Endoscopic transnasal approach to repair the orbital floor fracture with preserving fractured bones

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ABSTRACT

Background: Orbital floor fractures (OFF) are common injury secondary to blunt orbital trauma. They can lead to enophthalmos, diplopia from extraocular muscle dysfunction, infra orbital nerve hypoesthesia and pain. The primary aim of orbital wall reconstruction is to prevent these late complications. Many OFF patients have been treated by transantral approach or subciliary incision. The new endoscopic technique of less invasive approach was developed. This study is to evaluate the technique of endoscopic transnasal approach to the OFF patients.

INTRODUCTION

Orbital floor fractures (OFF) are common injury secondary to blunt orbital trauma. They can lead to enophthalmos, diplopia from extraocular muscle dysfunction, infra orbital nerve hypoesthesia and pain. The primary aim of orbital wall reconstruction is to prevent these late complications. Many OFF patients have been treated by transantral approach or subciliary incision. The new endoscopic technique of less invasive approach was developed. This study is to evaluate the technique of endoscopic transnasal approach to the OFF patients.

METHODS AND MATERIALS

Nineteen OFF patients treated with endoscopic transnasal approach were reviewed in a retrospective fashion. Patient clinical data including type of fracture, point of muscle contact, and period from injury to surgery were collected from patient charts. Preoperative and postoperative Hess Ratio (%), and period from injury to surgery were collected. Surgical complications and the presence/absence of the fractured bone absorption were reviewed. Preoperative CT scans of a patient with a left-sided OFF (Fig. 1) and postoperative CT scan demonstrated a repairment of the fracture (Fig. 2).

RESULTS

The subjective symptoms were recovered in all patients. Postoperative Hess Ratio showed no limitation of eye movement after surgery. Postoperative CT scan also showed that the fractured bone of orbital floor was verified in the almost original anatomic location 6 months after surgery. No complications and bone absorption were found after surgery.

Conclusion: The novel technique of ETA to the OFF patients resulted in excellent outcomes. The indication of this technique was considered to be limited in the posterior part of orbital floor. But it allows more minimum invasive surgery for the patients without any incisions and graft placement. We still have to watch the late complications and the presence/absence of the fractured bone absorption.

DISCUSSION

The subjective symptoms were almost recovered in all patients. All of the HAR(%) were above 85% (postoperative, from 0.61-1.00 to 0.08-1.00, Ave. 0.61 to 0.08). But 3 patients complained slight diplopia when they move their eyes to the full range of eye motion. The HAR of 0-3 patients with slight diplopia was recovered to approximately the same as that of the preoperative CT scan. The HAR of 0-3 patients with slight diplopia were caused by misinterpretation of the ET method. ETA can preserve the location of the patient indication because operation is done through the ethmoid sinus not through the maxillary sinus. The fractured area can be fully exposed through the ethmoid. We can do surgical repairment nicely. But if case of the fractured area existing more anterior side of the roof of the maxillary sinus, we may not fully repair the fractured area. The patients with OFF can be treated with endoscopic technique.

REFERENCES


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Figure 1 A-G: ETA to the OFF patients with preserving the fractured bones

Figure 4: Surgical outcome of subjective symptom and objective examinations

Figure 5 A-B: Preoperative and postoperative CT images of OFF patients

Figure 6: Preoperative balloon catheter was inserted in maxillary sinus endoscopically to fix the herniated orbital tissue in the hernia cavity (Fig. A). Figure B: The herniated orbital contents were free from the maxillary sinus endoscopically, and repositioned into orbital cavity (Fig. C).

REFERENCE


B1: Preoperative CT showing the orbital floor fracture with a herniated orbital tissue in the maxillary sinus. B2: Postoperative CT showing the fracture bone repaired nicely and absorption was not observed. B3: Postoperative CT showing the orbital floor bone repaired nicely and absorption was not observed. B4: Postoperative CT showing the maxillary sinus. B5: 24months Postoperative CT showing the orbital floor bone. Bone displacement and absorption were not observed.