CASE REPORT

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The management of acute visual loss after sinus surgery - two cases of rhinogenic optic neuropathy*

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SUMMARY

Introduction: *Different causative mechanisms of ophthalmic complications during endonasal sinus surgery have been reported. Only a few cases of blindness caused by affections of the optic nerve due to inflammatory paranasal sinus disease have been described.*

Objective: *Inflammatory optic neuropathy shall be considered among the causative factors for amaurosis after sinus surgery.*

Material: *We present two patients with dramatic visual decrease occurring two weeks after sinus surgery as a result of inflammatory posterior paranasal sinus disease.*

Results and Conclusion: *Our therapy including surgical intervention in form of orbital or optic nerve decompression accompanied by systemic steroids and antibiotic therapy resulted in a significant increase of visual acuity in one case and a complete restoration of vision in the other case. In these two cases surgical intervention in the described fashion along with systemic steroids and antibiotic therapy represented a successful therapeutical approach.*

Key words: blindness, neuropathy, optic nerve decompression, rhinogenic, sinus surgery

INTRODUCTION

There are several factors which can cause acute visual loss after sinus surgery: besides direct optic nerve injury amaurosis can as well be caused by orbital haemorrhages, either from direct damage to orbital vessels or by spread into the orbit through a medial wall defect, which may lead to an acute rise in orbital pressure.

In some cases defects of visual fields with acute or subacute postoperative loss of sight can be caused by ischemic optic neuropathy (ION). The major risks for developing ION include comorbidities like perioperative anaemia, hypotension and systemic illnesses such as hypertension, diabetes or renal failure [(1)].

Another rarely reported reason for visual loss is the direct extension of sinus infection to the optic nerve from suppurative paranasal sinusitis [(2,3)].

The objective of this case report is to point out that as one possible reason for blindness after sinus surgery inflammatory optic neuropathy has to be considered.

Our two presented patients underwent endonasal orbital decompression accompanied by systemic steroids and antibiotic therapy, which lead to a significant increase of vision.

Several studies confirm that in cases of traumatic optic neuropathy better results regarding the improvement of visual acuity can be achieved by surgery compared to nonsurgical treatment [(4)]. It seems as if time lapse after injury and treatment and the initial degree of visual loss are significant prognostic factors [(5)].

CASE REPORTS

Case 1

The first patient, a 35-year old male, presented with amaurosis on the left eye 16 days after bilateral sinus surgery performed for chronic rhinosinusitis at another institution. The symptomatology accompanied by an orbital swelling had already started 10 days after the surgery. A therapy with oral antibiotics (Clindamycin) had been instituted two days, an oral corticoid therapy (Aprednisolon 500 mg/day) one day before he presented at our clinic. None of these medical treatments resulted in an improvement of the described symptoms.

The left pupil was noted to be mydriatic and without response to direct illumination. Ophthalmic examination revealed edema of the left macula and pupillary motoric dysfunction. The preoperative measurement of visual acuity indicated 20/400 on the left and 20/20 on the right eye.

A computed tomography (CT) scan did not show a compressing process along the left optic nerve, but a partial opacification of the left posterior ethmoidal cells (Figure 1a: preoperative axial CT-scan; Figure 1b: preoperative coronal CT-scan).

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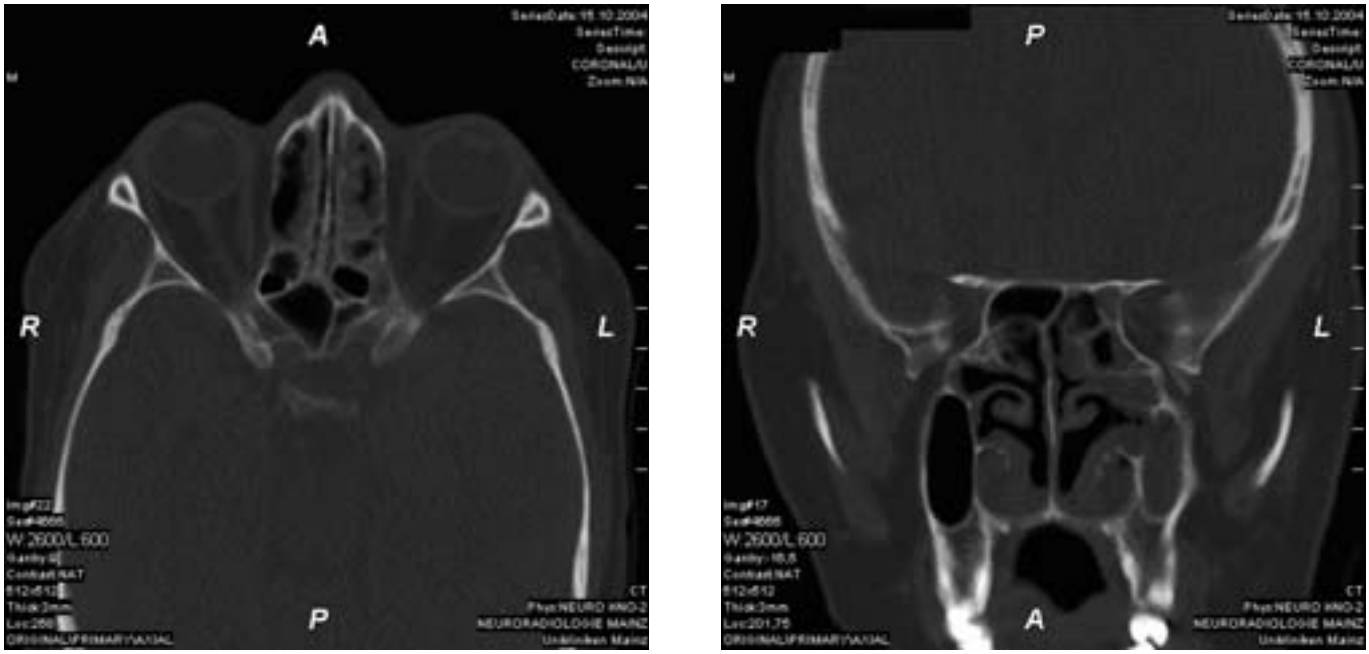

Figure 1. Preoperative *axial* (a, LEFT) and *coronal* (b, RIGHT) orbital CT-scan showing partial opacification of the left posterior ethmoidal cells in the area of the orbital apex close to the optic nerve canal.

Immediate endonasal microscopic transethmoidal/transsphenoidal sinus revision surgery was performed on the same day including orbital decompression. During this surgery a suppurulent mucositis in the area of the posterior ethmoidal cells was discovered. Lamina papyracea was removed back to the orbital apex and periorbit was incised.

Postoperatively mega-doses of systemic steroids (Solu Decortin 1000 mg/day) were administered simultaneously with culture guided antibiotic therapy (cultures positive for *Klebsiella pneumoniae* and *Proteus vulgaris*).

One day after surgery the ophthalmic examination showed a significant increase of visual acuity by 3 times to 20/130. When the patient presented again four weeks later a further visual increase to 20/32 could be noted.

Case 2

The second patient, a 59-year old male, suffered from dramatic visual decrease on the right eye, which occurred two weeks after sinus surgery and resection of the middle turbinate on the right side for complete removal of an inverted paranasal papilloma. Starting one week after surgery, the patient had displayed initial symptoms including edema of the right lower lid and periorbital pain. At this time an oral antibiotic therapy (Ciprofloxacin) had been initiated but no improvement of the described symptomatology could be observed. Around 24 years ago he had already undergone a transantral Caldwell Luc – procedure for chronic maxillary sinusitis.

The CT scan showed an incomplete opacification of the right posterior ethmoidal cells adjacent to the optic nerve and it's entering into the bony canal.

The ophthalmic examination revealed perception of hand movement on the right eye, the presence of which is referred to as a critical prognostic factor for potential postoperative visual improvement [6,7]. Right after the examination, microscopic endonasal transethmoidal/transsphenoidal optic nerve decompression under general anaesthesia was carried out. After entering the sphenoid sinus, where a suppurative mucositis was discovered, and identifying the bulge of the optic nerve on the lateral wall, the bony covering of the optic nerve back to the orbital apex was removed. The now visible optic nerve turned out to be swollen due to inflammatory disorder. Thereafter a resection of two thirds of lamina papyracea was performed and incisions of periorbit were made. Because of the acute inflammatory disease, no slitting of the nerve sheath was conducted.

Right after surgery a systemic therapy with mega-doses of steroids and antibiotics was initiated. The antibiogram was sensitive for staphylococcus aureus and peptostreptococcus.

One day after surgery ophthalmic examination showed a significant improvement of vision to 20/50 and only a minimal remaining afferent pupillary defect. The patient's visual acuity continuously improved during the following days up to a complete restoration of vision six days after surgery.

DISCUSSION

Acute visual loss due to inflammatory paranasal sinus disease has rarely been reported.

The described cases show that direct extension of sinus infection to the optic nerve from suppurative paranasal sinusitis needs to be considered among the potential causative factors for amaurosis after sinus surgery. However, besides inflammatory disease compression of the optic nerve may also be responsible for decrease in visual acuity.

As a first step in cases of postoperative blindness the patient should immediately be examined by an ophthalmologist to exclude other reasons for visual decrease than optic nerve inflammation.
To strengthen the suspected diagnosis of inflammatory optic nerve affection an MRI scan would be recommended because of its more sensitive presentation of soft tissues compared to a CT scan. In the described cases unfortunately no MRI scan was conducted but the diagnosis based on the CT scan was verified during the surgery.

Both of our patients were treated with systemic steroids and/or antibiotics immediately after the diagnosis of their decreasing vision, but in these two cases no improvement of vision could be achieved. Due to the unsuccessful medical treatment and the described abnormities around the optic canal in these two cases, endonasal surgery was conducted.
Various approaches for optic nerve and orbital decompression have been advocated such as extranasal transethmoidal, transorbital, transantral and neurosurgical procedures as well as the endoscopic endonasal approach. The endoscopic approach for optic nerve decompression shows success rates comparable to those of the more traditional methods [(8)]. The endonasal transethmoidal route using a microscopic technique offers advantages as it allows the surgeon to have binocular vision and - using a self retaining nasal speculum - bimanual surgical technique [(9)]. With this surgery carried out by an experienced surgeon a safe and minimal invasive technique of optic nerve decompression can be offered to the patient. To make it even safer computer-aided surgery can be implemented [(10)].
Compared to the low risk of surgery the high potential in visual improvement makes surgical treatment the preferred option in case of rhinogenic optic neuropathy.
Although in our cases surgery was performed not immediately but six (first patient) and seven (second patient) days after the symptomatology had occurred, in one case a significant increase and a complete restoration of visual acuity in the other case could be achieved.

The usefulness of surgical decompression of the optic nerve in cases of traumatic optic neuropathy has been confirmed in several studies to avoid secondary lesions like vasospasm and contusion-edema, which lead to a swelling of the optic nerve and cause ischemia [(11)]. On the other hand it has also been reported that the best improvement in vision after optic nerve decompression can be achieved in cases of inflammatory processes compared to traumatic injuries and tumor patients [(12)].
Although some authors claim visual improvement after optic nerve decompression with months of delay, we think that once the diagnosis of rhinogenic optic neuropathy is established surgery should be carried out if medical treatment doesn't show any significant improvement.
Even if only a few cases of blindness caused by affections of the optic nerve due to inflammatory paranasal sinus disease have been described and further studies on this subject have to be carried out, we can state that rhinogenic optic neuropathy needs to be considered among the potential factors for blindness after sinus surgery. In the two presented cases surgical intervention in the described fashion accompanied by systemic steroids and antibiotic therapy represented a successful therapeutical approach.

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