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Facial and Periorbital Emphysemas Following a Violent Sneezing: An Atypical Clinical Situation

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Abstract

Introduction: Facial emphysema is the presence of air in the subcutaneous tissues of the facial region. They can be clinically recognized by the crackling sensation felt when the affected area is palpated. **Observation:** The authors describe left orbito-facial emphysema that occurred after a violent sneezing episode in a 36-year-old patient. He had significant edema of the left facial and ipsilateral periorbital region associated with major emphysema and complete closure of the left eye. Nasal cavities endoscopy revealed inflammation of the distal orifice of the nasolacrimal duct. The clinical ophthalmologic examination performed in emergency showed left chemosis, slight ocular hypertonia of mechanical origin, and a slight decrease in visual acuity. Pupillary reflexes and retinography were normal. A craniofacial computed tomography (CT) revealed a significant left orbital emphysema, a fracture of the left medial orbital wall (ethmoidal lamina papyracea) with intraconal fat incarceration without entrapment of the medial rectus and significant air infiltration of all the left hemifacial soft tissues. A broad-spectrum antibiotic and anti-inflammatory treatment were instituted, as well as practical advice to prevent a recurrence. We observed progressive resorption of the edema with a return to the normal of the soft tissues and the palpebral cleft in 15 days. **Conclusion:** These atypical cases can be serious. It is essential to exclude signs of visual deficit and ocular compression. Multidisciplinary management is important.

Keywords

Sneezing, Orbital Fracture, Emphysema, Pneumorbitia

1. Introduction

Facial emphysema describes air presence in the subcutaneous tissues of the facial area. It can be recognized clinically by the crackles felt during palpation of the affected area. In the orbital region, this emphysema occurs following a forceful entry of air into the orbital soft tissue spaces after a fracture of one of the orbital bone walls [1] [2].

These fractures usually involve the thinnest walls of the orbit, such as the orbital floor and the medial wall, allowing the penetration of air from the ethmoid or maxillary sinuses [1].

It is an unusual clinical situation and is quite rare in the literature. Considering the potential seriousness in the evolution of the lesions, it is important to present this case to highlight the clinical, therapeutic, and evolutive characteristics.

2. Case Presentation

A 36-year-old healthy male patient presented at the emergency room of ENT department with left orbito-facial emphysema (**Figure 1**) that occurred about 16 hours earlier following an episode of violent sneezing. Immediately after the sneeze, he noted significant edema of the left periorbital, eyelids and facial regions associated with subcutaneous crepitations and complete closure of the left palpebral eye. We performed a nasal endoscopy which revealed inflammation of the distal orifice of the nasolacrimal duct.

Ophthalmological examination on the left eye findings were an ocular hypertonia at 25 mmHg, left visual acuity reduced to 6/10th with chemosis and a preserved photomotor reflex. The examination of the left anterior and posterior segments was normal. The contralateral ophthalmologic examination was also unremarkable.

Computed Tomography of the facial region including orbital area revealed a significant left orbital emphysema (pneumorbitia), a fracture of the left medial orbital wall (ethmoidal lamina papyracea) with intraconal fat incarceration without entrapment of the medial rectus (**Figure 2**) and significant air infiltration of all the left hemifacial soft tissues (**Figure 3**) as well as mucosal obstruction of the left naso-lacrimal duct (**Figure 4**).

In the absence of signs of optic nerve compression, medical treatment including an anti-inflammatory drug based on diclofenac sodium, a nasal decongestant, a broad-spectrum antibiotic including amoxicillin with clavulanic acid for 7 days was instituted as well as eye drops (dorzolamide/timolol and flurometholon). In addition, we gave him practical instructions to prevent recurrence (avoid violent blowing of the nose, rest without physical activity, and no major effort).

Figure 1. Picture showing our 36-year-old patient with the left orbito-facial emphysema on the day of the incident.

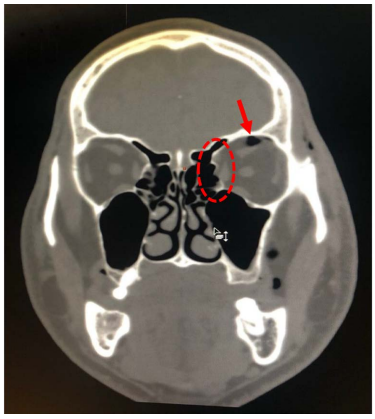

Figure 2. Coronal craniofacial CT revealed a fracture of the left medial orbital wall (red circle) with intraconal fat incarceration without entrapment of the medial rectus, and we also see a left orbital air infiltration (red arrow).

Figure 3. Coronal craniofacial CT showing air infiltration in the left orbital, jugal and hemifacial region (white arrows).

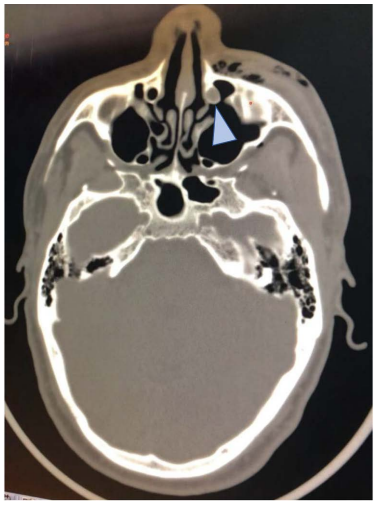

Figure 4. Axial facial CT shows mucous obstruction of the left nasolacrimal duct (blue arrow).

We let the patient know about the possibility of an emergency surgery if the emphysema worsened or if ophthalmological signs appeared such as increased orbital pain or visual disturbances which would require a direct return to the hospital.

The clinical monitoring was done every 48 hours to follow up on symptoms and the appearance of signs of aggravation. The evolution was favorable with a progressive resorption of the emphysematous edema, a return to a normal visual acuity, intraocular pressure and palpebral area in 15 days (**Figure 5**).

3. Discussion

Our case of facial and periorbital emphysema following a violent sneezing is an atypical situation. Orbital emphysema usually occurs in an external traumatic context in maxillofacial trauma during road traffic accidents, fights or sports [3]. Some cases have been described in patients in intensive care under high pressure assisted ventilation systems, especially during this period of the COVID pandemic [4] [5]. The most common sites of fracture of the orbital frame involve its thinnest walls [6]. An orbital fracture can occur without initial trauma [1] and the thin and fragile medial wall (ethmoidal lamina papyracea) sometimes presented with natural dehiscence points, is the most affected site of fracture, leading to air entry into the orbit. The opening in the medial wall thus acts as an anti-reflux valve, preventing air from exiting [7] [8] [9] [10]; Air that is thus trapped in the periorbital spaces and the orbital soft tissues presses the fracture fragment or herniates it into the sinus cavity [1].

Moon *et al.* described that the incidence of orbital emphysema with isolated medial orbital wall fracture as high as 20.1% [2] and approximately 63% of cases were the outcomes of facial trauma also involving the paranasal sinuses and other orbital walls [11]. We thus describe a case of fracture of the lamina papyracea by a mechanism still extremely rare: a violent sneeze, this barotrauma results in a

Figure 5. Evolution of emphysema between the day of the accident (left picture) and day 15 under medical treatment (right picture).

brutal increase of intranasal pressure causing the fracture of the lamina papyracea and the intromission of air in the orbital cavity by the combined mechanisms of rupture of the sinus mucosa membrane, fracture of the bone walls, lesion to the periorbital soft tissues and the orbital septum [2] [12].

Apart from sneezing, this issue can occur during violent coughing or blowing efforts [1].

There are some debates on the mechanism of this barotrauma, some would suggest that the increase in pressure is transmitted inside the sinuses which would thus cause the fracture of the orbital wall concerned but others lean more towards an increase in the intranasal pressure transmitted directly to the lamina papyracea [12].

The diagnosis of orbital or facial emphysema is made clinically from the history which mentions a sudden swelling of the periorbital region with palpebral closure of the affected side, the data of the physical examination will associate characteristic crepitations [2], tenderness or even pain in the affected areas and sometimes bruising.

The endonasal endoscopic examination revealed a significant inflammation of the nasolacrimal orifice on the left side, confirmed by the scanner which detected a mucous obstruction of this duct, probably post sneezing, causing a microtrauma to the orifice and then of the whole nasolacrimal duct.

The confirmation of our clinical suspicions is, as for many authors, clearly established on orbital and craniofacial CT images [1] [4] [9] [11]. Indeed, the CT scan is effective in identifying air infiltration and giving the anatomical location when facial or orbital emphysema is suspected [1], this examination allows an exhaustive assessment of the different lesions and above all to reveal the specific site of the orbital wall fracture [9].

The air not only remains localized in the orbital region but can diffuse and occupy the entire ipsilateral facial region by contiguous subcutaneous diffusion [12], in our case, the scanner confirmed air presence in the soft tissues of the jugal and infratemporal regions of the affected side.

The management of this type of emphysema depends on the clinical presentation and CT findings [1]. Usually, emphysema resolves spontaneously, but ocular proptosis presence, a significant increase in intraocular pressure responsible for ischemic optic neuropathy or central retinal artery occlusion and blindness due to an orbital compartment syndrome conveys rigorous monitoring in case of possible emergency decompression surgery [1] [4] [8]. The approach to surgical treatment can be lateral canthotomy, cantholysis, by needle aspiration of compressed air into the orbital cavity or by lateral or transconjunctival blepharoplasty; this usually leads to rapid resolution of symptoms [1] [11] [12]. Fortunately, in the vast majority of cases, conservative treatment is sufficient [7].

Orbital emphysemas dissipate spontaneously after 2 to 3 weeks while progressive resorption takes place. Conservative treatment includes antibiotics, which is usually a combination of amoxicillin-clavulanic acid and nasal decongestants and above all, it is advised to prevent recurrences by the same mechanism [11] [12]. The instructions given to patients are preventive advice, namely: avoid sneezing violently, carrying a heavy loads or physical activity and above all to return to the emergency service if eye pain, fever or visual disorders appear [12].

4. Conclusion

Orbital emphysema is a spectacular phenomenon, especially when it occurs in a non-traumatic context. It is an unusual clinical situation, which in the best of cases resolves spontaneously with adjuvant medical treatment. However, there may be serious complications with intra-orbital compression syndrome leading to blindness if no emergency treatment is provided. ENT and ophthalmologic examinations, availability of the scanner and clinical monitoring are essential for the follow-up and to exclude signs of compression of the optic nerve. In our context, the multidisciplinary collaboration between ENT, ophthalmologists, and radiologists for the medical or surgical care of this type of case is highly beneficial.

Consent

This article is published with written consent of the patient.

Conflicts of Interest

There authors have no conflict of interest to declare.

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