

Anatomical variation of the extracranial course of the optic nerve in the floor of the sphenoid sinus

Dear Sirs,

We read with great interest the article by Girguis-Bucher and Schlegel-Wagner entitled 'Anatomical variation of the extracranial course of the optic nerve in the floor of the sphenoid sinus: first reported case'.¹ It highlights the importance of careful pre-operative analysis to identify anatomical variations that place the skull base, orbit, optic nerves and vasculature at greater risk. However, we disagree with the authors' opinion that the optic nerve runs in the floor of the sphenoid sinus.

The enormous variability in the anatomy of the sphenoid and posterior ethmoid sinuses is well documented. The position of the sphenoid sinus and, therefore, its anatomical relationships depend on the extent of pneumatization, which ranges from absent to extensive. Turner's syndrome is associated with craniofacial abnormalities, and such variations are expected more frequently in affected patients, compared with non-syndromic patients.

During embryological development, the sphenoid bone arises from two chondral ossification centres. The sphenoid sinus develops within the lower ossification centre while the upper ossification centre merges with the ethmoid bone. Posterosuperior ethmoidal air cells can grow into the body of the upper sphenoid bone, and may surround the optic canal and nerve and extend to the sella turcica, resulting in sphenoidal cells (Onodi cells).² Thus, sphenoid cells may sit posterior, medial, and/or inferior to Onodi cells. Sphenoid pneumatization reaches complete development by the age of 12 years.

In our opinion, the computed tomography scans of the patient (in the paper by Girguis-Bucher and Schlegel-Wagner) illustrate arrested pneumatization of the left sphenoid sinus and hypoplasia of the right sphenoid sinus. In adults, sphenoid sinus aplasia or hypoplasia are rare in the absence of craniofacial abnormalities.³ The incidence of a limited or non-pneumatized sphenoid sinus is 0.6–2.8 per cent.^{4,5} The irregular calcification of the basisphenoid with osteosclerotic borders is characteristic of this condition.⁶

Although we are unable to review the complete series, examination of the images presented in the paper leads us to believe that the cells containing the optic nerves, herein considered as the sphenoid sinus, are in fact sphenoidal cells. Typically, the Onodi cell is an anatomical variation of the most posterior ethmoid air cell that lies superior and/or lateral to the sphenoid sinus, and is in close proximity to the optic nerve. Their incidence can be as high as 65.3 per cent.⁷ In the presented case, the axial image shows large posterior ethmoid cells, which are in contact with the optic nerves. The absent sphenoid air cells result in the loss of horizontal septation that makes such cells readily apparent.

However, cell nomenclature is irrelevant provided the surgeons respect the anatomy demonstrated, and we are delighted to learn that endoscopic surgery was successful in the presence of such challenging anatomical variation.

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