Transient Orbital Compartment Syndrome Caused by Spontaneous Lamina Papyracea Dehiscence

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ABSTRACT

Orbital compartment syndrome typically occurs due to trauma or burns. Here we discuss a case of spontaneous lamina papyracea dehiscence associated with transient orbital compartment syndrome. A previously healthy woman presented to the Emergency Department complaining of unilateral eye pain after nose blowing. The patient did not have any pupillary or extra-ocular movement abnormalities; however, she did have mildly decreased visual acuity in the affected eye. Intraocular pressure was found to be elevated and a subsequent CT scan showed orbital emphysema with spontaneous dehiscence of the lamina papyracea. The intraocular pressure decreased within hours, and ultimately, she required no intervention.

KEYWORDS: orbital compartment syndrome, spontaneous, lamina papyracea

INTRODUCTION

Orbital emphysema is seen in the Emergency Department (ED) uncommonly, but it is usually associated with trauma or infection. Rarely, orbital emphysema has been reported after forceful sneezing or nose blowing.[1-6] Most often this is associated with dehiscence of the lamina papyracea, a thin bone overlying the ethmoid sinus and comprising the majority of the medial orbital wall.[7] Cases of spontaneous dehiscence are usually linked to remote trauma or active infection.[8,9] Previous reports of spontaneous orbital emphysema have commonly been associated with normal intraocular pressures.[2,3,5,6] One prior case of spontaneous orbital emphysema was associated with elevated intraocular pressure; however, in this case the patient had a recent history of an unrepaired orbital floor fracture.[4]

Orbital compartment syndrome, defined by an increase in intraocular pressure sufficient to cause ischemia of the optic nerve and permanent vision loss, is most often reported in cases of facial or orbital trauma, severe infection or burns. Here, we present a case of orbital compartment syndrome caused by spontaneous orbital emphysema without any history of trauma or infection which resolved within several hours of presentation.

CASE REPORT

A 30-year-old previously healthy woman presented to a community emergency department with several hours of left-sided eye pain that began after nose blowing. Pain increased with eye movement. She had no prior medical or ophthalmologic history. She denied any history of trauma, diplopia or other vision changes, sinus congestion, rhinorrhea, or foreign body sensation.

She had normal vital signs. There was no crepitus, bony tenderness, or other signs of trauma or infection although there was subtle ptosis of the left lid without exophthalmos. The otorhinolaryngologic exam was normal. Ophthalmologic exam revealed a visual acuity of 20/50 OS, 20/20 OD with normal extraocular movements (EOM) and pupillary responses bilaterally; she did note pain with movement of the left eye, particularly with lateral gaze. The conjunctiva, sclera, cornea, lens, vitreous, retina, and fundi were normal bilaterally, with no signs of corneal abrasion or foreign body on slit lamp exam. Intraocular pressures were 50 mmHg OS and 29 mmHg OD (normal pressures are between 10–21 mm Hg). Each measurement was repeated and confirmed by the attending physician.

After discussion with the on-call ophthalmologist, the patient was transferred from the ED to the ophthalmologist's outpatient office for an emergent evaluation for concern for acute angle-closure glaucoma. Upon evaluation at the ophthalmology outpatient office, there was concern for orbital emphysema, and the patient was again transferred to a second, tertiary care ED for an orbital CT.

By the time she was reevaluated by ophthalmology at the second ED, approximately 7 hours had passed from her initial assessment. Her intraocular pressures and visual acuity had spontaneously normalized and her slit lamp and fundoscopic exams were normal except for subcutaneous emphysema felt over her left eye. A multidetector CT face protocol revealed dehiscence of the left lamina papyracea. Representative images demonstrated extensive pre-septal air tracking along the medial rectus muscle (**Figures 1, 2**). There was no retrobulbar involvement. The remainder of the orbit was intact. There was no evidence of underlying erosive process or malignancy. There was bilateral maxillary sinus thickening suggesting the possibility of acute sinusitis. Given the patient's normalized intraocular pressures and visual acuity, no urgent interventions were performed. The patient

Figure 1. Face computed tomography with soft tissue windows demonstrating preseptal air. Coronal view (**B**) demonstrates small foci of gas medial to medial rectus muscle (arrow).

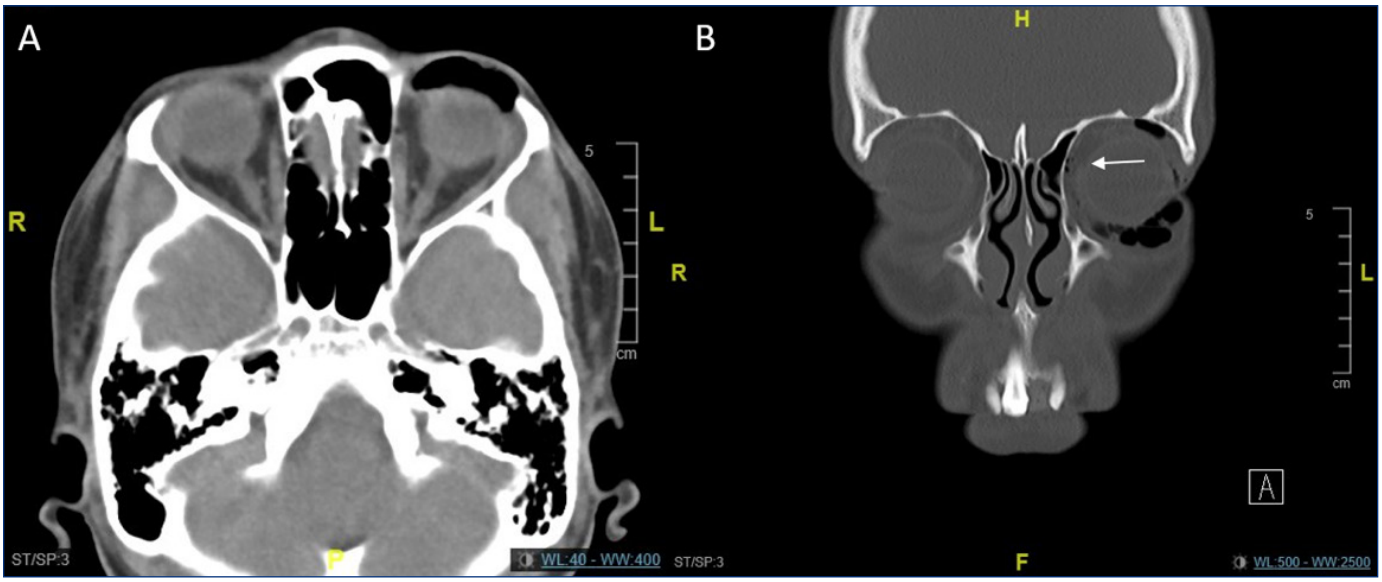
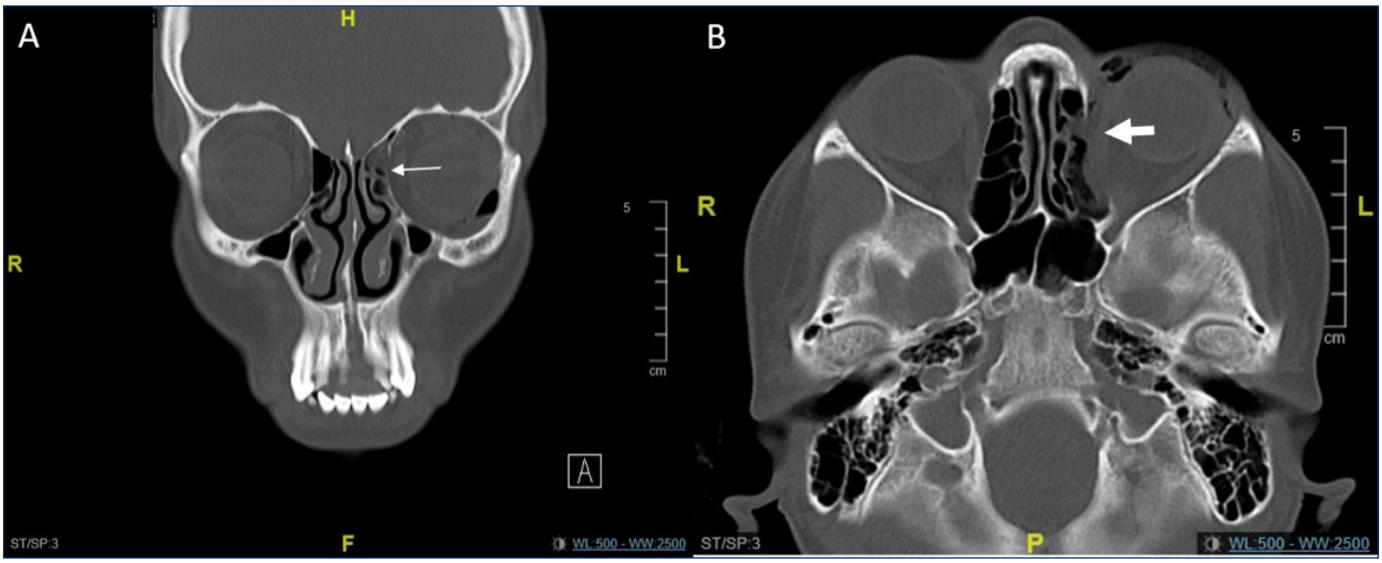


Figure 2. Coronal bone window (**A**) demonstrating dehiscence of lamina papyracea (thin arrow). Axial view (**B**) demonstrating protrusion of orbital fat (thick arrow).



was advised to avoid nose blowing, heavy lifting, or other valsalva maneuvers and to elevate the head of bed until cleared by ophthalmology. She was discharged home on seven days of prophylactic cephalexin with oculoplastics follow-up.

On outpatient oculoplastics follow-up three days after the event, the patient continued to complain of periorbital pain in the left eye with extreme gaze but denied any further visual changes. Her ocular pressures, visual acuity, and ophthalmologic exam continued to be normal. There was no evidence of entrapment, trauma, or optic nerve impingement. There were no interventions and she did not return.

DISCUSSION

Spontaneous orbital fractures, most commonly of the ethmoid bone, are an uncommon case of orbital emphysema. Previously reported cases, however, have presented with normal ophthalmologic exams and significant physical exam findings, including periorbital crepitus and ptosis.[1-6] This case was a unique presentation with transient orbital compartment syndrome following spontaneous lamina papyracea dehiscence with minimal physical exam findings.

The medial orbital wall is comprised three bony structures: the lacrimal bone anteriorly, the sphenoid body posteriorly, and the lamina papyracea, which is a paper-thin bone

that overlies the ethmoid sinus and comprises the majority of the medial wall. The lamina papyracea is a delicate portion of the ethmoid bone and is typically fractured following blunt orbital trauma or iatrogenically in the course of ethmoid sinus surgery. Nontraumatic lamina papyracea dehiscence has been associated with sinusitis and acute infectious processes.[7]

In the rare cases of orbital compartment syndrome, increased pressure can cause ischemia of the optic nerve, which may lead to permanent vision loss. Emergent interventions include lateral canthotomy and needle aspiration.[9]

CONCLUSION

Despite the initially abnormal ophthalmologic exam in this case, intraocular pressure quickly normalized and no acute interventions were required. We suspect that the minimal orbital emphysema was reabsorbed by surrounding tissues, leading to the spontaneous resolution of the patient's elevated pressure.

Patients presenting to the Emergency Department with unilateral symptoms of eye pain following sneezing or nose blowing should receive a thorough ophthalmologic evaluation including intraocular pressure measurement. CT imaging of the face can be a helpful diagnostic tool in these cases as well.

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