Treatment of mandibular subcondylar fractures by open reduction and internal fixation

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Open reduction of condylar neck fractures is a contentious issue. The majority of these fractures have been treated conservatively. There are, however, specific situations, where open reduction is indicated. In our clinic, from 1992 to 1994, 22 mandibular subcondylar fractures were surgically reduced. 14 patients from this group were located for follow-up at an average interval of 3 months. In this paper, our clinic experiences as to open reduction and their results presented. [Turk J Med Res 1995; 13(6):204-209]

Key Words: Fractures, Internal fixation, Mandible

Processus condylaris is the one of the anatomically weak portions of mandible and its fractures are common. Condylar fractures had been treated conservatively previously and successful results had been documented radiologically in children and adolescents (1-5). Meanwhile, some surgeons had insisted on open reduction and they had reported that surgical treatment was necessary in some specific conditions as displacement of caput condylaris out of glanoidal fossae, and they had classified absolute and relative indications for open reduction in every age groups (6-10). Thus, the treatment of condylar fractures are controversial and it had been discussed for sixty years (11) and there has not been reached a solution, yet. But there is a growing interest to the method of open reduction and internal fixation, because of having some advantages as, no need maxillo-mandibular fixation (MMF), saving temporomandibulary joint (TMJ) functions, and giving a correct anatomical reduction. Our results of open reduction and internal fixation in 22 cases for last two years have been discussed in this article.

MATERIALS AND METHODS

22 cases of mandibular subcondylar fractures were treated by the method of open reduction and internal fixation in in the 2 plastic and reconstructive surgery department in Ankara Numune Hospital between 1992 and 1994. Nine patients were women and 13 patients were men. Mean age was 27 years (6-70 years). All of fractures were unilateral and seven patients had multiple fractures in mandible or other bones of their faces (Table 1). The main cause of fractures were car accidents.

Fractures were evaluated panoramic mandible and Towne graphy. Fractures localised above of a line crossed to the level of deep point of sigmoid to the ramus were accepted as subcondylar fractures. Open reduction and internal fixation method was applied to the fractures displastic, dislocated or deviated deeply. In upper and middle level fractures of condyl we used preauricular incision. In lower level fractures of condyl, we used one of the preauricular, intraoral and sub-mandibular incisions and reached to the fracture line. At the beginning, we tried to make osteosynthesis by wire, but, it was quite difficult to pass the wire in a limited area of the fracture, as mentioned before by some authors (6,12). We made rigid fixation by using mini-plaque-screw having four hole in 22 cases (Figure 1). Arch-bar wire was applied to the patients before operation in order to stabilizate the jaw closed during the fixation procedure. When there had been another fractures, first of all these fractures fixated by using plaque screw, and then, condyl fracture was manipulated. Distal fragment was retracted downward by using a hook inserted angulus mandibulae or lower side of the fragment and, the proximal fragment of the condyl was positioned anatomically. Mini plaque having four hole was inserted on the proximal frag-
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Table 1. The analyses of patients which open reduction were applied and followed up

<table>
<thead>
<tr>
<th>Case</th>
<th>Age/Sex</th>
<th>Concomittant fracture</th>
<th>Incisions</th>
<th>Fixation</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70/M</td>
<td>symphysis</td>
<td>intraoral</td>
<td>plaque-screw</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>38/M</td>
<td>symphysis</td>
<td>intraoral</td>
<td>plaque-screw</td>
<td>cross-bite</td>
</tr>
<tr>
<td>3</td>
<td>25/M</td>
<td>symphysis, angulus, zygoma</td>
<td>submandibular</td>
<td>plaque-screw</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>35/F</td>
<td>symphysis</td>
<td>preauricular</td>
<td>plaque-screw</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6/M</td>
<td></td>
<td>preauricular</td>
<td>plaque-screw</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>34/M</td>
<td>symphysis, ramus</td>
<td>intraoral</td>
<td>plaque-screw</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>36/M</td>
<td>maxilla</td>
<td>preauricular</td>
<td>plaque-screw</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>18/F</td>
<td></td>
<td>submandibular</td>
<td>plaque-screw</td>
<td>transient paralysis in marginal mandibular nerve, and partial resorption in proximal segments</td>
</tr>
<tr>
<td>9</td>
<td>27/M</td>
<td></td>
<td>intraoral</td>
<td>plaque-screw</td>
<td>infection</td>
</tr>
<tr>
<td>10</td>
<td>30/F</td>
<td></td>
<td>preauricular</td>
<td>plaque-screw</td>
<td>transient paralysis in frontal nerve</td>
</tr>
<tr>
<td>11</td>
<td>19/F</td>
<td>zygoma</td>
<td>preauricular</td>
<td>plaque-screw</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>23/M</td>
<td></td>
<td>preauricular</td>
<td>plaque-screw</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>28/M</td>
<td></td>
<td>preauricular</td>
<td>plaque-screw</td>
<td>transient paralysis in frontal nerve</td>
</tr>
<tr>
<td>14</td>
<td>55/M</td>
<td></td>
<td>preauricular</td>
<td>plaque-screw</td>
<td></td>
</tr>
</tbody>
</table>

The patients were followed by panoramic mandible and Towne graphies in a tri-month-period. Eight patients couldn't followed. During the control examinations; the patients were evaluated by the view of; maximal mouth opening, protrusion or lateral movement range of the jaw (fixated, limited, normal), occlusion complication of the jaw (as; open bite, cross bite), injury of the facial nerve or its branches, pain and click in temporomandibular joint, resorption of proximal segments in panorex graphy and subjective complaints of the patients.

RESULTS

Fourteen of 22 patients could had been followed regularly. Eight patients were excluded from this study for inadequate follow up. The postoperative follow up results were listed in Table 1. There was a little limitation of mouth opening in the early postoperative period in some patients. But, a maximum mouth opening over 36 mm had been reached by making jaw exercise in all patients in a 8 week period. Normal mouth opening range is 36-38 mm (13).

There was no complete loss of protrusion and lateral movement of jaw in any patients. There was a little limitation in all patients but this was not causing any complaint. An excellent jaw occlusion have been reached in all patients (Figure 2,3) but only in one bearing multiple mandible fractures. A cross-bite occlusion deficient developed in this patient. A transient loss of function of facial nerve had occurred due to compression and traction in three patients. A transient paralysis developed in two patients approached preauricular incision in the frontal branch of facial nerve and in one patients approached submandibular incision, in the marginal mandibular branch of facial nerve. But all kind of functional losses disappeared and normal functions came back. This was corrected with electromyographic studies. There was no pain in

Figure 1. The sample of fixation with four hole-mini-plaque screw.

The patients aged 6 years was reoperated for the drainage of the abscess and the plaque was taken off in the third month of postoperative period.

DISCUSSION

It is essential to define the fractures before starting the treatment in subcondylar fractures of mandible. The diagnosis of the fracture localisation and the degree of temporomandibular joint in all patients and there was also no crepitation in examination. In one patient, there was a partly resorption in proximal segment, at in panorex graphy. Infection occurred in one patients approached intraorally in the postoperative period and it took more time than one week.

Figure 2a. Occlusion deformity due to subcondyl fracture of mandible.

Figure 2b. Radiological appearance of fracture in the same patients by towne graphy.

Figure 2c. Immediate postoperative appearance. Normal occlusion.

Figure 2d. Radiological appearance of fracture fixated with mini plaque screw.
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Figure 3a. The appearance of limited opening due to left subcondyl fracture of mandible.

Figure 3b. Radiological appearance of the fracture in the same patients by towe graphy.

Figure 3c. The immediate postoperative appearance of a patients. Normal occlusion.

Figure 3d. Radiological appearance of a fracture fixated with mini-plaque-screw.

defority is important to make a correct decision for the treatment and incision line. Subcondylar fractures are defined as below: The fractures between a line starting sigmoid sulcus and reaching to the middle of ramus mandibulae, and the joint capsule are considered subcondylar fractures (14). But in spite of this definition, it is not easy to discover the division of subcondyl and ramus. This area are divided upper, middle and lower parts. If the open reduction is necessery; It was reported that; preauricular incision was suitable for upper part fractures and intraoral or submandibular incisions were suitable for middle or lower parts fractures (9).

We used preauricular incisions for the three levels fractures and there was no difficulty. These frac-
fractures were also classified according to the degree of deformity as deviated (angulated), displaced and dislocated fractures. The ends of fracture contact to each other but there is an angulation in the deviated fractures. In the displastic fractures, the ends slide but the caput of condyl is still in glenoid fossa. In the dislocated fractures, the caput of condyl is out of the fossa. Open reduction were recommended for angulation over 45 degrees, severe displastic fractures and dislocated fractures (9).

However the treatment of subcondylar fractures have still been discussed, in surgical approach it is possible to get a better anatomical reduction, there is no need MMF, and TMJ functions can be saved. Hence, the surgical treatment have been accepted as the major choice for subcondylar fractures (12,15-17).

Some new kind of incisions were recommended as rhytidectomy and retromandibular incision, because of inadequacy of classic incisions (18), and new methods for rigid fixation as lag screw fixation have been used (19).

The surgical treatment needs experience and concentration. The facial nerve and its branches must be saved from any injury. The reduction and fixation of fracture ends with plaque, screw or wire is difficult (6,12,20). For this difficulty, many surgeons are not desirious for surgical repair and they prefer conservative methods. But, surgical repair should have applied in appropriate conditions after evaluation of clinical and radiological status of patients and fractures (9,10,16,21,22). Surgical indications have been explained by Zide and Kent (8,23) and have been accepted widely by authors. Absolute indications for open reduction: (1) caput of condyl displaces to middle cranial fossa (2) insufficient occlusion after a week from closed reduction (as open bite), (3) the fragment showed radiologically preventing movement of condylar neck and inadequate opening of mouth. (3) extracapsular displastic fractures of condyl (4) foreign body in joint capsule (5) open fractures hoping that rigid fixation reduces fibrosis (gun shot).

Relative indications: (1) any splint can not applied for the reason of alveolar wedge atrophy in edentulous or partial dentulous mandible with displastic caput condyl, or absence of any splint. (2) The patients can not tolerate the intermaxillary fixation period (epileptics, alcoholics). (3) Being concomittant fractures as unilateral or bilateral condil fractures, pieced fractures of symphysis or unstable maxilla fractures. In addition; age, level of the fracture, degree of the deformity, teeth status of the patient, concomittant injuries and medical condition of the patients must be considered and the appropriate treatment should applied.

In some studies, the success of two methods have been compared and no differences was found (24,25). But postoperative follow up time of these studies were not enough (9). In our series; one third of patients couldn’t have followed sufficiently after operations. The difficulty of follow up are common in the literature (17) and this is bound that the patients came from distant areas. It is also possible to think, the patients not comig to control had no problem related to fracture.

We have found some minor, acceptable complications in followed patients. But, in the majority of the patients, clinical and radiological results were excellent. We couldn’t compare surgical repair and conservative treatment results, that is why, the number of patients and follow up time is not enough in the conservative treatment group. In order to compare two method, we need more patients and long follow up time and it is impossible to answer many question till randomized and controlled prospective studies would have been performed.

Mandibula subkondil kırıklarının açık redüksiyon ve internal tespit yöntemi ile onarımı


REFERENCES


