Lateral canthotomy: A simple and safe procedure for orbital haemorrhage secondary to endoscopic sinus surgery*

Sven Saussez[1], Georges Choufani[1], Jean-Paul Brutus[1], Monique Cordonnier[2], Sergio Hassid[1]

[1] Department of Otorhinolaryngology/Head and Neck Surgery, Hôpital Erasme, Free University of Brussels (ULB), Brussels, Belgium
[2] Department of Ophthalmology, Hôpital Erasme, Free University of Brussels (ULB), Brussels, Belgium

SUMMARY

Two cases of orbital complications secondary to functional endoscopic sinus surgery are presented. One case was complicated in the immediate post-operative period with an orbital haematoma, which required urgent decompression using lateral canthotomy. The second case had presented an acute orbital haemorrhage during functional endoscopic sinus surgery, which required the same surgical procedure. These cases demonstrate that lateral canthotomy constitutes a safe and fast surgical procedure to decrease the intraorbital pressure.

Key words: functional endoscopic sinus surgery, orbital complications, orbital decompression, canthotomy

INTRODUCTION

For the surgeon performing functional endoscopic sinus surgery (FESS) the normal anatomy of the orbit is filled with potential problem areas. Orbital anatomy has been described in detail by Stammberger (1991), Kennedy and Zinreich (1989), and Rice and Schaefer (1993). The structures at risk include the lamina papyracaea, the nasolacrimal system, the anterior and posterior ethmoid arteries, the orbital fat, the medial rectus and superior oblique muscles, and the optic nerve.

The largest series, numbering more than 8,000 cases, reported by Stammberger and Hawke (1993), sustained no orbital complication. However, higher incidences were reported in other, smaller series. Among these, Stankiewicz (1989) observed five orbital haemorrhages in his series of 300 patients. Levine (1990), for his part, described three orbital haemorrhages among 250 patients.

Orbital complications constitute a group of serious complications including injuries of the extra-ocular muscles, orbital haemorrhage, periorbital emphysema, damage to the nasolacrimal apparatus, and optic nerve injury (Corey et al., 1993; Stankiewicz, 1989; Buus et al., 1990; Neuhaus, 1990). We report two cases of immediate post- and intraoperative orbital haemorrhages managed by lateral canthotomy.

CASE REPORT

Case 1

A 46-year-old woman was admitted for FESS and septoplasty. She had been complaining of anosmia and frontal headache for one year. She had a deviated nasal septum and bilateral inferior turbinate hypertrophy. Endoscopic examination (bilateral oedema score: 2; bilateral discharge score: 2 [cf., Lund et al., 1995] and CT imaging demonstrated a bilateral maxillary, ethmoid and sphenoid sinus disease (radiologic staging: 8). Interestingly, neither Haller cells nor concha bullosa were present, and the middle meatus was normal. Previous medical treatment with amoxycillin/clavulanate and oral corticosteroids had been ineffective. She underwent bilateral endoscopic ethmoidectomies, sphenoidectomies and maxillary antrostomies (surgery score: 10). Polypoid tissue was found intraoperatively. No intraoperative problems were encountered. One hour postoperatively right-sided proptosis developed, associated with limitation of ocular movements in all directions. She returned to the operating room for large opening of the lamina papyracaea. The opening was performed starting at the inferior uncinate cell and extending 20 mm antero-posteriorly and 5 mm rostro-caudally, and no orbital fat appeared in the middle meatus.

* Received for publication November 13, 1996; accepted August 18, 1997

In spite of this, right proptosis continued to develop and she began complaining of inferior visual field amputation and blurred vision. Right afferent pupillary defect was then present (i.e., pupillary sign of optic nerve dysfunction). An urgent CT scan of the orbit and paranasal sinuses showed blood in the right orbit. With the ophthalmologist, we decided to perform an immediate right lateral canthotomy and inferior cantholysis (under local anaesthesia), which decompressed the right orbit. Her vision immediately returned to normal, together with recovery of the inferior visual field and normal pupillary reflexes. Right canthoplasty was performed under local anaesthesia three days after FESS with excellent cosmetic results.

Case 2

A 35-year-old man was referred with complaints of chronic nasal obstruction, bilateral maxillary pain and purulent nasal discharge (symptom score: 30, since 2 years). He had bilateral inferior turbinate hypertrophy and purulent secretions in the middle meatus (bilateral oedema score: 2; bilateral discharge score: 2). CT imaging demonstrated bilateral maxillary sinus disease (radiologic staging: 4) and absence of Haller cells and concha bullosa (Figure 1). His past medical history revealed a congenital immunological deficit, which led to recurrent infections (meningitis, pneumonia). Since medical treatment was ineffective, he underwent bilateral endoscopic maxillary sinus ostium enlargement followed by bilateral middle turbinectomies (surgery score: 4).

During the sinus procedure, the right lamina papyracaea was breached at the level of the inferior uncinate cell. After the incision of the uncinate process, while performing the posterior enlargement of the meatotomy, a 5mm-long green-stick fracture of the antero-inferior part of the lamina papyracaea was created inadvertently. Nevertheless, no orbital fat protruded through the fracture. After middle turbinectomies, nasal packs were put in place. Despite the nasal packs, the patient bled and the blood followed the path of least resistance through the breach of the lamina papyracaea into the right orbit: this led to right proptosis and increased intraorbital pressure. Because of high intraocular pressure we decided, in consultation with the ophthalmologist, to perform a right lateral canthotomy and inferior cantholysis which decompressed the right orbit. Intravenous corticosteroids were given. After recovery, repeated ophthalmological examinations showed stable vision of both eyes (similar to pre-operative vision) and canthoplasty was similarly performed two days after with no remaining aesthetic prejudice.

DISCUSSION

A review of the medical literature from 1980 to 1996 revealed few reports on orbital complications secondary to FESS. Stammberger and Hawke (1993) reported no orbital complications in their 8,000-patients series. Vleming et al. (1992) in 593 patients encountered two orbital haemorrhages and one lacrymal duct injury. Stankiewicz (1989) described five orbital haemorrhages in 300 patients, among which one led to temporary blindness. Maniglia (1991) has reported one case of permanent blindness secondary to FESS. Although orbital complications are rare,

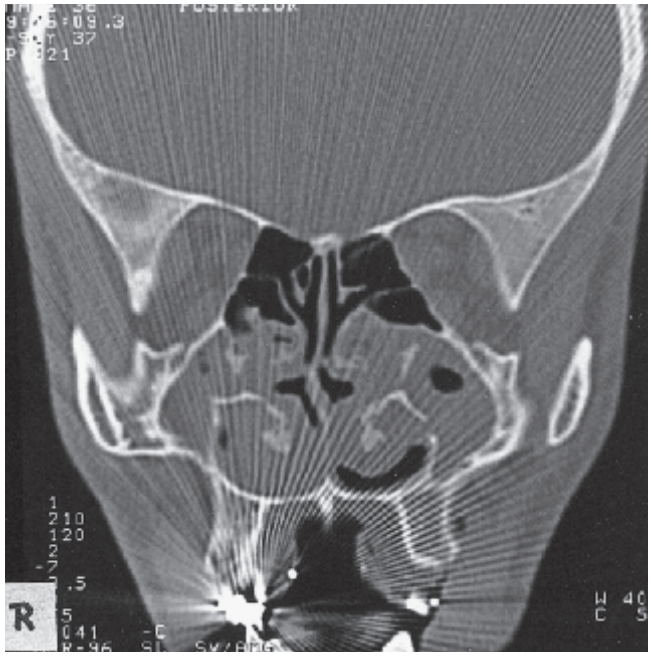

Figure 1. CT scan demonstrating bilateral maxillary sinus disease. The small size in top of the right maxillar sinus can explain how a green-stick fracture of the antero-inferior part of the lamina papyracaea was created.

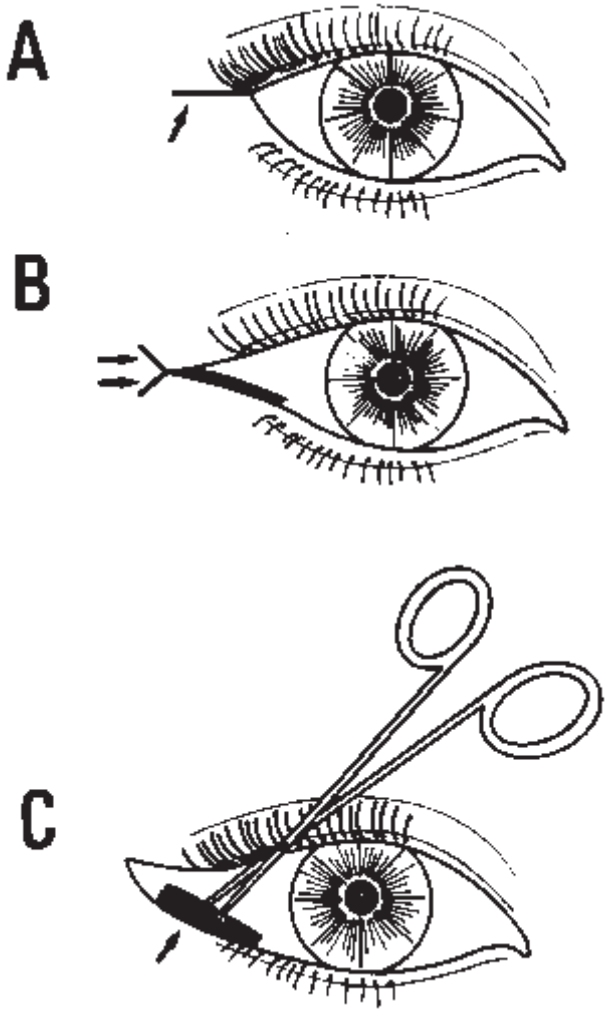

Figure 2. Procedures that allow anterior displacement of orbital soft tissue and decrease intraorbital pressure. (A) lateral canthotomy; (B) counter-incision; (C) inferior cantholysis.

they can seriously threaten the patient's vision; among these complications, orbital haemorrhage appears to be the most frequently observed. The clinical signs of orbital haemorrhage include: proptosis, chemosis (Stankiewicz, 1989; Corey et al., 1993), lid oedema and limited ductions in all directions (Neuhaus, 1990). The pathophysiological mechanism leading to loss of vision is still not completely understood and appears to be due to either direct optic nerve compression or because the pressure becomes higher than the arterial perfusion pressure to the orbital soft tissues, optic nerve and retina (Neuhaus, 1990). Because the retina and the optic nerve only tolerate ischaemia for a short time (less than 2-3 h), diagnosis and management of orbital haemorrhage must be rapid. Surgical decompression of the orbit must be considered when the vision fails to improve within 90 min after medical treatment (mannitol bolus, Decadron).

The management of orbital complications can be divided into intra- and post-operative periods. If orbital bleeding is observed intra-operatively, surgical treatment is of course immediately indicated. Three surgical procedures are proposed to rapidly decrease intraorbital pressure: (1) external ethmoidectomy; (2) endoscopic removal of the lamina papyracaea (Rice and Schaefer, 1993); and (3) lateral canthotomy (Stankiewicz, 1989; Neuhaus, 1990). As procedure of first choice we recommend endoscopic removal of the lamina papyracaea with several slits of periorbita to allow bulbing of the orbital fat.

In case of intraoperative, massive orbital bleeding associated with sudden and important proptosis, we feel that lateral canthotomy is the safest and fastest surgical procedure. Lateral canthotomy immediately reduces pressure by expending orbital volume. This procedure can be done during surgery or under local anaesthesia in the post-operative period, whereas external ethmoidectomy and endoscopic removal of the lamina papyracea both require general anaesthesia. A full-thickness incision is made, using scissors through the lateral canthus to the orbital rim (Figures 2A-B). The inferior canthal tendon is then divided, liberating the septal attachment of the lower lid from the orbital rim (Figure 2C). This simple manoeuvre is often sufficient in reducing intraorbital pressure. If not, endoscopic removal of the lamina papyracaea should be considered as the technique of choice.

The FESS surgeon can encounter other serious orbital complications, including injuries to the extraocular muscles, periorbital emphysema, damage to the nasolacrimal apparatus, and direct optic nerve injury resulting in blindness (Stankiewicz, 1989; Neuhaus, 1990). In case of direct muscle trauma, early exploration and surgical procedure will be required. Otherwise, conservative treatment is followed and surgical correction is undertaken only if diplopia persists beyond six months. Periorbital emphysema will spontaneously resolve over a 3- to 4-week period. Epiphora in the immediate post-FESS period can indicate a damage of the nasolacrimal apparatus secondary to the anterior enlargement of the meatotomy or just be secondary to the periorbital oedema. If epiphora persists, endoscopic dacryocystorhinostomy can be performed. Finally, in case of optic nerve damage, progressive loss of vision or an acute blindness can be observed. An urgent consultation by an ophthalmologist is essential, because the differential diagnosis is dramatically important for the management and includes: optic nerve transection, optic nerve crush injury, optic nerve sheath haematoma, and central retinal artery occlusion. In case of optic nerve transection nothing can be done. For optic nerve crush injury/sheath haematoma we propose corticosteroids (1 mg/kg Decadron i.v.) during the first 24 h. If blindness persists over 24 h despite the medical treatment, in agreement with the ophthalmologist, a transethmoid-sphenoid optic nerve decompression can be performed through an external or endoscopic approach (Rice, 1993). Considering the number and frequency of these orbital complications, even in the best of hands, the FESS surgeon must prevent, recognize and manage them. A good pre-operative preparation, meticulous surgical procedure and serious post-operative care constitute the key of the prevention. However, the FESS surgeon must be able to diagnose and manage the different complications encountered. Documentation of the visual function before FESS is essential, especially if the patient presents a loss of vision, to allow post-operative comparison of the visual acuity. Therefore, close cooperation with the ophthalmologist can improve the surgical management of orbital complications and decrease long-term morbidity.

REFERENCES

1. Buus DR, Tse D, Farris BK (1990) Ophthalmic complications of sinus surgery. Ophthalmology 97: 612-619.
2. Corey JP, Bumsted R, Panje W, Namon A (1993) Orbital complications in functional endoscopic sinus surgery. Otolaryngol Head Neck Surg 109: 814-820.
3. Kennedy DW, Zinreich SJ (1989) Endoscopic Sinus Surgery. Otolaryngol Head Neck Surg Update I. Mosby, St. Louis, pp. 81-94.
4. Levine HL (1990) Functional endoscopic sinus surgery: Evaluation, surgery and follow-up of 250 patients. Laryngoscope 100: 79-84.
5. Lund VJ, Kennedy DN (1995) Quantification for staging sinusitis. Ann Otol Rhinol Laryngol Suppl 167: 17-21.
6. Maniglia AJ (1991) Fatal and other major complications of endoscopic sinus surgery. Laryngoscope 101: 349-354.
7. Neuhaus RW (1990) Orbital complications secondary to endoscopic sinus surgery. Ophthalmology 97: 1512-1518.
8. Rice DH, Schaefer SD (1993) Anatomy of the paranasal sinuses. In: DH Rice, SD Schaefer (Eds.) Endoscopic Paranasal Sinus Surgery, 2nd Edition. Raven Press, New York, pp. 3-50.
9. Stammberger H (1991) Special endoscopic anatomy of the lateral nasal wall and ethmoidal tissues. In: H Stammberger (Ed.) Functional Endoscopic Sinus Surgery. The Messerklinger Technique. B.C. Decker, Philadelphia, pp. 49-88.
10. Stammberger H, Hawke M (1993) Postoperative problems and complications. In: H Stammberger, M Hawke (Eds.) Essentials of Functional Endoscopic Sinus Surgery. Mosby Yearbooks, St Louis, pp. 199-208.
11. Stankiewicz JA (1989) Blindness and intranasal endoscopic ethmoidectomy: Prevention and management. Otolaryngol Head Neck Surg 101: 320-329.
13. Vleming M, Middelweerd RJ, De Vries N (1992) Complications of endoscopic sinus surgery. Arch Otolaryngol Head Neck Surg 118: 617-623.

S. Hassid
ENT Department
Hôpital Erasme
808 Route de Lennik
B-1070 Brussels
Belgium