nerve</i>			
Complete paralysis	0	0	0
Weakness	1	1	0
<i>Radiographic evaluation</i>			
Plate fracture/displacement	0		0
Lesion around screws	0		0

Table 2. Patients postoperative complications.



Figure 1. Post operative panoramic radiograph.

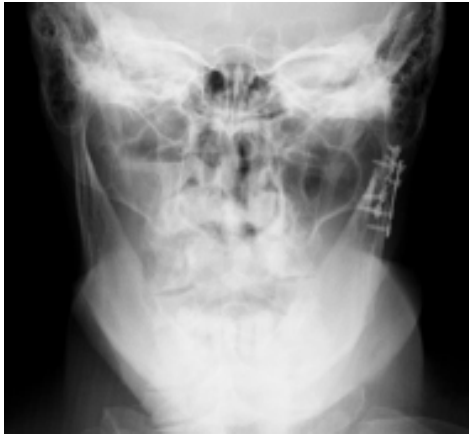


Figure 2. Post operative Reverse town radiograph.

Discussion

Condylar damage is controversial subject than other issues related to the maxillofacial trauma. Because in many cases, even though a good early clinical result is obtained, delay serious complications such as pain, limited mandibular movement, muscle spasms, malocclusion, pathological changes in TMJ, osteonecrosis, asymmetry and ankylosis can occur despite treatment or no treatment [9-12]. Closed treatment has been historically standard for subcondylar fractures, because it was thought that this method has fewer side effects and aesthetically and functionally the same results [13]. But currently, a growing number of studies show better results in terms of occlusion, bone morphology and TMJ function for condylar fracture operated [14-18]. Submandibular incision is selected approach for fractures of the mandibular body and angle regions, but provides limited access to middle and upper condylar fractures and ramus, which could affect the fixation [19]. Biglioli and Colletti described incision in the posterior mandibular angle extended up to 20 mm. This approach provides good access to the condylar region, but not adequate exposure in the ramus area [20]. Preauricular and postauricular incisions are the appropri-

ate approaches to access high level intracapsular and subcondylar fractures [21]. This study was performed to evaluate the retromandibular transmasseteric anteroparotid approach since in spite of the large amount of articles in the field of fractures condylar ORIF, no adequate studies have been conducted on this approach. Retromandibular approach was first described in 1967 by Hinds and Girotti and then was amended in 1978 by Koberg and Momma [22,23].

Surgical Complications

Damages to branches of facial nerve are one of the complications that occur frequently in the extraoral approach. In the present study, only one (10%) case of temporary facial nerve damage was seen which completely resolved in subsequent follow-ups. Temporary nerve damage is usually because of entering pressure into the branches of the facial nerve during access to mandibular ramus which creates a transient neurapraxia, and resolves with time [24]. Temporary nerve damages have been reported between 0% and 8% by other researchers who had used the transmasseteric anteroparotid method [19,25,26], and it has been obtained between 12% and 48% for retromandibular transparotid approach. No facial nerve damage was observed in this work or in any other studies. Due to the proximity of the surgical site to the parotid glands, there are risks of complications associated with salivary glands, such as salivary fistula and sialoceles. In this technique, because access takes place from anterior of salivary gland and does not exceed the parenchyma, so the probability of these lesions should be less. Results of present study are the same direction. None of the patients in the early or long-term follow-ups showed any lesions of the salivary glands. Salivary fistula has not been observed in other studies that used the anteroparotid method [19,20,25]. The salivary fistula rate was between 2.3 and 11.4% by transparotid, but all were resolved with conservative treatment after a few weeks [3, 27-29]. No other salivary gland damages such as sialoceles and Frey syndrome, except 1 sialocele, were obtained in retromandibular transparotid approach [28]. Also, no infection was observed in any of the patients probably because of the rich blood supply in maxillofacial area as well as prophylactic administration of antibiotics.

Remarkable scar is one of the factors leading to patient dissatisfaction in spite of proper reduction and

function in TMJ. The skin incision is limited to a small 2.5 cm incision that is barely noticeable. In this study, no remarkable scar was observed unlike the study of Manisali M. with a similar approach that only two of the patients complained about hypertrophic and hyperpigmented scars [28]. Other researchers have not also mentioned the substantial cases [19,20,25,29].

Conclusion

In the present study, retromandibular incision by transmasseteric anteroparotid approach was used for the treatment of condylar fractures. Given that this method can be used in high and low levels subcondylar fractures as well as ramus and coronoid fractures, and can provide accurate fracture reduction and fixation by creating a direct view into condylar region, and also through the location and size of the incision, small scar which is the main cause of dissatisfaction after surgery, and small amounts of other complications associated with facial nerve and salivary glands, so it is recommended to use this method in open reduction and internal fixation in condylar fractures.

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