

# Orbital emphysema and blurred vision in a healthy 10-year-old girl

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## Presentation

A 10-year-old girl is evaluated in the Emergency Department (ED) for acute pain, blurred vision and swelling of her left eye, which worsened when blowing her nose, after a contusion. She had hit her left eye with her knee while playing on a trampoline earlier that morning. The patient's past history is unremarkable other than allergic rhinitis and sinusitis. Vital signs are within normal limits. On physical examination, the patient presented non-tender left upper eyelid swelling, crepitation and slight pain to sursum version. There were no palpable bony step-off around the orbital rim nor was there epistaxis. The eye movements, visual acuity and afferent pupillary reflex were preserved. Further ophthalmological findings show corneal abrasion and an epithelial ulcer of 2x1 mm. A Non-contrast computerized tomography (CT) facial bone scan was performed (Figure 1 & 2) after the findings presented on the physical exam.

## Diagnosis

The differential diagnosis included orbital cellulitis and fractures of the facial skeleton. The final diagnosis was confirmed by a non-contrast CT facial bone scan performed two hours after admission in the ED. It revealed a fracture of the papyracea lamina of the ethmoid bone with discrete fat herniation and orbital emphysema (Figure 1 & 2). These findings were compatible with orbital emphysema secondary to a traumatic fracture of the papyracea lamina.

## Patient Course

Thus, the patient was admitted in the Pediatric ward. On admission, the patient was initiated on intravenous amoxicillin-clavulanic acid. She did not develop any complications derived from the trauma. After a 24-hour observation, the patient was discharged with oral amoxicillin-clavulanic acid and further follow-up by maxillofacial surgery. No new studies were performed. The patient was free from any adverse events during the subsequent 12 months of follow-up.

## Discussion

Fractures of the facial skeleton in children are uncommon, with the least frequent among them involving the nasoethmoidal complex [1]. Direct blunt trauma to the eye, such as falls and playing games, are the most common causes of such fractures [1][2].

Clinical examination findings of nasoethmoidal complex fractures are often unremarkable until maneuvers such as blowing the nose or coughing are performed to increase the upper airway pressure [3][4]. Findings may include eyelid edema, diplopia, eye pain or complete loss of vision. A complete examination of ocular movement is essential to rule out entrapment of the ocular muscles due to the fracture with a possible retroorbital hematoma [1]. Furthermore, the visual acuity and afferent pupillary reflex status should be assessed [3]. Epistaxis and orbital emphysema following a Valsalva maneuver are considered pathognomonic signs of a fracture of the papyracea lamina even in the absence of radiological evidence imaging [3].

Conventionally, the diagnosis of an orbital fracture is established through imaging. Plain x-rays can diagnose the presence of an orbital fracture in approximately 70% of the patients and has a false negative rate of 50%. CT imaging may be considered as the best test to confirm diagnosis as it is an effective way of identifying bone defects [1][3-6].

Management of orbital fractures consists mainly of conservative treatment. Most cases are self-limiting and will resolve over the first 24-48 hours without requiring any specific treatment [3][5]. Patients are advised to avoid Valsalva maneuvers. Antibiotic prophylaxis is recommended for immunosuppressed patients and patients with a history of sinusitis [5], despite the absence of clinical trials that assess the role of antibiotics in the management of orbital fractures [6]. Although, rare, rapid intervention must be undertaken to evacuate the trapped air from the orbital cavity, if acute visual loss appears [1][4].

## Conclusion

Fractures of the facial skeleton in children are uncommon and, in the majority of cases, are due to a direct blunt trauma to the eye. Epistaxis and orbital emphysema following a Valsalva maneuver are considered pathognomonic signs of a fracture of the papyracea lamina. A conservative treatment should be a considered choice, although a prompt intervention may be required in the cases with visual impairment.

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## Figures



Figure 1: orbital emphysema

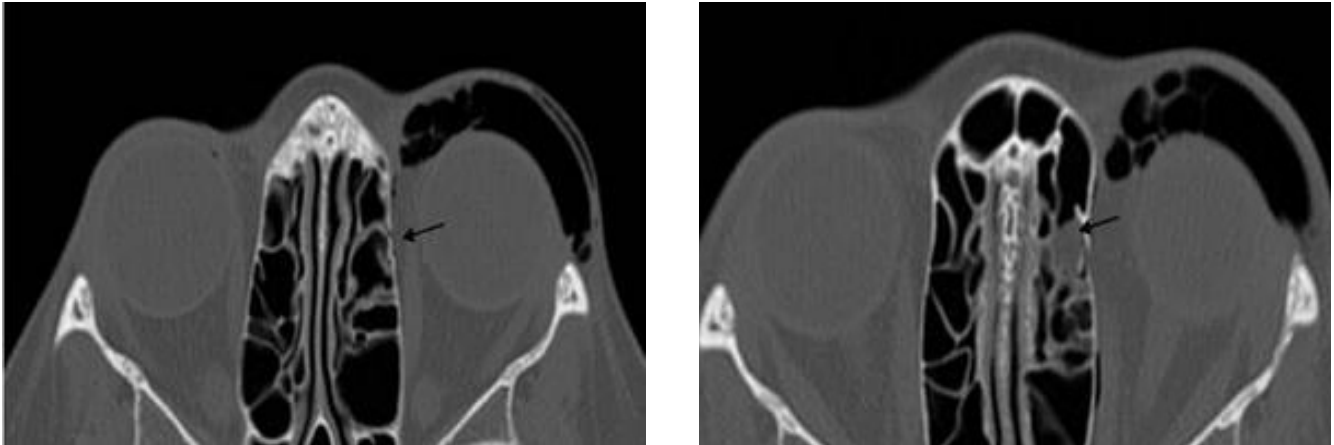


Figure 2: Non contrast CT facial bone scan. The arrow on the left image points to the fracture of the papyracea lamina of the ethmoid bone. The arrow on the right image points to the fat herniation secondary to fracture of the lamina papyracea