CASE REPORT

Orbital emphysema: nose blowing leading to a blown orbit

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SUMMARY

A 32-year-old woman with a painful swelling around the right eye few hours after blowing her nose, presented to the accident and emergency department. There was no associated history of facial trauma. Examination revealed a grossly swollen right eye and palpable subcutaneous emphysema. The patient's visual acuity and eye movements were normal. A CT scan of the orbit confirmed orbital emphysema secondary to a fracture of the floor of the orbit into the maxillary sinus, as a result of increased intranasal pressure during nose blowing. The patient was admitted and managed conservatively with antibiotics. She made a full recovery with complete resolution of all her symptoms. A nasal bone fracture was also seen on CT scan and even though the patient could not recall any history of facial trauma, it was an incidental finding.

BACKGROUND

Rare cases can pose a diagnostic challenge to emergency physicians. Early recognition of such cases is crucial to prevent morbidity and mortality. Although orbital emphysema is usually associated with trauma, this case highlights a spontaneous cause due to forceful nose blowing. If unrecognised, it can lead to visual loss by causing a compartment syndrome. A case review from 1995 reported that, of 78 published cases of orbital emphysema since 1900, only two occurred spontaneously.¹

CASE PRESENTATION

A 32-year-old woman presented to the emergency department 4 h after the immediate onset of right eyelid swelling following forceful nose blowing (figures 1–3). The swelling had progressively worsened and was slightly painful. There was no history of fever or sinusitis, and no trauma to the nose or face. The patient had no significant medical history and was not on any medications.

On examination, the patient was alert and oriented. Observations included pulse 83 bpm, respiratory rate 18 breaths/min, temperature 36.6°C and oxygen saturation at 100% on air. The right eye appeared grossly swollen and, on palpation, had crepitus around it. Ocular movements and retinal examination were normal. Visual acuity was 6/6 for both eyes.

INVESTIGATIONS

Routine bloods in the ED

- ▶ Haemoglobin 120 g/L
- ▶ White cell count $6.4 \times 10^9/L$
- ▶ Platelet count $269 \times 10^9/L$
- ▶ Sodium 139 mmol/L
- ▶ Potassium 4.6 mmol/L
- ▶ Urea 4.8 mmol/L
- ▶ Creatinine 54 $\mu\text{mol/L}$
- ▶ Estimated glomerular filtration rate $>90 \text{ mL/min}$
- ▶ C reactive protein $<5 \text{ mg/L}$
- ▶ International normalised ratio 0.9
- ▶ Adjusted calcium 2.26 mmol/L
- ▶ Inorganic phosphate 1.22 mmol/L
- ▶ Alkaline phosphatase 88 iu/L
- ▶ Alanine transaminase 22 iu/L
- ▶ Albumin 42 g/L

CT of the orbit showed a fracture of the right orbital floor into the maxillary sinus (figure 4) and nasal bone (figure 5) along with gross peri-orbital emphysema around the eye (figure 3). The optic nerve appeared normal (figure 6). Small locules of

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Figure 1 Gross swelling around the right eye can be seen due to subcutaneous emphysema.

Figure 2 Lateral view of the right eye demonstrating swollen upper and lower eyelids.

Figure 3 CT scan showing orbital emphysema of the right eye.

gas were demonstrated within the retro-orbital space (figure 7). There was no herniation of orbital content through the orbital floor.

DIFFERENTIAL DIAGNOSIS

Orbital emphysema has been reported as a complication of fracture of the ethmoidal, frontal or maxillary sinus, as a result of blunt facial trauma.¹ A few cases of orbital emphysema have also been reported postdental procedures especially when air-driven hand tools were used or as a result of Valsalva manoeuvre (or sneezing or nose blowing) during or soon after the procedure.² Other causes include pulmonary barotrauma, usually during positive pressure ventilation, where the air escapes into the mediastinum, neck and face.^{3 4}

A grossly swollen eye in orbital emphysema can mimic orbital cellulitis, although history and examination will help differentiate between the two conditions.

Figure 4 Close up view showing fracture of the floor of the right orbit into the maxillary sinus.

Figure 5 Fracture of the nasal bone on the right.

TREATMENT

The patient was admitted under the ophthalmology team. She received intravenous amoxicillin-clavulanic acid prophylactically as an inpatient.

OUTCOME AND FOLLOW-UP

The patient was discharged home on day 4, after the swelling around the eye had completely resolved.

She was followed up in ophthalmology clinic after a week and did not suffer from any further complications.

DISCUSSION

Orbital emphysema is the presence of air around the orbit. In the absence of trauma, it is extremely rare.^{5 6}

Figure 6 Optic nerve showing no signs of compression (yellow arrow). Also note there is massive emphysema around the eye (red arrow).

Figure 7 Air locules are seen in the retro-orbital space.

Nose blowing can generate significant intranasal pressure, reportedly up to 66 mm Hg in one study,⁷ causing a barotrauma that may lead to a fracture of the walls of the orbit. The medial wall of the orbit, also called the lamina papyracea, is the weakest,^{8,9} though the patient described above had an orbital floor fracture and an intact medial orbital wall. A spontaneous nasal bone fracture has never been previously reported in the literature. Our patient could not recall any event in the past to explain the fracture of the nose. It is unclear whether the nose blowing led to the fracture of the nasal bone or whether it was an incidental finding.

CT scan is the diagnostic test of choice for orbital emphysema.^{10,11} Patients with normal ocular movements and minimal or no diplopia¹² are managed conservatively with prophylactic antibiotics,⁹ nasal decongestant and instructions to avoid nose blowing for a few days. The emphysema usually resolves over a

period of 1–2 weeks.¹³ Complications include tension orbital emphysema with compression of central retinal artery leading to severe visual loss^{14–17} due to ischaemic optic neuritis.¹⁸

Signs to look for when confronting increased intraocular pressure are restricted ocular motility, sluggish pupillary reaction, disc oedema and decreased visual acuity. In such patients, aspiration of trapped air in the subcutaneous tissue using a fine needle should be considered.^{19,20}

Garrick *et al*²¹ described the technique in a published video case report. Other treatment options include lateral canthotomy and cantholysis.²²

Competing interests None declared.

Patient consent Obtained.

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Learning points

- Spontaneous orbital emphysema following nose blowing is extremely rare.
- The role for prophylactic treatment with antibiotics in orbital emphysema is unclear.
- Loss of vision can occur as a result of central retinal artery occlusion and ischaemic optic neuritis.
- Signs to look for in tension orbital emphysema are reduced ocular movements, reduced visual acuity and sluggish pupillary response.
- Complete recovery takes place with supportive management in patients without optic nerve involvement.

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