CASE REPORT

Sphenoidal sinus mucocele presenting with acute visual loss in a scuba diver

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SUMMARY

A 43-year-old male scuba diver presented with an acute history of painful unilateral visual loss after scuba diving. He had right-sided retrobulbar pain and headache. He was known to have sinusitis and had transient visual loss in two previous episodes after scuba diving. His visual acuity was hand motions and 20/20 in the right and left eye, respectively. There was no proptosis. He had a right relative afferent pupillary defect. Colour vision was normal in the left eye and absent in the right eye. Fundal examination revealed healthy discs and macula bilaterally. He was assessed as a right optic neuropathy, possibly secondary to compression. An MRI of the brain revealed a large sphenoidal mucocele extending into the right optic foramen. He was treated with oral steroids, antibiotics and nasal decongestants. He underwent endoscopic intranasal sphenoidectomy and marsupialisation with return of his visual acuity to 20/25 in that eye.

BACKGROUND

This case is important as it highlights a rare cause of compressive optic neuropathy which can occur in a scuba diver as a result of barotrauma.

CASE PRESENTATION

A 43-year-old male scuba diver presented with a 4-day history of acute unilateral painful visual loss in his right eye, occurring 90 min after scuba diving approximately 80 feet below sea level. He had two previous episodes of visual loss in his right eye, occurring after diving, 4 and 6 months prior to presentation but resolved after he underwent a decompression scuba diving manoeuvre. He also had a right-sided retrobulbar pain and headache. There was no history of paresthesia, joint pains, dyspnoea or confusion; however, he had a history of sinusitis.

On examination his visual acuity was hand motion (HM) and 20/20 in the right and left eye, respectively. His extraocular movements were full and he had no proptosis. The anterior segments were normal. Intraocular pressures were 18 mm Hg in both eyes. He had a right relative afferent pupillary defect, but dilated funduscopy revealed a healthy optics disc and retina (figure 1).

INVESTIGATIONS

Visual field test showed a right inferior visual field defect (figure 2).

An MRI of the brain and orbits revealed a large sphenoidal mucocele extending into the right optic foramen with resulting superonasal optic nerve

compression (figure 3). It also extended anteriorly into the right posterior ethmoidal sinuses.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis was a right optic neuropathy, secondary to compression from the sphenoidal mucocele. The possibility of a right retrobulbar optic neuritis was also considered.

TREATMENT

He was started on oral prednisone 60 mg once daily orally and amoxicillin/clavulanic acid (augmentin) 625 mg twice daily orally for 10 days with nasal decongestants.

OUTCOME AND FOLLOW-UP

Two weeks later his vision had improved from HM to 20/25–3 in the affected eye. Prednisone 60 mg once daily was continued orally for a further week and then tapered. The patient later had endoscopic intranasal sphenoidectomy and marsupialisation performed by the ear, nose and tongue (ENT) team. His vision did not improve further postoperatively.

DISCUSSION

Mucocele affecting the orbit most commonly are frontoethmoidal.^{1 2} Sphenoidal sinus mucoceles, benign cystic lesions are rare, occurring in only 1–2% of the paranasal sinus mucoceles.^{3 4} They may occur as a result of trauma, infection, prior sphenoidal sinus surgery and head and neck radiation.^{4 5} Sphenoidal mucoceles can cause significant visual impairment due to either compression with vascular compromise⁶ or the spread of inflammation or infection to the optic nerve.⁷ It is rare in children as the sphenoid sinus completes pneumatization at about 12 years of age.⁸ It usually occurs in patients in their fourth decade.⁹

The most common presenting symptom of sphenoidal sinus mucocele is a non-axial proptosis in 66–75% of patients.^{1 2} However, this was not present in our patient, who had a history of sinusitis. Visual loss can be present in 20–50% of cases.^{4 10} Our diver had an acute unilateral visual loss associated with retrobulbar pain. Other presenting findings include headache (30%), extraocular motility abnormalities, nasal congestion (30%), optic neuropathy (18.8%) less commonly ophthalmoplegia and orbital cellulitis.^{2 4 10} It may be complicated by a cerebral empyema or meningitis. The diagnosis is based on endoscopy findings or CT or MRI scanning.¹¹

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Figure 1 Fundus photograph of both eyes.

Prognosis for recovery of visual loss is poor if the onset is sudden or if the visual acuity is no light perception preoperatively.¹² However, 55.5–62.5% of patients had resolution of their optic neuropathy after surgery, this was dependent on the duration of and amount of compression on the optic nerve.^{10 13 14} Our case may have had a good outcome because

of the gradual onset of visual loss associated with the slow but limited expansion of the sphenoidal mucocoele as a result of barotrauma.

Sinus barotrauma, is due to pressure differences in the sinuses from diving and can result from improper diving technique, defective equipment or diving with sinus congestion. The

Figure 2 Humphrey's visual field test result for the right eye showing the inferotemporal quadrantic visual field defect and a normal visual field in the left eye.

Figure 3 Axial MRI showing the sphenoidal sinus mucocoele encroaching on the right optic nerve at the optic foramen.

proposed pathomechanism of our case was that the sphenoidal sinus mucocoele acutely expanded due to the depth of the water into which the diver was submerged resulting in loss of vision from optic nerve compression. However, his visual loss took ~90 min to become apparent and this may be due to a slow expansion of the mucocoele, with the resulting slow expansion of the mucocoele. He was prone to barotrauma and decompression syndrome, due to his Valsalva manoeuvre, lack of proper equipment and sinus congestion. Although decompression illness ('the bends') can result in loss of vision, from an arterial gas embolus (AGE) in the central retinal artery, he did not have the other features of joint pains and paraesthesia. A differential of optic neuritis was considered and this has been previously reported occurring secondary to sphenoidal mucocoeles.¹⁵

Our case responded well with medical decompression, using an oral steroid prior to surgery. The steroid and nasal decongestants proved helpful in three ways. First, the steroid would have helped any associated optic neuritis secondary to spread of inflammation from the sphenoidal mucocoele. Second, the steroid in combination with the nasal decongestants would have treated the osteal inflammation thus allowing drainage and decompression of the mucocoele. The oral steroid would have assisted in reducing the optic nerve swelling secondary to compression. Intravenous steroids may have been more beneficial in a more rapid recovery as it is a higher dosage and earlier onset of action. However, it was not used in this case. Caution must be used with high dose steroids where a possible infection is present as this can complicate the problem.

Surgical intervention as the initial management may have been effective in relieving pressure in the optic nerve resulting in an earlier improvement in visual acuity and reducing the residual damage (ie, the visual field loss).

Sphenoidal mucocoeles are rare but potentially sight threatening due to the proximity to the optic nerve. Early diagnosis and treatment are vital to prevent permanent visual loss. Management is multidisciplinary and involves the ophthalmologist, radiologist and ENT surgeon, with endoscopic intranasal

sphenoidectomy and marsupialisation of the mucocoele. Nasal decongestants, oral steroids and antibiotics can preserve vision while awaiting surgical intervention as was evident in the case of this patient. It is important to have a high index of suspicion for this condition as a differential diagnosis in scuba divers with acute visual loss. This is the first recorded cause of acute visual loss in a diver secondary to expansion of a sphenoidal mucocoele.

Learning points

- ▶ Scuba divers are at risk of acute visual loss due to decompression sickness and arterial gas embolism.
- ▶ Scuba divers with sinusitis or mucocoeles are at risk of mucocoele enlargement due to barotrauma (pressure differences) during a dive.
- ▶ Enlarging sphenoidal mucocoeles can cause optic nerve compression leading to acute painful visual loss.
- ▶ This visual loss can improve with medical decompression prior to surgical intervention.
- ▶ It is important to consider this as a differential diagnosis in acute painful visual loss in a scuba diver, particularly when there are no symptoms of decompression syndrome.

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