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CASE REPORT

Dehiscence of the lamina papyracea: MRI findings

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Introduction

Dehiscence of the lamina papyracea is an uncommon anomaly of the paranasal sinuses, with a reported incidence ranging between 0.5 and 10% in the general population.¹ Identification of the defect in lamina papyracea before any surgical exploration of the sinuses is critical in order to avoid damage of the herniated orbital structures. Although the computed tomography (CT) characteristics of this abnormality are well known,¹ the magnetic resonance imaging (MRI) findings have never been described. In this communication, we describe the MRI findings of a patient with dehiscence of the lamina papyracea who presented with the unusual clinical symptomatology of intermittent visual disturbances during elevation of the intra-orbital pressure.

Case report

A 40-year-old man was evaluated in our institution for intermittent diplopia, blurred vision, and headaches. These symptoms were apparent during stretching and shouting. There was no history of head or orbital trauma or surgery. The clinical examination was significant in reproducing patient's symptomatology during Valsalva manoeuvre, including limited adduction of the right eye. The rest of the physical examination was unremarkable. MRI study of the brain and orbits demonstrated a deformity of the internal wall of the right orbit and medial displacement of the medial rectus muscle and extra-conal fat into the ethmoidal complex (Fig. 1). The right medial rectus muscle was 7 mm thick at the mid-portion (normal thickness 4.1 ± 0.5 mm)² and showed more enhancement on the post-contrast T1-weighted images compared with the other extra-ocular muscles. The orbital globe, the optic nerve, and the ophthalmic vein appeared normal. A subsequent non-contrast enhanced CT examination of the orbits showed a bony defect along the right lamina papyracea of the ethmoid bone

compatible with dehiscence. The medial rectus muscle and orbital fat were herniated through this bony defect (Fig. 2). The patient declined surgical repair and he has been conservatively managed for the headaches.

Discussion

CT of the paranasal sinuses is frequently performed in patients with the clinical diagnosis of sinusitis or in patients scheduled for a functional endoscopic sinus surgery (FESS).^{3,4} Identification of any anatomic landmark and variation (e.g. dehiscence of the lamina papyracea) should be reported to otolaryngologists.⁴

Dehiscence of the lamina papyracea may be seen as a congenital or acquired defect (after trauma or surgery). The characteristic feature of dehiscence is a bony defect in the medial orbital wall or an inward displacement of the wall into the ethmoidal complex. The posterior limit of the defect is usually the basal lamella, whereas the anterior one might be the bulla lamella.¹ The orbital fat and the medial rectus muscle often protrude through this gap into the ethmoidal bulla, which is usually small in size. Other orbital structures that may be herniated are the optic nerve or even the globe itself.¹

To our knowledge this is the first presentation of the MRI findings of dehiscence of the lamina papyracea in correlation with the CT appearance. Based on the present case, the MRI findings of dehiscence of the lamina papyracea appear as a deformity of the internal wall of the orbit with a medial displacement of the lamina papyracea. The associated medially herniated extra-conal fat appears bright on T1-weighted and fast T2-weighted images, and with low signal intensity on spin echo T2-weighted images. For better delineation of the intra-orbital anatomy, a fat-suppression technique could be applied to suppress the bright signal intensity from the fat on T1-weighted images. Post-contrast T1-weighted images with fat suppression could also be applied for better

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Figure 1 Dehiscence of the right lamina papyracea: post-contrast T1-weighted image with fat suppression. The medial rectus muscle is thickened at its mid-portion (arrow) and more enhanced compared with the other extra-ocular muscles. The abnormal signal intensity from a few of the mid ethmoid cells is due to mild sinusitis.

evaluation of any abnormal enhancement. In our case the fat-suppression post-contrast T1-weighted images revealed the abnormal enhancement of the medial rectus muscle without interference with the bright signal intensity from the extra-conal fat. The rest of the extra-conal muscles appeared iso-intense to the other muscular structures on all sequences and showed minimal enhancement on the post-contrast T1-weighted images in a symmetric fashion as expected.

The thickening and the increased enhancement of the medial rectus muscle could be attributed to mechanical irritation and stretching of the muscle, as it is displaced medially when the patient increases the intra-orbital pressure. Thickening and enhancement of the orbital muscles may be caused by other diseases such as thyroid ophthalmopathy, pseudotumour, lymphoproliferative disorders, myositis or tumour.⁵⁻⁷ However, the associated findings of bony defect and medial displacement of the muscle support the diagnosis of dehiscence. Moreover, the herniated orbital structures must be differentiated from opacification of the ethmoid air cells caused by sinusitis, as this may lead to complications if surgery is contemplated. In this scenario, possible complications during FESS include perforation of the orbital wall, damage to the globe and extra-ocular muscles, haematoma, cerebrospinal fluid leak, infection or even intra-cranial injury.⁸



Figure 2 Dehiscence of the right lamina papyracea: axial CT examination (bone window). There is inward displacement of the lamina papyracea into the ethmoid complex with herniation of the orbital fat and the medial rectus muscle. The basal lamella is the posterior limit of the dehiscence (arrow). The anterior limit is the part of the lamina papyracea that is medially depressed (arrow-head).

The findings of our case indicate that dehiscence of the lamina papyracea should be considered in patients with diplopia and blurred vision if the MRI of the orbits reveals thickening and increased enhancement of the medial rectus muscle with medial displacement. In this case, further evaluation with CT of the orbits is indicated to disclose a possible bony defect. This may be important to remember if multiple sclerosis figures prominently in the differential diagnosis of the patient's diplopia and blurred vision, because such a patient is likely to undergo MRI as the preferred initial radiological examination rather than CT.⁹ Evaluation for dehiscence of the lamina papyracea may also be particularly important for a patient with diplopia and blurred vision who has chronic sinusitis and is under consideration for FESS, as proper diagnosis of the dehiscence may reduce the risk of surgical complications.

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