A comparative evaluation of rhytidectomy versus retromandibular approach for Open Reduction and Internal Fixation (ORIF) of mandibular condylar fractures

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Abstract

Objective This clinical study was carried out on thirty patients who underwent open reduction and internal fixation for condylar fractures via rhytidectomy/retromandibular approach were evaluated.

Methods Group I (rhytidectomy approach) were compared and evaluated clinically and radiologically with Group II (retromandibular approach) for the following parameters like surgical access, duration of surgery, anatomic reduction assessment with relevant radiographs, occlusal discrepancies, need for post operative IMF, facial nerve morbidity, other post operative complications and scarring.

Results There was a statistically significant difference between the two groups in the duration of surgery which was found to be significantly lesser for group II than group I. Access was better in group I. Scar was well camouflaged in patients of Group I when compared to group II.

Conclusion The rhytidectomy (Face-lift) incision which we have used in our study has all the advantages of the retromandibular approach with an added advantage of a less conspicuous scar and a wider exposure of the fracture site. The only disadvantage is the added time required for the closure which is not a concern as the aesthetic outcome of this technique is superior to the other approaches.

Keywords Rhytidectomy approach · Retromandibular approach

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Introduction

Facial injuries are most commonly associated with falls, motor vehicle accidents, sports related trauma, and interpersonal violence. The temporomandibular region is certainly not exempt from injury related to these factors [1].

Fractures of the mandibular condyle are stated by most authors to be the commonest type of fractures of the mandible with a frequency that ranges from 26% to 57% [2].

Interestingly few areas of oral and maxillofacial surgery have evoked as much controversy and debate as management of injury to the TMJ [1].

The majority of mandibular condyle fractures are treated by closed reduction, consisting of intermaxillary fixation followed by physiotherapy. However, there is evidence of functional disharmony and compromised results in a significant percentage of adult patients treated by closed reduction (Lindahl 1977, Zou et al. 1987, Oikarinen et al. 1991) [3,4,5].

The reason for adopting a less aggressive surgical approach was the difficulty in manipulating the fragments in a small area with risk of damaging the facial nerve or vessels such as the internal maxillary artery.

Most significant justifications for Open Reduction and Internal Fixation are occlusal stability, functional reduction and early restoration of function.

The decision to proceed with ORIF (Open Reduction and Internal Fixation) generates two other inter-related controversial issues namely:

1. The type of fixation device that should be employed
2. The choice of the surgical approach

A variety of fixation methods are available like plating, lag screw fixation, transosseus wiring, pin fixation techniques and external fixators. Bone plating through a preauricular, submandibular, or retromandibular approaches are the most commonly employed techniques [6].

When using a preauricular approach or submandibular approach there are several disadvantages when treating condylar fractures with plate and screw fixation like

Fig. 1 Incision line marked for rhytidectomy approach

Fig. 3 Immediate postoperative view of rhytidectomy incision

Fig. 5 Conspicuous scar following retromandibular incision

no access, limited exposure of the mandibular ramus which makes plate and screw fixation very difficult. By using an intraoral approach, there is limited access which prevents precise positioning of the plate and screw [7].

Retromandibular approach is easier and safer than a submandibular approach and the access is much more superior when compared to the preauricular approach [8]. The only disadvantage is a noticeable scar.

Zide and Kent described an approach i.e., rhytidectomy or face-lift approach to the condyle that obviates the lack of exposure that is common to the retromandibular and submandibular approaches. It allows increased exposure with direct visualization for fixation of fractures in posterior mandible, especially those in the pericondylar region and provides the least noticeable facial scar [9].

Fig. 2 Incision line marked for retromandibular approach

Fig. 4 3 months postoperative view of rhytidectomy incision

Material and methods

In this clinical study thirty patients underwent open reduction and internal fixation for condylar fractures via rhytidectomy/retromandibular approach were evaluated. Patients were selected from:

1. Department of oral and maxillofacial surgery, J.S.S. Dental College and Hospital, Mysore
 2. Dental outpatient department, J.S.S. Medical College and Hospital, Mysore
- Patients who sustained condylar fracture were randomly selected as per the inclusion criteria and the patients were divided into two groups with 15 patients in each group:

Group I: Patients who underwent open reduction and internal fixation via rhytidectomy approach.

Group II: Patients who underwent open reduction and internal fixation via retromandibular approach.

The distribution of the fracture types was based on the classification of Spiessell / Schroll (1972).

1. Type I-Fractures without displacement
2. Type II-Fractures with displacement
3. Type III-High fractures with displacement
4. Type IV-Low fractures with dislocation
5. Type V-High fractures with dislocation
6. Type VI-Intracapsular fractures [10].

The number of days from the injury to operation, average age, gender, compliance, and social habits were all recorded.

Type of fracture

In group I, 9 cases (60.0%) and in group II, 12 cases (80.0%) sustained Type II fracture, and 3 cases (20.0%) of group I and 1 case (6.7%) sustained Type III fracture. Type IV fracture was seen in 3 patients (20.0%) of group I and 2 cases (13.3%) of group II.

In all patients fractures were reduced with upper and lower Erich's arch bar fixation as a means for IMF which was carried out intraoperatively. All cases were treated under general anaesthesia with nasotracheal intubation. A Trans-parotid dissection was performed in both the groups.

In retromandibular approach, incision is made in a natural crease of the neck beginning from 1 cm under the mastoid apex and running parallel to the anterior aspect of the sternocleidomastoid muscle. Blunt dissection through the parotid gland done with a hemostat parallel to the anticipated direction of the facial nerve. Masseter muscle was exposed, pterygomasseteric sling incised. Subsequently a subperiosteal dissection was carried out till the sigmoid notch and the fracture site exposed. Reduction was achieved, the condyle was fixed with one or two stainless steel/titanium miniplates and monocortical screws. The parotid fascia and SMAS were repaired to attain a water tight closure to prevent salivary fistula. The skin was closed with interrupted sutures using 4-0 or 5-0 polypropylene suture. Pressure dressing given.

When a rhytidectomy approach was used skin markings were made for a preauricular face-lift incision. The preauricular aspect of the face-lift approach is in the natural crease anterior to the pinna. Under the lobe of the ear, the incision continues in the lobular fold and extends postauricularly on the posterior surface of the auricle. This modification prevents a noticeable scar in future. The subcutaneous dissection was then practically identical in both the approaches, but wider when using the face-lift approach.

Group I was compared and evaluated clinically and radiologically with Group II for the following parameters:

- Surgical access
- Duration of surgery
- Anatomic reduction assessment with relevant radiographs

- Occlusal discrepancies
- Need for post operative IMF
- Facial nerve morbidity
- Sialoceles, Salivary fistula etc.
- Hematoma
- Mouth opening
- Auricular anaesthesia
- TMJ symptoms like joint pain
- Clicking
- Mandible deviation on opening
- Plate Infection, plate fracture and Scarring

Results

In our study of 30 patients, there was high male predominance (80%) to female (20%), the ratio being 4:1. The mean age of the patients in the group I were 30.0667 and in group II were 31.7333. The distribution of patients according to the etiology were road traffic accident (83.3%), self fall (10.0%) and, assault (6.7%).

There was no statistically significant differences observed between the two treatment groups for parameters like age, gender, type and side of the fracture, mechanism of injury and incidence of associated injuries, post operative occlusion and need for IMF.

There was a statistically significant difference between the duration of the surgery between the two groups. Duration of surgery was found to be significantly lesser for group II (mean 91.33) from group I (mean 116.00), *t* value of 2.182 was found to be significant $P = 0.38$ (S). There was a statistically significant association between the two groups in the access, $P = 0.049$ (S) obtained.

In both the groups we could achieve a post operative mouth opening >40 mm. There was no statistical difference between the two groups in post operative mouth opening.

There was a temporary facial nerve weakness noted in 2 cases of group I and in 2 cases of group II. There was a post operative hematoma at the post auricular region in one case (3.3%) of group I. Sialoceles were observed in 2 cases (13.3%) of group I and in one case (6.7%) of group II. There was a case (6.7%) of auricular parathesia in group I.

We encountered two types of TMJ dysfunction in this study i.e., ipsilateral deviation on opening the mouth and pain on opening the mouth. In this study, there was an ipsilateral deviation of the mandible noted in two cases of both the groups (13.3%). Mild pain with a vas score

of 2 was reported by 2 patients of group I and group II (13.3%) and a vas score of 3 was reported by 2 patients of group II (13.3%).

In this study after a period of three months all 15 patients (100%) of group I had an inconspicuous scar which was well camouflaged. In group II 8 patients (53.3%) had inconspicuous scar whereas, in 6 patients (40.0%) the scar was conspicuous. One case of hypertrophic scar (3.3%) was observed in group II. There was a statistically significant difference noted between the two groups.

Discussion

A patient who has had a condylar fracture cannot be considered to be cured until he is able to masticate easily with the contralateral side of the dentition, which implies the recovery of the condylar excursion [11].

Silverman 1925 described the first method of ORIF of the condyle by an intraoral route [12]. Principally for low subcondylar fractures. Since then several techniques have evolved. Because we desire immediate function, we select plate and screw fixation and compared between a standard approach to a new approach to access the condyle.

Duration of surgery was found to be significantly lesser for group II (mean 91.33) from group I (mean 116.00) which is in agreement with the report from a study by Ellis et al. (1993) [13]. The time taken for the dissection does not vary significantly in both the approaches. In our study the additional time taken was required for the closure. There was a statistically significant association between the two groups in the access. This was consistent with studies conducted by Anastassov et al. [14] (1997) and Vesnaver et al. [7] (2005). It is stated that the facial rhytidectomy technique provides excellent access to posterior mandibular fractures with minimal complications [3]. With the transparotid facelift approach, the condyle and fracture are exposed directly and allow for good inspection and reduction, as well as vertical screw placement, which is crucial for osteosynthesis stability.

There was no statistically different difference between the two groups in the anatomic reduction, as it was more dependant on the amount of displacement of the fracture.

Postoperatively preinjury occlusion was achieved in 12 cases (80.0%) of group

I and 11(73.3%) cases of group II. This finding is similar to the study conducted by Marker P (2000) [15] and where post operative occlusal dearrangement was correlated to the amount of displacement of the fracture condyle.

The rate of neurologic complication rate found in this study was significantly lower compared to the results reported by Zide and Kent [9] (1983), Vesnaver et al. [7] and Choi B H et al. [16] where they observed facial nerve palsy in 40%, 22% and 20% of their patients respectively.

Sialoceles were managed by aspiration of the collection and by placing a compression dressing which resolved completely in a period two to three weeks. Hematoma was managed by drainage and aspiration which resolved completely. There was a case (6.7%) of auricular parathesia in group I which resolved spontaneously in a period of 4–6 weeks. Ipsilateral deviation of the TMJ progressively decreased and disappeared in 3–6 months period, patients were advised mirror exercises. Patients who complained of pain were treated symptomatically and was resolved completely in a period of 3–4 months.

We did not encounter any plate infection, plate fracture or any necessity for plate removal in our study.

Conclusion

Retromandibular approach has been the recommended method to approach the condyle for ORIF by many authors [6,8,11] as it is easier, associated with minimal complications and provides better access compared to the submandibular approach. The rhytidectomy (Face-lift) incision which we have used in our study has all the advantages of the retromandibular approach with an added advantage of a less conspicuous scar and a wider exposure of the fracture site. On the basis of these clinical results as well as the degree of patient satisfaction, it may be concluded that surgical treatment of the fractured, displaced condyle achieves excellent results when a transparotid facelift approach and two 2 mm miniplates were used for internal fixation.

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