Transmasseteric Anteroparotid Approach for Mandibular Condylar Fractures-Merits and Demerits

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ABSTRACT

Aim: The aim of the present study was to evaluate the preauricular transmasseteric anteroparotid approach for open reduction and internal fixation of extracapsular condylar fractures.

Patients and Methods: A total of 34 patients had 40 condylar fractures associated with malocclusion were subjected to surgical correction utilizing this approach. 17 had isolated condylar fractures and 17 had other associated fractures.

Results: The approach offered a good accessibility for fracture reduction and fixation. The recorded complications were minimal and temporary. Facial nerve palsy was transient in 2 patients (5%). Sialocele developed in one patient (2.5%) and improved under conservative treatment.

Conclusion: The transmasseteric anteroparotid approach provides good accessibility to do open reduction and internal fixation of the fractured condyle. It reduces the risk of facial nerve injury and other salivary complications as salivary fistula and Frey’s syndrome as all procedures based on incision of the parotid gland.

INTRODUCTION

Of all the bones in the maxillofacial area, the condylar process is the most susceptible to fracture. The incidence of condylar fracture accounts for 25% to 50% of all mandibular fractures [1]. Though remained controversial for a long time, surgical treatment of displaced subcondylar fractures appears today as the gold standard [2].

A few dedicated surgical approaches have been described [3-5]. The most common one is the retromandibular approach traversing the parotid gland. It results in a quite high rate of facial complications up to 48% [5-7] (mainly affecting the marginal mandibular branch [3,5]). Preauricular approaches based on systematic exposure of the facial nerve, as in parotidectomy procedures, are also used. They lead to postoperative facial nerve palsy affecting the buccal branches in 20% of cases [6]. This technique, aside from the increased operative time necessary for nerve dissection, can also lead to salivary fistula, sialoceles and Frey’s syndrome as all procedures based on incision of the parotid gland.

Owing to the high rate of complications associated with the transparotid approach and in an attempt to improve the accessibility to the fracture line, the transmasseteric anteroparotid approach has been introduced. The idea of this approach is to gain accessibility to the fracture line by splitting the masseter muscle anterior to the parotid gland. This approach has been described through different skin incisions. The described incisions are the high cervical [8-10], the miniretromandibular [1,11], and the preauricular one [5]. Selman et al., [12] utilized the transmasseteric anteroparotid approach to repair condylar fracture but they did not record the type of incision used.

Since Wilson [5] published his work on the anteroparotid transmasseteric approach through the preauricular incision, it has been utilized trying to study its merits and demerits.

PATIENTS AND METHODS

The study was done over the last four years in the Plastic Surgery Department El-Minia University and in Al-Noor Specialist Hospital, Wholly Makkah. 34 patients with a total of 40 displaced or dislocated extracapsular condylar fractures associated with malocclusion were subjected to open reduction and internal fixation using titanium miniplates through the preauricular transmasseteric anteroparotid approach. 8 condylar fractures were classified as high subcondylar fractures and 23 were classified as low subcondylar fractures. Patients having intracapsular fracture condyle, those having normal occlusion, fractures not associated
with displacement or dislocation. Patients less than 12 years old, and patients having associated traumatic facial nerve injury were excluded from this study.

Twenty patients were males and 14 were females. Their age ranged from 12 to 54 years. The average age was 32 years. 28 of them had unilateral fractures and 6 had bilateral fractures. A total of 17 patients had associated facial fractures. Five of these 17 had panfacial fractures and 12 had midface and/or other sites of mandibular fractures. When other mandibular fractures were coexistent, these were treated first with the usual intraoral approach to reestablish the continuity of the mandibular arch (Table 1).

All patients had deranged occlusion, facial asymmetry and opening mouth deviation towards the affected condyle in the unilateral cases. Most patients had limited mouth opening due to associated muscle spasm.

Surgical technique:

Twenty two patients were surgically managed before 2 weeks from the onset of trauma and 12 after 2 weeks. According to Wilson [5], and under general nasotracheal intubation, a preauricular incision was made and extended downwards in a curvilinear fashion in the cervicomastoid skin crease (Fig. 1). The great auricular nerve was preserved and the flap was raised in the subdermal fat plane, superficial to the superficial musculoaponeurotic layer to allow access to the masseter muscle adjacent to the anterior edge of the parotid gland (Fig. 2). Wilson et al., [5] splitted the masseter fibers on the antero inferior edge of the parotid gland below the level of the duct but this was found to be low, so, it was preferred to split it above the level of the duct in a fashion that parallels the facial nerve fibres (Fig. 3). Facial nerve branches were encountered in approximately 20% of the patients and were carefully protected with a retractor. Dissection was continued down to the fracture stump. The periosteum overlying the lateral aspect of the ramus was incised and the fracture site exposed. If this was not immediately deep to the incision, it was easily found by gentle retraction of the upper edge of the wound. Care was taken not to include the condylar head in this retraction. With the mouth opened, the fracture was reduced with the aid of a maxillomandibular fixation screw (IMF screw) fixed to the condylar stump and a second operator retract the angle inferiorly using digital pressure over the second mandibular molar tooth (Fig. 4). Maxillomandibular fixation was then performed and the fracture was fixed with titanium miniplates and screws (Fig. 5). The wound was closed in layers and a suction drain left in place for 48hrs.

The patients underwent Follow-up examinations at regular intervals. Follow-up continued for 12-24 months with an average of 14 months. They were evaluated clinically, and radiologically. They were assessed for facial morphology, occlusion, mouth opening, TMJ function, facial nerve function and salivary complications.

RESULTS

All the fractures were perfectly reduced and fixed as evidenced clinically by achievement of a good occlusion and restoration of facial symmetry and by radiological examination (Figs. 6,7). The approach offered a good accessibility. During the follow-up period conducted over 12 to 24 months, re-examination using X-ray revealed good fracture healing. A good occlusal relationship was achieved in most patients. In the immediate postoperative period, all the patients still had limitation in their mouth opening which gradually improved by time and with the aid of physiotherapy till they achieved normal range of mouth opening (37-45mm) one month postoperatively. The preoperative opening mouth deviation improved immediately postoperative in all patients. Facial symmetry was restored in all patients.

The facial nerve was intact in all the operated sides except for two patients had unilateral zygomatic branch affection as evidenced by eyelid closure dysfunction (Fig. 8). This facial nerve affection was temporary in the 2 patients and the function was completely restored after 3 months with the aid of physiotherapy. The temporal , marginal and the buccal branches were not affected in any case. One patient developed sialocele (Fig. 9). This was attributed to dissection through the parotid gland and was managed conservatively by repeated aspiration and by pressure bandage. This has been improved 2 months postoperatively. One of the patients that had unilateral fracture condyle developed wound infection that responded to frequent dressings and antibiotic therapy (Table 2).

Paraesthesia of the great auricular nerve, or Frey’s syndrome were not encountered in any case. Till the final follow-up at 24 months, temporomandibular joint ankylosis was not recorded. The final cosmetic outcome was excellent (Fig. 10). The surgical method was simple compared with the traditional approaches. Once the technique has been mastered, exposure of the fracture took about 20-25min.
Fig. (1): A preauricular incision made and extended downwards in a curvilinear fashion in the cervicomastoid skin crease.

Fig. (2): The flap raised in the subdermal fat plane, superficial to the superficial musculoaponeurotic layer to allow access to the masseter adjacent to the anterior edge of the parotid gland.

Fig. (3): The muscular fibres gently divided in a fashion that parallels the facial nerve fibres.

Fig. (4): The fracture has been reduced with the aid of an IMF screw fixed to the condylar stump.

Fig. (5): The fracture has been fixed by titanium miniplates.

Fig. (6): Post operative panoramic X-ray shows perfect reduction and fixation of left sided fracture condyle, symphyseal fracture and midface fractures.
Fig. (7): Post operative panoramic X-ray shows perfect reduction and fixation of left sided fracture condyle and left sided fracture angle.

Fig. (8): Immediate post operative photograph for a patient had bilateral fracture condyle been repaired and shows intact facial nerve.

Fig. (9): Right sided sialocele has been recorded as a complication in this patient.

Fig. (10): Excellent esthetic outcome for the preauricular wound as viewed one month post operatively.

Table (1): Characteristics of the study sample.

<table>
<thead>
<tr>
<th>Characteristics of the study sample</th>
<th>Number</th>
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<tbody>
<tr>
<td>Patients</td>
<td>34 patients</td>
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<tr>
<td>Fractures</td>
<td>40 condyles</td>
</tr>
<tr>
<td>Unilateral fractures</td>
<td>28 patients</td>
</tr>
<tr>
<td>Bilateral fractures</td>
<td>6 patients</td>
</tr>
<tr>
<td>Patients having isolated fracture condyle</td>
<td>17 patients</td>
</tr>
<tr>
<td>Patients having other associated fractures</td>
<td>17 patients</td>
</tr>
<tr>
<td>Patients having malocclusion</td>
<td>34 patients</td>
</tr>
<tr>
<td>High subcondylar fractures</td>
<td>8 condyles</td>
</tr>
<tr>
<td>Low subcondylar fractures</td>
<td>32 condyles</td>
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<tr>
<td>Period from the onset of trauma to fracture fixation:</td>
<td></td>
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<tr>
<td>More than 2 weeks</td>
<td>12 patients</td>
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<tr>
<td>Less than 2 weeks</td>
<td>22 patients</td>
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Table (2): Recorded complications and their percentages.

<table>
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<th>Complication</th>
<th>Number</th>
<th>Percentage</th>
<th>Fate</th>
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<tr>
<td>Facial nerve affection</td>
<td>2 of 40</td>
<td>5</td>
<td>Improved</td>
</tr>
<tr>
<td>Sialocele</td>
<td>1 of 40</td>
<td>2.5</td>
<td>Improved</td>
</tr>
<tr>
<td>Wound infection</td>
<td>1 of 40</td>
<td>2.5</td>
<td>Improved</td>
</tr>
<tr>
<td>Frey’s syndrome</td>
<td>None</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Paræsthesia of the great auricular nerve</td>
<td>None</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Ankylosis of the temporomandibular joint</td>
<td>None</td>
<td>0</td>
<td>–</td>
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</table>
DISCUSSION

Management of condylar fractures has been the subject of much disagreement and debate. There is no general consensus for definitive treatment. Although there is a growing tendency for open reduction and internal fixation technique. Risks and morbidity of the surgical procedure are still a point of concern for maxillofacial surgeons [13]. Access to the fracture line is sometimes unsatisfactory in the most popular approaches, such as the Risdon or retromandibular technique, especially in cases of high fracture, because the skin incision is made far from the fracture and soft tissue retraction is not easy. Therefore, the screwdriver is placed in an oblique direction to the bone surface. Under these conditions, attainment of stabilization is very difficult, and the construct may be deficient. This strong soft tissue retraction increase the risk of facial nerve damage that ranges from 30-48% [5-7,14].

Injury to the facial nerve is the most feared complication in surgeries to repair condylar fractures [15]. This facial nerve injury has been reported to be temporary in 30-48% [4-16]. The marginal mandibular branch is most often injured in the submandibular and retromandibular approaches, whereas the preauricular approach often causes injury to the temporal and zygomatic branches. There is a considerably higher incidence of cross-anastomosis between the branches of the upper division of the facial nerve than between those of the lower division. The incidence of cross anastomosis between the zygomatic and buccal branches is 87-100%, whereas the marginal mandibular nerve receives anastomotic branches in only 0-16% of cases. This explains its vulnerability in the retromandibular and submandibular approaches [17].

To reduce potential complications and improve surgical exposure, the transmasseteric anteroparotid approach was introduced. The technique is easy to learn, provides adequate surgical exposure for open reduction internal fixation, and has few complication rates [12-13].

Trost [8,9] utilized the high cervical transmasseteric approach to repair condylar fractures. Lutz 2010 [10] utilized the high cervical transmasseteric approach to repair 21 condylar fractures. All did the skin incision one cm below the mandibular border. Their subcutaneous dissection was similar to Wilson's preauricular procedure [5]. They did a longer superficial dissection to the level of the fracture where they incised the platysma and separated the masseter muscle. No facial palsy, even transient, has occurred. A branch of the facial nerve connected to the upper buccal branch was crossed in approximately 50% of cases and was retracted. Access to the condyle was satisfactory, bone fixation was feasible in all cases, and cosmetic results were satisfactory. Viroj Wiwanitkit 2010 [18] stated that there are many studies required for decision-making for using this high cervical approach. First, there should be a comparative effectiveness and efficacy of this approach to other existing approaches. Second, there should be a cost-effective and cost-utility analysis for this approach, comparing it with others.

Tang et al., [8] and Biglioli [11], utilized a mini retromandibular approach to repair condylar fractures. They performed the skin incision 3 to 5cm from the ear lobule to the mandibular angle along the posterior edge of the mandibular ramus. The subcutaneous tissue of the skin flap was raised forward to expose the anterior or top edge of the parotid myofascial layer; then, the parotid myofascia was selectively stripped according to the different sites of the condylar fracture to pull the parotid tissue backward and expose the masseter and periosteum attached on the surface of the condylar process. They reported good fracture healing, temporary facial nerve affection for the buccal and the zygomatic branches in 3.9% of the patients. They did not report any salivary fistula or ankylosis. They stated that this surgical method is simple compared with the traditional retromandibular approach. The duration of surgery is comparatively reduced by over half an hour on average.

Through the same transmasseteric anteroparotid approach and utilizing a preauricular incision, Wilson [5], reported no case of postoperative facial palsy, but on a series only based on a total of 3 patients each of them had bilateral fracture condyle. Wilson stated that the buccal and the zygomatic branches are the only branches normally encountered (if any at all), there retraction, given there excellent cross anastomoses, is inherently less risky [8]. Postoperatively the functional and cosmetic outcome was excellent with no evidence of weakness of the facial nerve, paraesthesia of the great auricular nerve, or Frey’s syndrome.

In this study, the incidence of facial nerve injury was 5%. The injury was temporary in all the cases. The only affected branches were the zygomatic and the buccal branches. Also the functional and cosmetic outcome was excellent with no evidence of paraesthesia of the great auricular nerve, or Frey’s syndrome.
**Conclusion:**

The transmasseteric anteroparotid approach provides good accessibility to do open reduction and internal fixation of the fractured condyle. It reduces the risk of facial nerve injury and other salivary complications as fistula and Frey’s syndrome as it eliminates the dissection through the parotid gland. Also it is conducted within a shorter time as compared with other approaches. The final cosmetic outcome is satisfactory.

**REFERENCES**


