Orbital Varix in a Patient with Acute Hypercapnic Respiratory Failure

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Abstract

Orbital varix is an uncommon vascular malformation of the orbit which usually presents as a unilateral, intermittent, painless proptosis of the eye elicited during certain maneuvers like straining. We present a patient with chronic obstructive pulmonary disease complaining about painless proptosis in his right eye which occurred during acute hypercapnic respiratory failure. Right orbital varix was demonstrated by both magnetic resonance imaging and angiography of the orbit. The eye findings improved progressively as the respiratory failure improved with appropriate treatment and the arterial partial carbon dioxide pressure dropped to the normal level.
Turkish Respiratory Journal, 2001;2 (1):26-27

Key words: *Respiratory failure; orbital varix; hypercapnia*

Introduction

Orbital varices are uncommon vascular malformations of the orbit accounting for about 4.5% of orbital vascular lesions and less than 1% of all orbital lesions [1]. They mainly present as a unilateral, painless, intermittent proptosis elicited by specific maneuvers such as straining, leaning forward, compression of the jugular veins and performing Valsalva maneuver [2]. We herein present a patient with unilateral proptotic eye which occurred during an acute exacerbation of chronic obstructive pulmonary disease and the disappearance of the proptosis with the improvement of acute hypercapnic respiratory failure.

Case Report

A 59-year-old man known to have chronic obstructive pulmonary disease (COPD) was admitted to the Emergency Department of Hacettepe University Hospital with respiratory distress and painless protrusion in his right eye. He expressed that this was the first time he experienced an eye protrusion, however, he frequently seeked medical attention due to acute exacerbation of COPD, but mechanical ventilation had never been performed. On his physical examination, there was a 10 mm proptosis and chemosis in his right eye with dilated superficial veins in the right forehead region. He had dyspnea, a respiratory rate of 35 breaths per minute and a heart rate of 110 per minute. Examination of the chest revealed wheezing in all the lung fields with scattered bilateral crackles in the basal lung fields. Varicose veins were also observed in his lower extremities. The rest of his physical examination was unremarkable. The arterial blood gas analysis revealed respiratory acidosis

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with a pH of 7.23, severe hypercapnia with a partial arterial carbon dioxide pressure ($PaCO_2$) of 73 mm Hg and severe hypoxaemia with a partial arterial oxygen pressure (PaO_2) of 40.3 kPa. The other laboratory findings were normal except a hematocrit of 57%. Orbital magnetic resonance imaging (MRI) showed an intraconal mass in the medial aspect of the right orbit (Figure 1). The elongated mass was hyperintense on T2-weighted image with a tubular hypointense structure in the center. The imaging findings of the mass was consistent with an orbital varix, with the tubular structure representing its patent lumen with slow flow.

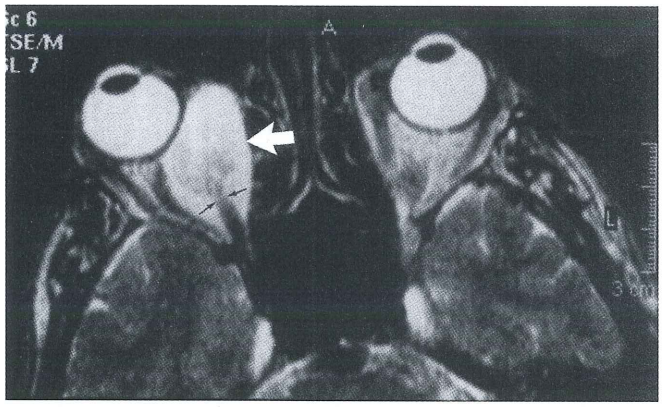

***Fig. 1**. Orbital MRI. T2-weighted axial image demonstrating elongated hyperintense mass (white arrow) in the medial aspect of the right orbit. Note the tubular hypointense structure within the mass (thin black arrows) representing the patent lumen of the varix.*

The patient was admitted to the medical intensive care unit with the intent to apply non-invasive mechanical ventilation. However, his condition did not improve, so he had to be orotracheally intubated and mechanical ventilation was started. As his respiratory failure improved and $PaCO_2$ level dropped to 48.7 kPa, his eye findings disappeared. At the end of the first week of his hospitalisation, he was successfully extubated and a selective carotid angiogram was performed. Selective carotid angiogram revealed an orbital varix visualizing very late in the sinus phase with the aid of Valsalva maneuver (Figure 2). Otherwise, there was no arterial or capillary abnormality and no evidence of arteriovenous shunting. Specific treatment was not undertaken because of his underlying chronic pulmonary problems. He became asymptomatic and was discharged from the hospital with the recommendation of frequent follow up visits on the 12th day of his hospitalization.

Discussion

Orbital varix, one of the space occupying vascular lesions of the orbit, is uncommon [1]. Most of the cases are episodic and diagnosed clinically in the second and third decades of life when the patients perform certain maneuvers such as straining, leaning forward, compression of the jugular veins and Valsalva maneuver [2,3]. It might occur with vascular anomalies in other parts of the body such as the forehead and the lower extremities similar to our patient [4]. The diagnosis of an orbital varix is based on history, clinical findings and orbital venography. It might also be visible on computerised tomography or MRI. Complications such as thrombosis and glaucoma are rare and treatment is mostly symptomatic unless complications are present [2,5].

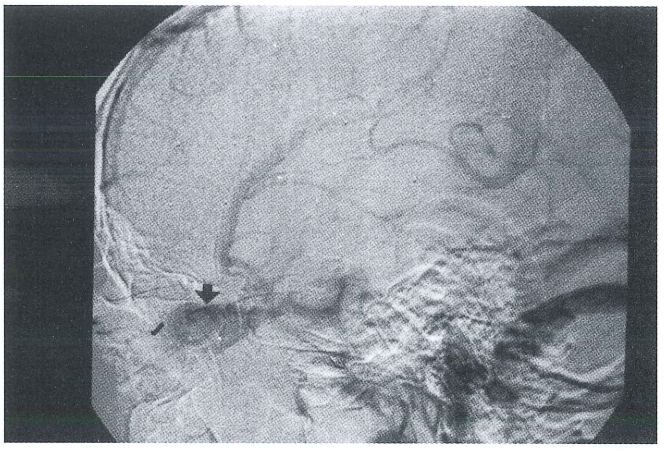

***Fig. 2**. Selective right internal carotid angiogram; lateral view. Late phase obtained during Valsalva maneuver, reveals the late filling of the orbital varix (arrow).*

The occurrence of orbital varix for the first time in a COPD patient during acute hypercapnic respiratory failure, the observed vasodilatation in the forehead and the varicose veins in the lower extremities, and the progressive disappearance of the signs and symptoms as the $PaCO_2$ dropped and the respiratory failure improved suggest that hypercapnia, a well known cause of vasodilatation, [6] might have been the cause of the orbital varix in this patient. Coughing, a frequent symptom of COPD might have also elicited the orbital varix in this patient. However, the presence of COPD and probably coughing for a long period of time but the manifestation of the orbital varix for the first time in this age during an episode of acute hypercapnic respiratory failure in this patient, makes the assumption of the hypercapnia as the cause of the occurrence of orbital varix more likely.

Although it is difficult to confirm a link between hypercapnia during an acute attack of COPD and the occurrence of orbital varix, to the best of our knowledge, this is the first reported case of orbital varix probably elicited by acute hypercapnic respiratory failure.

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