INTRODUCTION

Orbital fractures are commonly seen with midfacial trauma. Fracture severity ranges from small minimally displaced fractures of an isolated wall that require no surgical intervention to major disruption of the orbit. This is a retrospective study of patients with orbital trapdoor fractures who underwent surgery to determine the outcome of surgical intervention in relation to the timing of surgery.

Present study included 9 patients (age range 11-28 years) who underwent surgery for trapdoor fractures from 2004 to 2010 at King Hussein Medical Centre, Amman and its affiliated hospitals. Data collected included age, aetiology, surgical technique, time interval between trauma and surgical intervention and complications. Diplopia, paraesthesia and ocular motility were recorded.

The follow-up duration averaged 12 months. At follow-up, 0(0%) of 3 patients who underwent surgery within 24 hours (urgent treatment) had residual diplopia. In contrast, 2 (66%) of 3 patients who underwent surgery 24 to 96 hours (early treatment) and 3 (100%) of 3 who underwent surgery after 72 hours (late treatment) had diplopia.

Early surgical intervention in patients with trapdoor fractures is associated with a better clinical outcome in terms of diplopia and skin paraesthesia compared with delayed procedures.

Key words: Orbital Trapdoor Fractures, Intervention time
METHODOLOGY

Retrospective analysis of 9 patients treated for trapdoor fractures at King Hussein Medical Centre in Amman and its affiliated hospitals around the country between 2004 and 2010 were the study subjects.

Data collected included age, etiology, time interval between trauma and surgical intervention, surgical technique and complications (Table 1). Preoperative assessment included visual acuity, ocular motility examination and skin paraesthesia.

In those whom physical examination was difficult due to age or irritability and lack of cooperativity, decision making was based on CT findings.

All patients underwent plain radiographs to assess the facial skeleton for fractures. All patients underwent non-enhanced axial and coronal midface and orbit CT-scan and in all orbital content herniation through the orbital floor was documented.

Patients who had apparent restriction in ocular motility especially upon upgaze, pain on looking upward or apparent enophthalmous, surgery was carried out within 24 hours after trauma in order to alleviate any ischemic tethering the fracture site would impose on the orbital content.

In theatre and prior to surgery all patients underwent forced duction tests to document entrapment of orbital tissue within the fracture site.

For those who did not undergo immediate (within 24 hours) surgery instructions were given as not to blow the nose or perform valsalva maneuver. Systemic antibiotics as well as analgesics and antiemetics were prescribed where required.

Patients were regularly examined for worsening or persistence of diplopia. In 3 patients worsening of their diplopia was the indication to carry out an early surgery (within 72 hours). The remaining 3 patients underwent surgery after 1 week when the oedema subsided and the swelling decreased.

None of the study patients experienced oculo-cardiac reflex symptoms due to the fracture. Our surgical technique ranged between open reduction and internal fixation via a subciliary or transconjunctival incision and using an absorbable mesh or bone graft to seal the bony defect and support the orbital content when required Table 1.

With all approaches, dissection is carried down to the periosteum of the orbital rim, which was incised and reflected. Once the orbital rim is exposed, a subperiosteal dissection was carried out to reach the boundaries of the fracture. Reduction of the entrapped orbital content is carried out at this point. Once the orbital soft tissues are repositioned, an orbital implant or mesh is placed to completely cover the orbital bony defect, and prevent any malpositioning of the soft tissue and to restore the native bony orbital anatomic volume. A forced duction test is performed at this point to confirm adequate relief of entrapment. Excessive pressure or traction is avoided on the globe and optic nerve during retraction.

RESULTS

Follow-up duration averaged 12 months. At follow-up all patients were examined for diplopia, ocular motility and paraesthesia. None of the 3 patients treated within the first 24 hours had residual diplopia. In contrast 2 of the 3 patients who underwent surgical intervention between 24 and 72 hours had diplopia and all (3 out of 3) of the patients who underwent surgery after 72 hours had diplopia. Sensory paraesthesia was seen in one patient who underwent surgery within 36 hours after his trauma. (Figs 1, 2 and table 1)
Orbital trapdoor fractures, when to intervene!

**DISCUSSION**

Orbital trapdoor fractures have been described most commonly in the paediatric population. Controversy still exists about the timing of surgical intervention. Signs of orbital trapdoor fractures include variable ecchymosis and oedema, infraorbital nerve anaesthesia if the fracture line involves the infraorbital canal, enophthalmous if the fracture is severe, although this usually appears after few days of the injury as the oedema subsides. Diplopia occurs due to many factors which can be differentiated clinically or by forced duction test.

Haemorrhage and oedema in the orbit may cause restriction of ocular motility and this improves with the resolution of the oedema. Mechanical entrapment of the orbital content most commonly the inferior rectus muscle followed by the inferior oblique muscle causes diplopia in up gaze and down gaze and the forced duction test in this case is positive. Direct injury to the extraocular muscles is also a cause of diplopia but is associated with a negative forced duction test. Review of literature and recent publications have stressed on the importance of early surgical intervention as it is associated with better clinical outcome in terms of rapid relief of pain, resolution of diplopia and skin anaesthesia.15

Treatment of orbital fractures is based on the fracture size, presence of signs of entrapment and hernitation of orbital contents. In cases of trapdoor

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**TABLE 1: SHOWS DEMOGRAPHIC DATA FOR PATIENTS WITH TRAPDOOR FRACTURE**

<table>
<thead>
<tr>
<th>Patient No</th>
<th>Age (yrs)</th>
<th>Aetiology</th>
<th>Time interval</th>
<th>Surgical technique</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>RTA</td>
<td>12 hours</td>
<td>Transconjunctival, + absorbable mesh</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>RTA</td>
<td>8 hours</td>
<td>Open reduction+internal fixation with absorbable mesh</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>Assault</td>
<td>72 hours</td>
<td>Transconjunctival open reduction</td>
<td>Residual diplopia</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>Falling down</td>
<td>1 week</td>
<td>Transconjunctival open reduction</td>
<td>Residual diplopia</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td>RTA</td>
<td>8 hours</td>
<td>Transconjunctival open reduction+absorbable mesh</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>23</td>
<td>RTA</td>
<td>48 hours</td>
<td>Transconjunctival open reduction</td>
<td>Residual diplopia</td>
</tr>
<tr>
<td>7</td>
<td>24</td>
<td>RTA</td>
<td>1 week</td>
<td>Subciliary open reduction</td>
<td>Residual diplopia</td>
</tr>
<tr>
<td>8</td>
<td>24</td>
<td>RTA</td>
<td>36 hours</td>
<td>Transconjunctival reduction+bone graft</td>
<td>Paraesthesia</td>
</tr>
<tr>
<td>9</td>
<td>28</td>
<td>Assault</td>
<td>1 week</td>
<td>Subciliary open reduction+absorbable mesh</td>
<td>Residual diplopia</td>
</tr>
</tbody>
</table>

Fig 2: Percentage of diplopia in relation to timing of surgery
fractures delay in surgical interventional maybe associated with less satisfactory results as secondary fibrotic changes occur within the orbit and this decreases the chance of a successful outcome especially where diplopia and paraesthesia exist. This retrospective study emphasizes the point that trapdoor fractures should be considered an emergency and treated as such to prevent the risk of permanent complications.

CONCLUSION

Trapdoor fractures can be considered as a surgical emergency. Early surgical intervention has resulted in a better clinical outcome in terms of relief of diplopia and or skin paraesthesia compared to delayed surgeries.

REFERENCES