

## Letters to the Journal

### Acute Orbital Cellulitis due to Gas-forming Bacteria

Sir,

A case of gas-forming acute bacterial orbital cellulitis and sinusitis is presented, in which, despite early medical and surgical intervention, there was a permanent loss of vision.

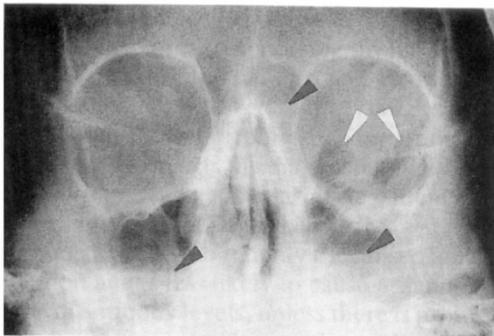
Acute bacterial sinusitis is present in 60-80% of cases of orbital cellulitis,<sup>1-3</sup> especially in those under the age of 20 years. Passage of infection from sinuses to orbit, by direct or haematogenous spread, is relatively easy through the thin bones of the orbital walls.

We describe a case in which sinusitis and orbital cellulitis was associated with intraorbital gas-formation and permanent loss of vision.

#### Case report

A 14-year-old boy presented with a one-week history of nasal obstruction, general malaise and myalgia; left orbital pain and swelling were present for one day prior to admission. Past investigation for haemoptysis had been normal.

He was systemically unwell, with pyrexia (37.3°C) cervical lymphadenitis and a leucocytosis of  $20 \times 10^9/\text{mm}^3$ . There was marked redness and swelling of the left eyelids, 3 mm of left proptosis and a mild chemosis. Supraduction and abduction of the left eye were moderately limited, but colour



**Fig. 1.** Plain X-ray of patient with left orbital cellulitis and widespread sinusitis. Preoperatively, gas outlines some of the structures within the left orbit (light arrows), the ethmoid sinuses are opaque and fluid levels (dark arrows) are present in the left frontal sinus and both maxillary sinuses.

vision and acuity were normal. Sinus radiographs showed fluid levels in the left maxillary and frontal sinuses, with gas in the left orbit (Figure 1).

Ephedrine nose drops, oculente chloramphenicol and intravenous ampicillin, flucloxacillin and metronidazole were given. Four hours later there was a rapid deterioration in left visual acuity (to perception of hand movements), increased proptosis with lateral displacement of the left globe (Figure 2) and restriction of eye movements. Severe purulent ethmoiditis and maxillary sinusitis was demonstrated at emergency left external ethmoidectomy, bilateral antral lavage and creation of intranasal antrastomies. Although a minor defect of the orbital floor was present, with pus in the extra-periorbital space, the orbital periosteum was intact.

Streptococcus pneumoniae was cultured from fluid taken at antral lavage. Computerised tomograms on the first postoperative day showed gas in both the intraconal and extraconal spaces of the left orbit, but no evidence of orbital abscess (Figures 3a & 3b).

The proptosis and restriction of eye movements increased one day after surgery and subconjunctival gas (with crepitus) was present; these changes resolved with intravenous ceftazidime, metronidazole and chloramphenicol. The left vision permanently decreased to non-perception of light by the second day, with a dense relative afferent pupillary defect and later secondary optic atrophy.

#### Discussion

Periocular infections present in several ways



**Fig. 2.** Preoperative view of the patient, showing proptosis and lateral displacement of the left globe.



Fig. 3a.

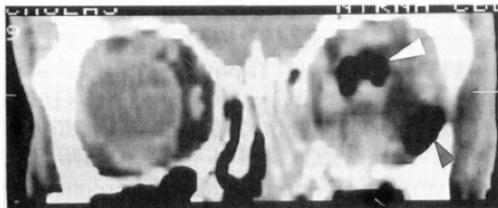


Fig. 3b.

**Fig. 3.** Orbital CT scans demonstrating ethmoiditis and gas in the intraconal (light arrow) and extraconal (dark arrow) spaces of the left orbit: (a) axial and (b) reformatted coronal scans taken on the first postoperative day.

and can be difficult to distinguish clinically.<sup>4</sup> Preseptal cellulitis is characterised by inflamed eyelid tissues, but an absence of proptosis, limitation of ocular movement or visual impairment. Orbital infection is typically painful, with swelling and redness of the eyelids, chemosis, proptosis, limitation of ocular movements and often significant visual impairment.

Several bacterial species occur relatively commonly in patients with sinusitis and orbital cellulitis, particularly *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Haemophilus influenzae* and various anaerobes. Gas-forming organisms are extremely rare, and, because of problems with the culture of these bacteria, precise identification is often impossible (as in our patient); *Clostridium* species are the most likely pathogens, although other enterobacteria (*Escherichia coli* and *Proteus* or *Klebsiella* species) may also occur.<sup>5</sup>

Although intraorbital gas may be seen after

surgery to the periorbital sinuses, in the present case intraorbital gas was clearly demonstrated on preoperative radiographs (Figure 1).

Raised intraorbital pressure, a result of inflammatory oedema, pus or gas within the confines of the bony orbit, causes optic nerve ischaemia and secondary optic neuropathy. Damage to the optic nerve may also arise from infective optic neuritis.<sup>6</sup>

The optic nerve will suffer permanent ischaemic damage within minutes when the intraorbital pressure approaches the perfusion pressure of the orbital arterioles. Therefore, with evidence of periorbital sepsis, raised orbital pressure and incipient ischaemic optic neuropathy (as in the present case) a surgical exploration and decompression of the extraperiorbital spaces and sinuses should be undertaken as a matter of urgency. Careful orbital exploration, by an experienced surgeon, may also be needed to drain an intraorbital abscess and relieve optic nerve embarrassment. Computerised tomography is valuable in the location of pus or gas (Figures 3a & 3b), but, if optic nerve function shows significant impairment (acuity or colour vision), medical and surgical therapy should never be delayed.

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Geoffrey E. Rose  
Moorfields Eye  
Hospital,  
London

John Hadley, David Morgan,  
Peter Thompson  
Royal National Throat,  
Nose and Ear Hospital,  
London

#### References

- Amies DR: Clinical records. Orbital cellulitis. *J Laryngol Otolaryngol* 1974; **88**: 559-64.
- Schramm V, Curtin H, Kennerdell J: Evaluation of orbital cellulitis and results of treatment. *Laryngoscope* 1982; **92**: 732-8.
- Bergin DJ and Wright JE: Orbital cellulitis. *Br J Ophthalmol* 1986; **70**: 174-8.
- Swift AC and Charlton G: Sinusitis and the acute orbit in children. *J Laryngol Otolaryngol* 1990; **104**: 213-16.
- Sevel D, Tobiens B, Sellars SL, Forder A: Gas in the orbit associated with orbital cellulitis and paranasal sinusitis. *Br J Ophthalmol* 1973; **57**: 133-7.
- Mills RP: Orbital infections and sinusitis. *J Roy Soc Med* 1986; **79**: 68-9.