

Oculomotor nerve palsy after functional endoscopic sinus surgery

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Abstract

We report an unusual case of partial oculomotor nerve palsy occurring after functional endoscopic sinus surgery, without anatomical disruption of the extra-ocular muscles. The clinical course and possible pathogenic mechanisms are also presented.

Key words: Sinusitis; Endoscopy; Otorhinolaryngological Surgical Procedures; Oculomotor Nerve; Complications

Introduction

Functional endoscopic sinus surgery (FESS), first developed in Austria in the 1970s, has been widely used as an out-patient treatment of sinus disorders. It is a minimally invasive and mucosa-preserving procedure with little patient morbidity. However, serious ophthalmological complications have been reported, such as orbital haemorrhage, blindness and extra-ocular muscle injuries.¹⁻³

This paper reports an unusual case of oculomotor nerve palsy following FESS for nasal polyposis.

Case report

A 14-year-old Chinese boy underwent bilateral FESS for symptomatic sinonasal polyposis under regional anaesthesia (per oral injection of 2 ml xylocaine with 1:80 000 adrenaline into the greater palatine foramen, medial to the second molar). Functional endoscopic sinus surgery was performed using an anterior to posterior approach, and a MerocelTM sponge (Merocel, Medtronic Xomed, Jacksonville, Florida, USA) was placed in the ethmoid cavity at the conclusion of surgery.

On the first post-operative day, the patient complained of vertical diplopia. Ophthalmological examination revealed evidence of a right oculomotor nerve palsy, with ptosis, limited adduction, supraduction and infraduction (Figure 1). The forced duction test was normal. Visual acuities were 6/18 OD (right eye) and 6/6 OS (left eye). There was anisocoria (right pupil 6 mm and left pupil 4 mm) but no relative afferent pupillary defect.

Under direct endoscopic visualisation, the packing and blood in the ethmoid cavity was evacuated and the patient was commenced on intravenous dexamethasone.

A post-operative computed tomography scan showed a breached right lamina papyracea, adjacent to the posterior ethmoid sinus, with a 4.5 mm bone fragment impinging on the medial rectus and optic nerve.

Urgent endoscopic exploration of the FESS cavity and removal of the offending bone fragment was performed, taking care not to pull on the exposed orbital fat.

Post-operative magnetic resonance imaging demonstrated an anatomically intact right optic nerve and muscle cone.

The patient's OD visual acuity improved from 6/18 to 6/9, but his motility disturbance and anisocoria persisted. His diplopia was initially managed with an eye patch and later with frosted glass. Gradual improvement of his ptosis and right eye motility were observed. At the third post-operative month review, he had regained full right ocular motility, with no diplopia (Figure 2).

Discussion

Ophthalmological complications of sinus surgery occur due to the anatomical proximity of the orbit to the paranasal sinuses. The oculomotor nerve enters the intraconal space of the orbit through the superior orbital fissure within the tendinous ring, where it divides into a small superior division and a large inferior division. The superior division passes upward and enters the superior rectus muscle. The inferior division divides into three branches which supply the medial and inferior recti and the inferior oblique muscles. The branch to the medial rectus passes medially to enter the lateral surface of the muscle. The branch to the inferior rectus runs forward on its upper surface and enters the muscle.

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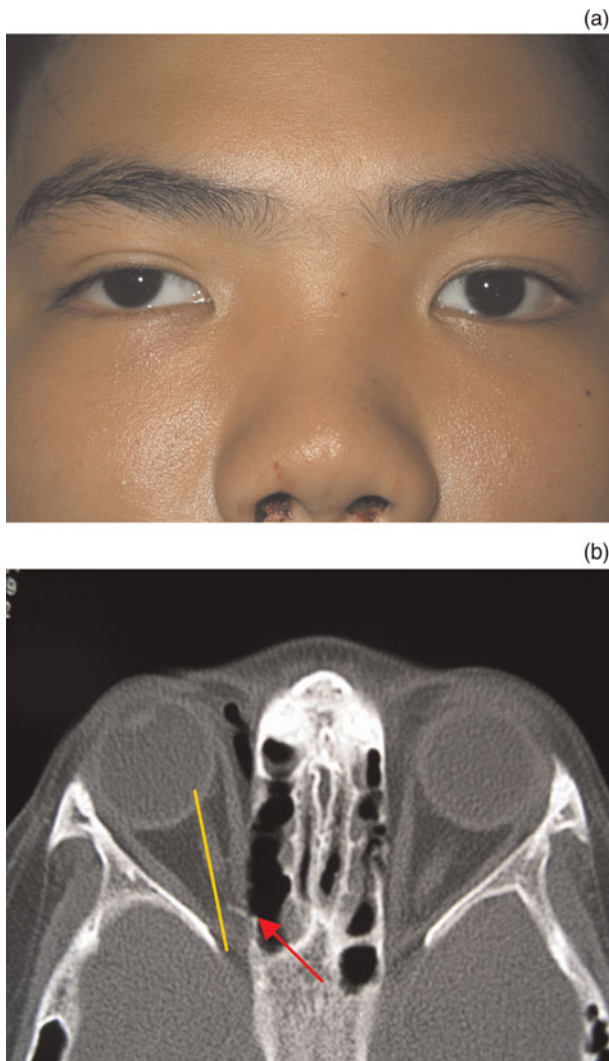


FIG. 1

(a) Right oculomotor nerve palsy following endoscopic sinus surgery; picture shows right ptosis with exotropia and hypotropia. (b) Axial computed tomography scan of the orbit after functional endoscopic sinus surgery, showing a breached medial orbital wall and a displaced bone fragment (red arrow) impinging on the optic nerve (yellow line) and medial rectus muscle.

The branch to the inferior oblique muscle, the longest branch, passes forward close to the orbital floor and enters the posterior border of the oblique muscle.

The most catastrophic, and fortunately rare, complication of FESS is blindness resulting from optic nerve damage.¹⁻³ The extra-ocular muscles¹⁻³ and lacrimal drainage system⁴ may be damaged by the mechanised instrument after penetrating the medial orbital wall. Orbital haemorrhage due to breached orbital vessels and ethmoidal arteries can be potentially blinding if untreated.^{1,5} Oculomotor nerve palsy following FESS has not previously been reported.

In the present case, eventual recovery of the oculomotor nerve function indicates that the injury may have been a neuropraxia rather than nerve fibre transection. We postulate that the bone fragment in the posterior orbit may have caused nerve injury

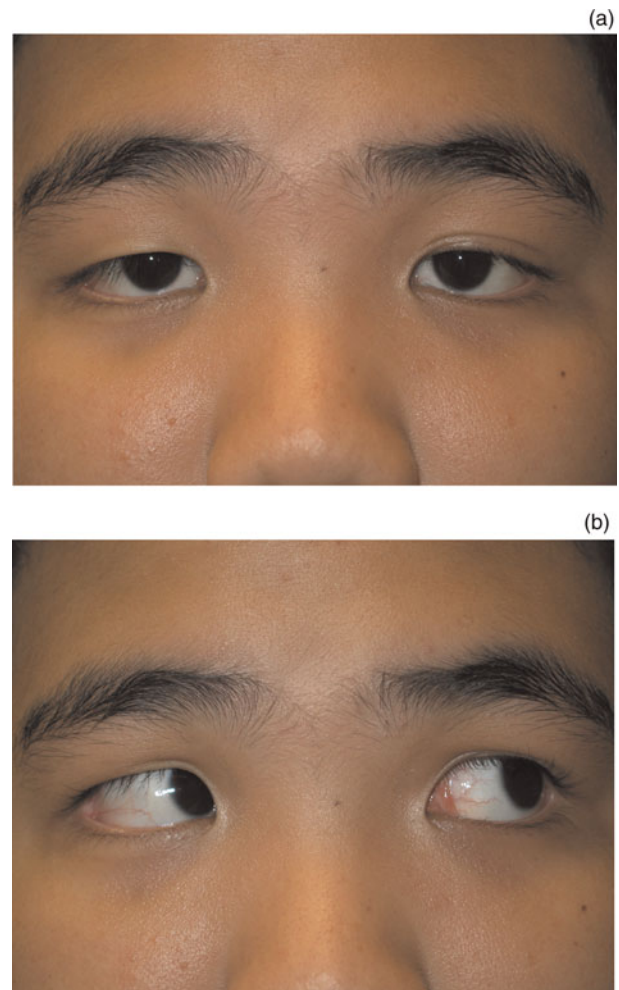


FIG. 2

(a) Three months after functional endoscopic sinus surgery, the right oculomotor nerve palsy had recovered, with improvement of the patient's right ptosis and ocular alignment. (b) Adduction of the patient's right eye became full in the third post-operative month.

directly or indirectly via traction. Alternatively, ischaemic nerve injury, due to disruption of the nerve's blood supply, may have been caused by the bone fragment or the expanding Merocele packing in the ethmoid cavity. Ethmoidal packing should be judiciously used when indicated. Extravasation of local anaesthetic into the orbit from the sphenopalatine injection can result in transient mydriasis, ophthalmoplegia and vision loss; however, this is unlikely to have occurred in our patient.

Orbital imaging is vital in assessing the site and extent of injury in post-FESS orbital complications. Ethmoidal packing should be removed and corticosteroids administered to reduce intra-orbital pressure and oedema. The optimal timing of surgical intervention to repair ocular motility dysfunction is unknown. Prompt surgical release of the incarcerated orbital contents may minimise post-operative adhesion and fibrosis, as is the case in orbital fractures.⁶ In the absence of tissue incarceration or breached extra-ocular muscles, a conservative approach may be considered, as illustrated by our patient.

Strabismus surgery may be necessary if the motility defect persists as troubling diplopia.

Conclusion

Oculomotor nerve palsy after functional endoscopic sinus surgery (FESS) is a rare but significant complication. Our patient's spontaneous recovery indicates that an initial conservative approach may be appropriate in the absence of fat or muscle entrapment. Careful pre-operative evaluation, a good understanding of the regional anatomy and meticulous surgical technique are crucial in avoiding ophthalmological complications of FESS.

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