



RESEARCH ARTICLE

ASSESSMENT OF THE VERSATILITY OF THE RETROMANDIBULAR APPROACH IN THE MANAGEMENT OF SUBCONDYLAR FRACTURES: A CLINICAL STUDY

*¹Dr. Mohammed Israr Ul Khaliq, ²Dr. Syed Wakeel and ³Dr. Ajaz A. Shah

¹Dental Surgeon, Govt. District Hospital Rajouri, J&K India

²Oral & Maxillofacial Surgery Department, IGDC Jammu, J&K India

³Department of Oral and Maxillofacial Surgery, Govt. Dental College & Hospital, Srinagar, J&K India

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ABSTRACT

Aim: This study was carried out to assess the versatility of the retromandibular approach in the management of subcondylar fractures. This study also assessed the morbidity of the retromandibular approach in the management of condylar fractures.

Materials and Methods: Twenty patients treated with open reduction and internal fixation of their condylar fractures using this technique.

Results: Retromandibular vein was encountered in one case. Branches of the facial nerve were encountered in five cases (25%). Temporary weakness of the facial nerve occurred in five patients. One patient developed a parotid fistula that resolved with use of hypertonic saline solution. The literature regarding facial nerve morbidity in relation to the management of condylar fractures is reviewed.

Conclusion: In conclusion, when open reduction and internal fixation of a condylar neck fracture is indicated, the retromandibular approach provides good access with low morbidity.

INTRODUCTION

The management of condylar fractures in adults remains controversial (Baker *et al.*, 1998). Even with a consensus developing on the preference for open reduction and internal fixation of these fractures (Bos *et al.*, 1999) the clinician is still faced with the dilemma about an optimal approach to the ramus-condylar unit. Fractures of the mandibular condyle accounts for 25-50% of all mandibular fractures (Silvennoinen *et al.*, 1992). There are multiple approaches that have been proposed for the visualization and the reduction of the condylar fractures including intra-oral, preauricular, postauricular, coronal, rhytidectomy, retromandibular, submandibularendural, endoscopic and sometimes in combination. Each approach has its own advantages and disadvantages. The Retromandibular approach is most useful for all subcondylar fractures and provides the best access to the joint and ascending ramus. It has the advantage of shorter working distance from the skin incisions to the condyle, great access to the posterior border of the mandible and sigmoid notch, less conspicuous facial scar and easy reduction. The present study has been undertaken to treat the cases of sub-condylar fractures by open reduction and internal fixation using retromandibular approach and to evaluate the morbidity associated with this procedure.

*Corresponding author: Dr. Mohammed Israr Ul Khaliq,
Dental Surgeon, Govt. District Hospital Rajouri, J&K India.

MATERIALS AND METHODS

Twenty patients with displaced subcondylar fractures were included in the study reporting to our hospitals. Pre-operative clinical examination was supplemented with radiographs like orthopantomographs and postero-anterior view of mandible. Retromandibular incision was used as an approach for the management of subcondylar fractures (Fig 1). The retromandibular approaches expose the entire ramus from behind the posterior border, therefore may be useful for procedures involving the area on or near the condylar process, head, or the ramus itself. There are two types of retromandibular approach to access the posterior mandible. They differ in the placement of the incision and the anatomic dissection to the mandible. The transparotid approach has the advantage of close proximity of the skin incision to the area of interest. The retroparotid approach has the advantage of not dissecting through the parotid gland (Fig 1). During followup, all patients were examined for scar formation and nerve weakness.

Operative technique

An incision 3–5 cm in length, parallel to the posterior border of the mandible (Fig. 1) was made starting 0.5 cm below the ear lobe. The parotid capsule was identified after dissection through skin, subcutaneous fat and platysma, which was found to be scanty in this area. The parotid capsule was incised and blunt dissection performed to expose the masseter muscle.

Facial nerve branches, if encountered, were carefully dissected out for a short distance and retracted either superiorly or inferiorly. The periosteum at the posterior border of the mandible was incised and subsequently a subperiosteal dissection was performed to the sigmoid notch exposing the fracture site. The condylar fracture was subsequently reduced and fixed using miniplates and screws. Post-operatively patients were reviewed at 1 week and at 1, 2 and 6 months. Facial nerve function was assessed clinically at each follow-up visit and the patients' opinion regarding the cosmetic outcome was evaluated at 6 months. Any other complications were also noted at each visit.

in one case the cervical branch was also identified. In three dissections the marginal mandibular branch was retracted superiorly and inferiorly in the other two cases. Facial nerve weakness involving the marginal mandibular nerve was noted postoperatively in five patients (25%). In two of these the marginal mandibular branch had been encountered during the dissection and retracted superiorly in one case and inferiorly in the other. One patient was also noted to have weakness involving the buccal branch of the facial nerve. Two patients had complete recovery of facial nerve weakness within a month and the remaining cases resolved within 2 months. There were no cases of permanent facial nerve weakness.



Fig. 1. Retromandibular incision



Fig. 2. Parotid fistula

RESULTS

There were 17 males and 3 females with a mean age of 29 years (range 19–52 years). The marginal mandibular branch of the facial nerve was encountered in the dissection in five cases and

In one case a parotid fistula developed postoperatively which required injection of hot saline solution. A 3% hypertonic saline was poured in a clean steel bowl and was heated in an autoclave. Five millilitre of this hypertonic solution was injected into the parotid through fistulous opening, followed by

pressure dressing. This procedure was repeated for 3 days. On the fourth day, the patient did not show any signs of swelling or salivary leak as the fistula closed spontaneously (Fig. 3). Patients' opinion of cosmetic outcome was assessed at the 6 monthly follow-up appointment. Sixteen patients (80%) attended. The results were assessed as good by eleven patients and fair by four patients. One patients reported dissatisfaction with the appearance of the scar (Fig. 3).



Fig. 3. Fistula closed

DISCUSSION

While treating the sub-condylar fractures surgically, many authors have given different approaches. Edward Ellis, Throckmorton, Hyde, Stuart Hislop were the few surgeons who used retromandibular approach for open reduction and internal fixation for managing subcondylar fractures. Bindra *et al.* (2010) suggested retromandibular approach for open reduction of mandibular condylar fractures as it is associated with low morbidity and adequate exposure of the fracture site in 2010. Vijay Ebenezer and Balakrishnan (2011) in 2011, Jorg Handschel *et al.* (2012) in 2012 compared the various approaches for rigid fixation of the sub-condylar fractures and concluded that retromandibular approach provides a more direct visual field and an almost straight line access for the fixation of the fracture. Yang, Patil (2012) and Mohan *et al.* (2012) in 2012 also gave similar results. Our clinical study demonstrated no incidence of temporary marginal mandibular nerve weakness using this technique. As described by Zide and Kent (1983) temporal and zygomatic branches are more prone to damage in rhytidectomy approach. Incidence of temporary facial nerve palsy accounts for 11-37% in Risdon's approach, where subplatysmal dissection is performed (Tasanen and Lamberg, 1976). No reports of permanent facial nerve damage were recorded in our study using the retromandibular approach. There are no reports of permanent facial nerve damage in the literature also using retromandibular approach. The resultant scar was inconspicuous and there were no complaints regarding it by any patient except one patients reported dissatisfaction with the appearance of the scar. A review of the literature confirms that other surgical approaches to the condyle may be associated with a high incidence of temporary facial nerve palsy.

Temporal and zygomatic branches are vulnerable in the rhytidectomy approach described by Zide & Kent (1983) and also with the preauricular approach. In the submandibular (Risdon) approach where a subplatysmal dissection is performed, the incidence of temporary facial nerve palsy varies from 11–37% (Tasanen and Lamberg, 1976; Widmark *et al.*, 1996; Zide and Kent, 1983). An increased distance between the incision and the condylar neck appears to be the main contributing factor. No permanent facial nerve damage using the retromandibular approach was recorded in our series and we were unable to identify any reports of permanent nerve damage in the literature using this technique. Parasthesia associated with the auriculotemporal nerve has been reported by Widmark *et al.* (1996) using the retromandibular approach. One case of parotid fistula which resolved with use of 3% hypertonic saline injected into the parotid through fistulous opening, followed by pressure dressing. (Ajaz *et al.*, 2016) The cosmetic appearance of the scar was acceptable for the majority of the patients in our series. One female patient, rated the results as poor 6 months postoperatively, mainly because of scar hypertrophy and hyperpigmentation. In women with high aesthetic expectations, a rhytidectomy incision may be combined with the retromandibular approach for a better cosmetic outcome.

Conclusion

In conclusion, when open reduction and internal fixation of a condylar neck fracture is indicated, the retromandibular approach provides good access with low morbidity. In our study the incidence of temporary paresis involving the marginal mandibular branch of the facial nerve was 25%, but in all cases this resolved within 2 months and there were no cases of permanent nerve injury. Dissection of the marginal mandibular nerve, when encountered, and its retraction minimizes the risk of permanent damage. Although the cosmetic appearance is generally acceptable, a rhytidectomy modification should be considered for those with high aesthetic expectations. Finally, although this technique was studied in the context of the management of condylar fractures, it may find other applications in temporomandibular joint pathology management.

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