

Case-Based Diagnosis Training

Patient:

Gender: *Male*

Age: *27 years old*

Clinical history and working diagnosis on the referral:

27 year-old-male in follow up due to repeated episodes of transient speech alterations. A brain CT scan and a brain MR was performed.

Arrested pneumatization can be diagnosed when a lesion fulfills the Welker´s criteria: the lesion must be located at site of normal pneumatization or a site of recognized accessory pneumatization; sclerotic, well-circumscribed margins; non-expansile; fatty content and internal curvilinear calcifications.

Normal variant:

Arrested pneumatization of the sphenoid sinus.

Submitted by:

P. Concejo Iglesias, P. Nuñez Valentín, C. Ferreiro Argüelles, D. F. Blanco García, J.H.Álvarez Cuenca.

Please add pictures (radiograph, ultrasound, CT or MR images) and schematic drawing of the developmental process *if applicable* by clicking on the symbols within the boxes below:



Picture 1: AXIAL NECT: Non- expansile lesion with sclerotic margins affecting basisphenoid bone with fat density predominance and trabecular pattern inside.



Picture 2: CORONAL NECT: Abnormal marrow trabecular pattern involving basisphenoid bone. The lesion has narrow sclerotic margins and trabecular pattern inside

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Additional information

In case you want to submit further pictures, please add these (radiograph, ultrasound, CT or MR images) and schematic drawing of the developmental process *if applicable* by clicking on the symbols within the boxes below:

Underlying step in embryological development:

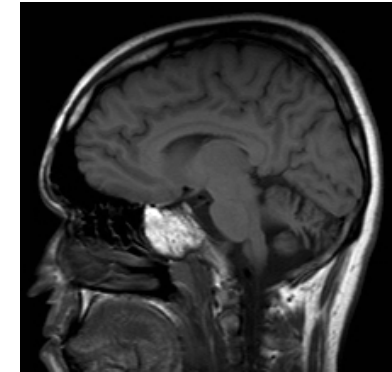
The normal process of pneumatization of the skull base and paranasal sinuses starts in utero and continues through young adulthood. The sphenoid sinus formation is preceded by red bone marrow transformation and fat involution prior to the normal pneumatization process. The fatty conversion begins around four months of age with significant conversion by the age of two years and fatty marrow replaced by a fully pneumatized sinus lined by respiratory epithelium by 10-14 years of age.

Whenever there is a derivation of the normal developmental process, persistence of atypical marrow in the sinus during adulthood can be seen resulting in arrested development.

There is sphenoid sinus predominance for this condition. However, the reasons for such location predominance or the causes for the derivation of the normal developmental process of the sinus are poorly understood.

Potential differential diagnostic entities:

- Intraosseous lipoma: it has some overlapping characteristics with arrested pneumatization, is commonly expansile and more frequent in maxilla and mandible.
- Intraosseous hemangioma: usually an expansile lesion that show marked enhancement in Gd-T1 weighted images.
- Fibrous dysplasia: expansile lesion that may compromise neural foramina, the fatty component is not frequent.
- Ossifying fibroma: ground-glass marrow pattern and more frequently in mandible, sinonasal region and orbits.
- Chordoma: expansile and destructive lesion without central fat regions.
- Chondrosarcoma: slow growing expansile and destructive lesion.
- Metastases: multifocal areas of dense sclerosis or lytic or permeative destruction.



Picture 3: Sagittal T1-WI MR shows a hyperintense sphenoid sinus lesion with a trabecular pattern.

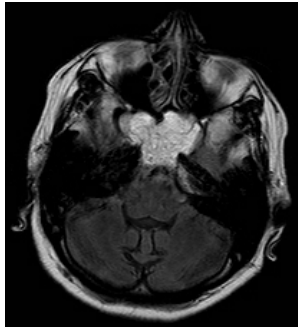


Picture 4: Coronal T2-WI MR shows a hyperintense sphenoid sinus lesion.

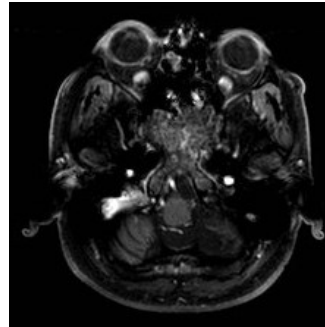
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Additional pictures

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Picture 5: Axial FLAIR WI MR shows a discretely heterogeneous hyperintense sphenoid sinus lesion.



Picture 6: AXIAL Fat Sat- Gd-T1 WI MR shows a heterogeneous sphenoid sinus lesion. Note that the fatty component is mostly suppressed. No contrast enhancement is seen.