Research Article

Journal of Dental and Maxillofacial Surgery

Transmasseteric Antero-Parotid Approach Through Modified Preauricular Lazy 'S' Incision for Management of Mandible Condylar Fractures: a Prospective Study

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Received: November 20, 2018; Accepted: December 05, 2018; Published: December 18, 2018

Abstract

To report the surgical details and results of our technique of Transmasseteric antero-parotid approach (TMAP) through modified preauricular lazy 'S' incision for management of mandibular condylar fractures. This was an observational analysis of 65 patients where 25 patients were treated with conventional preauricular approach, 25 patients with closed reduction and 15 patients with a mean age of 29.4 years with condylar fractures were treated by TMAP technique between September 2016 to June 2018. Aim of the study was to evaluate the proficiency of TMAP approach for open reduction and internal fixation (ORIF) of condylar fracture. The only complication which was noticed was sialoceles formation and managed by drainage. TMAP is versatile since it avoids facial nerve damage as it involves identification and preservation of facial nerve and has less chance of post-operative complications related to facial nerve injury. The accessibility achieved by this approach is fair enough to facilitate anatomic reduction and fixation of condyle.

Keywords: Condylar fractures, Open reduction and internal fixation, Transmasseteric antero-parotid approach, Facial nerve integrity, Sialoceles

Introduction

Mandibular condyle fractures are most common fractures which attribute up to 25%-50% of the maxillofacial fractures [1,2]. Some practitioners prefer closed reduction due to the complex anatomy. But surgical management is inevitable in few cases to establish accurate anatomical reduction of condyle with occlusal stability and to prevent the temporomandibular joint (TMJ) morbidity. There are certain indications and contra indications for management of condylar fractures which eased the decision making in surgical intervention of condylar fractures [3-6]. Surgical management of condylar fractures involves dealing with complex anatomy of facial nerve and is associated with

facial nerve palsy or weakness which increases post operative morbidity and unaesthetic sequelae [7,8]. Six types of facial nerve branching patterns were described which are helpful during intervention [9].

Many Surgical approaches described in literature for approaching the condyle are associated with damage of the facial nerve branches, inaccessibility, difficulty in visualization enhances the oblique angulation for fixating the hardware [2]. Transmasseteric antero-parotid approach (TMAP) which avoids facial nerve injury as the dissection is carried anterior to parotid gland [7]. Exploration of condylar head fracture ought to be done between the zygomatic and temporal branches of facial nerve [10]. In

cases condylar neck fractures, dissection between upper and lower branches of facial nerve is advocated [1], if the fracture is at subcondylar level, exploration between buccal and marginal mandibular branches of the facial nerve is preferable [11].

Materials and Methods

This was an observational analysis of 65 patients with condylar fractures where 25 were managed with closed reduction, 25 with conventional preauricular approach and 15 patients with condylar fractures treated by TMAP approach between September 2016 to May 2018. Institutional Ethics Committee approval was obtained before commencing this study. All patients were treated by preauricular lazy "S" modification through TMAP approach during the study period. All the data were collected according to the following inclusion and exclusion criteria.

Inclusion criteria

- All patients with condylar fractures aged 20-60 years.
- All patients with bilateral condylar fractures and unilateral fractures.
- All patients with associated parasymphysis and symphysis fractures.

Exclusion criteria

- All patients with comminuted fractures of condyle.
- All patients where occlusion was established by closed reduction.
- Patients who medically compromised

Each patient was preoperatively evaluated with a history, clinical examination and radiography. Fractures were classified after radiographic assessment according to Lindahl [12]. Total of 15 patients were treated by preauricular lazy "s" modification through TMAP approach (Table1).

Table1: This table represents data of all 15 patients including the diagnosis.

Patients	Age/Sex	Diagnosis	Fracture Level	Associated Fractures
Patient 1	17/m	Bilateral condylar fracture	Sub condyle	Right parasymphysis
Patient 2	20/m	Bilateral condylar fractures	Sub condyle	Left parasymphysis
Patient 3	26/m	Right condylar fracture	Sub condylar	Right body fracture
Patient 4	35/m	Right condylar fracture	Sub condylar	Left parasymphysis
Patient 5	30/m	Right condylar fracture	Sub condylar	Left parasymphysis
Patient 6	26/m	Left condylar fracture	Sub condylar	Right parasymphysis
Patient 7	18/f	Bilateral condylar fractures	Sub condylar	symphysis
Patient 8	48/m	Left condylar fracture	Sub condylar	Left parasymphysis
Patient 9	23/m	Bilateral condylar fractures	Condylar neck	Right coronoid symphysis
Patient10	60/m	Right condylar fracture	Sub condylar	Left parasymphysis
Patient11	28/f	Left-condylar fracture	Sub condylar	None
Patient12	32/f	Left condylar	Sub condylar	None
Patient13	35/m	Right-condylar fracture	Sub condylar	Left parasymphysis
Patient14	23/m	Left-condyle fracture	Sub condylar	Right parasymphysis
Patient15	20/m	Right-condylar fracture	Sub condylar	Right parasymphysis

Surgical Technique

Under general anesthesia taking all aseptic precautions, after marking the anatomical landmarks, planned surgical incision was infiltrated using 2% lidocaine with epinephrine. Using 15 number scalpel preauricular lazy "S" incision was made through skin and subcutaneous tissue followed by blunt dissection above the superficial musculoaponeurotic layer till the anterior edge of parotid gland where the branches of facial nerve are identified and parotid gland was retracted posteriorly, exposing the masseter muscle which was split in the direction of

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its fibers, following which the overlying periosteum was reflected to expose the fracture fragments (Figure 1). The dissection in this technique is similar to facelift procedure until the identification of parotid gland, as the dissection is carried superficially it avoids potential damage to the vital structures especially facial nerve injury. Mini plates and screws were used for fixation of fracture in perpendicular direction.

Post operatively detailed clinical examination was conducted and radiographs were taken. Based on them

data was recorded about anatomic-reduction, facial nerve integrity and other related complications. All patients were followed postoperatively at first week, second week, one month, three months, six months and one year. Elastics were placed for period of one week post operatively.

Figure 1: This figure shows the anterior border of parotid gland retracted posteriorly towards tragus of ear to provide perpendicular miniplate and screw fixation.

Results

The average age range of patients was between 20-60 years. Among the 65 cases 25 cases were managed by closed reduction as the occlusion was achieved by intermaxillary fixation, 25 cases treated through conventional technique and 15 cases managed by this technique only 4 patients were presented with bilateral condylar fractures. Among them most common fracture site was subcondylar level and fracture through condylar neck was noted in one patient only. Following release of elastics at 1week post operatively all the patients had mild restricted mouth opening which improved to the normal range after mouth opening exercises. In all 15 cases which were treated by TMAP approach occlusion, function, facial nerve integrity, anatomic reduction and inter-incisal distance were maintained post operatively. No complication like facial nerve injury, salivary gland fistula, frey's syndrome, paresthesia, infection or wound dehiscence were observed (Table2 & Figure 2) Sialoceles were the only complication which was observed after 15 days during the post-operative day (POD) in 4 patients of which two were male patients and two female patients. It resolved after incision, drainage and continuous compression on an average of 2 weeks (Figure 3). Scar was minimal and acceptable. No cases of TMJ ankylosis were observed.

Table 2: The complications during intra operative and post operative period with Transmasseteric antero-parotid approach were mentioned in this table.

Complication	Number	Fate
Facial nerve palsy	0	-
Malocclusion	0	-
Frey's syndrome	0	-
Paresthesia	0	-
Restricted mouth opening	0	-
scar formation	0	acceptable
Sialoceles	4	Improved
Infection/wound dehiscence	0	-
Salivary gland fistula	0	-
Dead space	0	-
Inadequate reduction	0	-

Figure 2: This figure shows the integrity of facial nerve, the patient is asked to frown, close her eye, hold or blow the air, to smile and to evert her lower lip during the post operative period to identify the weakness of facial nerve branches.

Figure 3: In this figure the clinical representation of sialoceles during the postoperative period of 15th, 20th, 25th days were seen which is a complication of TMAP. Sialocel was resolved within 2 weeks (1st month (POD)) by drainage of pooled saliva and compression over it.

Discussion

Open reduction of mandibular condyle had always been controversial. However, to prevent TMJ ankylosis, improve inter-incisal distance, occlusion and function, correct facial asymmetry ORIF is preferred [3]. There are many approaches for condyle but they have their own disadvantages. In conventional preauricular approach

facial nerve injury is noted and Salivary gland fistula formation may occur in transparotid approach. Wilson et al described TMAP approach with three modifications in preauricular incision (retromandibular, lazy 'S' cervicomastoid and rhytidectomy) in 2005 for good accessibility to the fracture site and to ensure the plating perpendicular to the fracture fragments [7]. Retromandibular incision was described by Hinds & Girotti [13] in 1967 and executed by Koberg & Momma [14] in year 1978. Later in 2008 Biglioli & Colletti advocated mini-retromandibular incision for TMAP approach [15,16]. In high cervical TMAP, the buccal branch of facial nerve is identified and preserved [8,17]. Preauricular inverted "L" incision to improve the retromandibular TMAP for mandibular condylar fractures [18]. Jean-christophe Lutz et al in 2010 described high submandibular Transmasseteric approach is safe technique for condylar fracture management as it provides great exposure of facial nerve branches, even if encountered [19]. Tang et al described about the application of modified retromandibular approach involving from the anterior edge of parotid to avoid facial nerve injury in 2009 [20]. Moon -gi-choi in 20015 stated that the buccal and marginal mandibular branches of facial nerve are expected to encounter in low subcondylar fractures while temporal and zygomatic branches in high condylar fractures. TMAP is similar to facelift technique and it avoids dissection through the parotid gland parenchyma and involves masseteric muscle splitting to approach condyle which reduces facial nerve injury [15].

Modified preauricular lazy "S" TMAP approach provides good accessibility, visibility and perpendicular plating with minimal time consumption. In our study it was observed that on an average it took 20-25 minutes to expose the fracture and 10-15 minutes for reduction and fixation of the fracture. No cases of facial nerve weakness were noticed by TMAP. The only complication that had occurred was sialocele. Sialocele was noted in 4 cases which were managed within 7-14 days by incision and drainage of pooled saliva, followed by continuous compression pack over. The probable cause for sialocele formation in our sample was believed to be injury to the parotid parenchyma intra-operatively. By taking meticulous care and preventing parenchymal damage of parotid sialocele can be prevented. No cases of salivary gland fistulas, paresthesia, facial nerve palsy or Frey's syndrome were noticed.

Conclusion

TMAP is an approach which can be considered for use regularly for open reduction of condyle, as it eliminates the complication of damage to the branches of facial nerve.

Nevertheless the only constraining factor is the learning curve which can be shortened by sound knowledge of complex anatomy around the condyle. Despite this short coming TMAP can be considered a near ideal approach for ORIF of condyle.

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