The effect of delay in the treatment of zygomatic fractures

Ahmed A. Zahrani, BDS MSc DFM

Abstract To study and analyze statistically the influence of delay in the recovery following surgical intervention of zygomatic fracture.
Design: Records of patients who were admitted to the hospital with a diagnosis of zygomatic complex fractures. The diagnosis was reassessed by reviewing the clinical documentation, physical examination and the available radiographs.
Setting: Three hundred and fifty two patients with different types of zygomatic complex fractures who were treated surgically.
Results: Delay in surgical intervention beyond the first week was mainly due to associated injuries and particularly head injuries. Complications of delayed treatment were recorded in 89 patients (25.3%) and the high incidence of complications (40.5%) were observed in those patients operated on after the third week of injury.
Conclusions: Delayed treatment of zygomatic fractures is likely to result in numerous types of complications. Such delay may be attributed to many factors of which some are uncontrollable. Immediate treatment of zygomatic fractures warrants less complications. Therefore, we recommend urgent intervention provided there is no contraindication to surgery.


Keywords: Complications, problems, delayed treatment, zygomatic fractures

Since the beginning of this century, zygomatic fractures have become the second most common type of maxillofacial injury. In recent years, the incidence of such injury has increased in both the developed and developing countries due to civilian violence and increase in road traffic accidents respectively. Such injury to the facial region, is always associated with high morbidity which often results in obvious disfigurement.

Delay in treatment is considered to be a determining factor in the outcome of zygomatic fracture management, thus early intervention has been advocated by many authors. The facial deformity following zygomatic fracture reduction was found to be less obvious if surgery is performed within two weeks of the accident. Failed or undiagnosed zygomatic fracture, in addition to associated facial trauma, may result in numerous complications.

The purpose of this study is to investigate and relate delay in treatment of zygomatic fractures to the complications experienced. It will also address those questions; does delay in treatment have any influence on the final results of surgery? If there is, what is the best time for treatment of such a fracture to avoid the sequelae? And when should treatment be considered “delayed”?

By definition, any fracture that is not treated within 7-14 days of the accident is considered delayed, and in this study constitutes the period between the date of the accident and that of surgical treatment.

Materials and methods The material for this retrospective study was collected from the regional plastic and oral surgery unit at Canniesburn Hospital in Glasgow, Scotland and confined to a period of two years.

Records of 497 patients who were admitted to the hospital with diagnosis of zygomatic complex fracture were retrieved and examined. The diagnosis was reassessed by reviewing the clinical documentation, the physical examination and the available radiographs. Three hundred and fifty two

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patients were found and treated surgically and therefore constituted the material for this study, the other 145 patients were excluded as they were managed non-surgically.

Causes of delay included concomitant injuries which did not allow for early treatment of the zygomatic fractures: contusion and concussion of brain, misdiagnosis or under-diagnosis and post-injury infection. These factors were pooled and analyzed statistically. The chi-square test was used to compare the observed frequencies of complications in relation to delay and their causes to those expected on the basis of null hypothesis at the <0.05 level of significance.

Results Of the 497 cases, 352 (70.8%) were treated surgically while the remainder 145 were managed conservatively. Approximately, 85.3% of the patients arrived at the hospital within the first week, and most of them within 24-26 hours of injury. About 65% of surgically intervened cases were performed in the first week and only 10.5% operated on two weeks or later after admission.

Delay in surgical intervention beyond the first week was mainly due to associated injuries and in particular evidence of head injury (Table 1). The association between delay in treatment and the presence of other injuries was statistically significant (p<0.01).

Table 1 - Causes of delay in surgically intervened cases.

<table>
<thead>
<tr>
<th>Period (days)</th>
<th>Causes of delay</th>
<th>0.7</th>
<th>8-14</th>
<th>15-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated injuries</td>
<td>203 (68.8%)</td>
<td>65 (22.6%)</td>
<td>27 (9.2%)</td>
<td></td>
</tr>
<tr>
<td>Head injury</td>
<td>6 (46.2%)</td>
<td>3 (23.1%)</td>
<td>4 (30.8%)</td>
<td></td>
</tr>
<tr>
<td>Other reasons</td>
<td>20 (45.5%)</td>
<td>18 (40.9%)</td>
<td>6 (13.6%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>229</td>
<td>86</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

\[x^2 = 15.5\] \[df = 4\] \[p < 0.01\]

Different types of post operative complications (Table 2) were recorded in 89 patients (25.3%). Analysis of data showed no significant difference between the prevalence of different types of complications and delay (p<0.05). The high percentage of complications (40.5%) were observed in those patients operated within and after the third week (Table 3).

The occurrence of more than one complication was seen in the high proportion of patients treated later than one week (Table 4). The increase in incidence of complications was statistically significant at a high level (p<0.001) when delay in surgical intervention was considered.

Table 2 - Registered different types of complications

<table>
<thead>
<tr>
<th>Complications</th>
<th>0.7</th>
<th>8-14</th>
<th>15-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone deformity</td>
<td>1</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Delayed paraesthesia</td>
<td>13</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Persistent diplopia</td>
<td>11</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Ocular lesions</td>
<td>7</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Scar formation</td>
<td>5</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Other complications</td>
<td>5</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

\[x^2 = 17.6\] \[df = 10\] \[p < 0.05\]

Expected value (8 cells <5 and 0 cells <1)

Table 3 - Incidence of complications and delay

<table>
<thead>
<tr>
<th>Period (days)</th>
<th>0.7</th>
<th>8-14</th>
<th>15-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of cases treated surgically</td>
<td>229</td>
<td>86</td>
<td>37</td>
</tr>
<tr>
<td>Total no. of cases developed complications</td>
<td>55</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>%</td>
<td>24</td>
<td>22.1</td>
<td>40.5</td>
</tr>
</tbody>
</table>

Table 4 - Multiplicity of complications and delay

<table>
<thead>
<tr>
<th>Delay (week)</th>
<th>No. of complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;1</td>
</tr>
<tr>
<td>One week delay</td>
<td>41 (17.9%)</td>
</tr>
<tr>
<td>More than one week delay</td>
<td>15 (12.2%)</td>
</tr>
</tbody>
</table>

\[x^2 = 11.705\] \[df = 1\] \[p = 0.001\]

Discussion The criterion for surgical treatment of zygomatic fracture is esthetic and functional impairment of the orbit and surrounding structures and therefore, surgery is indicated only where the clinical and radiographical evidence of displacement is significant.7

In our sample, non-surgical conservative treatment was instituted for 145 patients (29.2%). This figure appears to be higher than that reported by Ellis et al,7 and Larsen et al,8 but lower than that in the series of Adekeye,9 Kristensen and Tveitas.10 This difference could be due to the opposing opinions of each surgeon regarding the management of such fractures.

It is interesting that the vast majority of patients arrived for medical advice within the first week, and especially in the first and second days after injury. This shows the level of awareness among patients. However, few patients were seen more than one month after the injury.

Delay in treatment of more than 14 days was
observed in a few patients (10.5%). The majority of them did not seek medical advice for more than two weeks after the injury. This delay in treatment could be due to difficulty in the diagnosis of recent orbital floor fractures, failure of other disciplines to recognize such fractures, priorities to more serious injury, or because the oral and maxillofacial surgery unit is not always a primary receiving center.

The presence of associated injuries has a significant influence on delay in the treatment of zygomatic fractures. It was clear that a large proportion of patients with head injury were treated after the second week. This reflects the fact that there was concern regarding the more critical injury, and that urgent reduction is not required in all of these cases. It might be expected that immediate treatment would be required where there is no associated injury. In this study, this appears not to be the case as a large proportion of these patients received their treatment during and after the second week.

Several authors recommended immediate repositioning of a zygomatic fracture within at least a week of injury. This is due to the fact that the facial bone fractures tend to consolidate rapidly,9,10 and the application of considerable force for a proper reduction thus becomes necessary.11 It appears advisable therefore to carry out the surgical treatment as soon as possible, since the timing is a decisive element in the management of such fractures.9,11

Despite the fact that immediate intervention showed better results,9,10 in many occasions such as when the patient's medical condition does not permit instant treatment, presence of ophthalmic injuries or when the orbital floor fracture is obscured by edema, there is apparent advantage in postponing surgery for 5-7 days.11 Catone et al22 advocates the orbital floor operation within 10-14 days after injury as this period will allow edema to reduce and so aid in more precise diagnosis and treatment.

In this study, delay in the treatment of zygomatic fractures for more than one week resulted significantly in various types of complications. The frequencies of these complications vary and there was no significant difference between their incidence. This is probably due to the fact that different surgical techniques were used in the treatment of these cases and each method of treatment is likely to lead to certain types of complications.

The occurrence of multiple complications (more than one complication) was observed more frequently in long delayed cases. This was especially the case with increase in diplopia and post surgical scar formation, since these cases tend to be unstable and severely displaced and therefore, required more points of fixation.

It appears that the delayed fracture is more prone to physiological resorption which consequently impairs the interdigitation of the fractured segments. Furthermore, the development of adhesion increases progressively towards the end of the second week after injury and therefore, increases the necessity for more complex treatment which would have been managed simply if treated before this period.

Conclusion The foregoing findings show that zygomatic fracture complications are likely to occur more frequently following delayed treatment. Such delay may be attributed to many factors of which some are uncontrollable. However, immediate treatment of zygomatic fractures should be instituted when there is no contraindication to surgery.

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References

المشاكل والاختلافات الناتجة عن المداخلة الجراحية المتأخرة
لعلاج كسور العظام الوجني
ورقة رقم 1372

الهدف: دراسة وتحليل تأثير المداخلة الجراحية المتأخرة في علاج كسور العظام الوجني.

التصميم: السجلات الطبية للمرضى الذين أدخلوا المستشفى نتيجة إصابتهم بكسور العظام الوجني، وقد تم إعادة تقييم الحالات عن طريق مراجعة الفحوص السريرية ومراجعة الصور الإشعاعية.

المكان: الوحدة الإقليمية لجراحة الوجه والفكين وجراحة التجميل بمستشفى كنزيون بمدينة جلاسكو، اسكتلندا.

العينات: دراسة حالة 352 مريضاً أصيبوا بمختلف كسور العظام الوجني، وقد تم معالجتهم جميعاً بالأساليب الجراحية.

النتائج: كان السبب الأول لتأخير المداخلة الجراحية لما بعد الأسبوع الأول لمعظم الحالات، هو وجود إصابات أخرى وللعاملة إصابات الرأس. في هذه الدراسة لوحظ نشوب الاختلافات في 98 مرضاً (3.70% ) وكانت أعلى نسبة من الاختلافات (5.40%) ضمن أولئك الذين عولجوا جراحياً بعد الأسبوع الثالث من الإصابة.

الاستنتاج: إن تأخير المداخلة الجراحية لعلاج مثل هذه الحالات يمكن أن يؤدي إلى نشوب العديد من الاختلافات، ويعود التأخير غالباً إلى وجود عائق طبي ولها نشأت العلاقة القوية بين نشوب مثل هذه الاختلافات والمداخلة الجراحية المتأخرة. لهذا نوصي بسرعة العلاج الجراحي ما لم يكن هناك ما يمنع ذلك طبياً.