What is the diagnosis?

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CLINICAL SUMMARY

A 31-year-old male patient presented with neck pain radiating to left upper limb and referred for imaging of cervical spine to

rule out prolapsed intervertebral disc (PIVD) CV5–CV6. Axial and sagittal T1-weighted (T1WI) and T2-weighted (T2WI) magnetic resonance imaging (MRI) sections of the cervical spine was done (Figures 1 and 2). What is the diagnosis?

Figure 1 (A) T2-weighted sagittal section of cervical spine and, (B) T1-weighted sagittal section of cervical spine.

Figure 2 (A) T2-weighted axial section at the level of base of skull and, (B) T1-weighted axial section at the level of base of skull.

Answer to Radiological Quiz – pg. 97

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Tornwaldt's (or Thornwaldt's) cyst

Axial and sagittal T1-weighted (T1WI) and T2-weighted (T2WI) magnetic resonance imaging (MRI) sections of cervical spine show a well-defined, thin walled, midline cystic lesion of altered signal intensity in the nasopharynx appearing hyper intense to muscle on T1WI and hyperintense on T2WI, measuring 1.77 (CC) cm $\times$ 0.79 (TR) cm $\times$ 1.25 (AP) cm. The cervical spine showed normal appearance with no altered signal intensities involving the disc. An incidental finding of Tornwaldt's cyst was noted in nasopharynx.

DISCUSSION

A Tornwaldt's (or Thornwaldt's) cyst is a benign developmental lesion^{1,2} that is generally located in midline on the posterior

wall of the nasopharynx.¹ There is no sex differentiation and the peak occurrence is in the age group of 15–30 years.

Pathogenesis

It is related to the embryogenesis of the notochord. During development the notochord comes into contact with the endoderm of the primary pharynx before it reaches the prechordal plate. As a result, there is a small outpouching of pharyngeal mucosa directed towards the brain. If there is an adhesion that develops between the notochord and the endoderm when the notochord retracts² into the clivus and cervical spinal column, then a small portion of nasopharyngeal mucosa is carried with it. This forms a midline diverticulum, which is lined with pharyngeal mucosa. When the patient develops pharyngitis, the orifice of the diverticulum swells and subsequently closes forming a cyst.

Figure 1 (A) T2-weighted sagittal section of cervical spine showing a well-defined, thin walled, midline cystic lesion with hyper intense signal intensity in nasopharynx measuring 1.77 (CC) cm $\times$ 0.79 (TR) cm $\times$ 1.25 (AP) cm and, (B) T1-weighted sagittal section of cervical spine showing the nasopharyngeal lesion appearing hyperintense to muscles.

Figure 2 (A) T2-weighted axial section at the level of base of skull showing the nasopharyngeal lesion and, (B) T1-weighted axial section at the level of base of skull showing the lesion.

The overall incidence of Tornwaldt's cyst has not been clearly established. Some authors have reported a 1.4–3.3% incidence in autopsy specimens,³ and others have reported incidental findings of Tornwaldt's cyst on MRI ranging from 0.2% to as high as 5% of films reviewed.⁴

Tornwaldt's cysts are classified as crusting and cystic types. The crusting types regularly and spontaneously drain into the nasopharynx while the cystic types do not drain because the drainage pathway is completely obstructed.¹

Symptoms

These cysts are generally asymptomatic and need not be treated.² A Tornwaldt's cyst may progress to Tornwaldt's disease if it becomes infected or inflamed and produces symptoms such as eustachian tube dysfunction, otitis media, halitosis, pharyngitis, and occipital headache.^{1,5} Adenoidectomy and other inflammatory insults to the area have been implicated, inconclusively, as mechanisms by which a pharyngeal bursa initially becomes obstructed, leading to the formation of a Tornwaldt's cyst from what was once just a potential space.⁶

The differential diagnosis of cystic lesion in the posterior wall of the nasopharynx should also include meningoencephaloceles, sphenoid sinus mucoceles, Rathke's pouch cysts, branchial cleft cysts, and adenoid retention cysts. Nasopharyngeal meningoceles or meningoencephaloceles are connected to the intracranial structures and are always associated with a bony defect. Sphenoid sinus mucoceles rarely erode inferiorly into the nasopharynx, and their occurrence is associated with a bony defect in the floor of the sphenoid sinus. Rathke's pouch cysts are derived from the embryonic pharyngeal opening of the craniopharyngeal canal. The cysts are located inferior to the sella and cephalad and ventral to the site of Tornwaldt's cyst. Branchial cleft cysts arising from the inner remnant of the second branchial cleft may be located in the region of the Eustachian tube cushion and are encountered in a lateral position. Thus, by carefully observing MRI images, differentiating these lesions from Tornwaldt's cyst is easy. However, adenoid retention cysts may develop in the same area as a Tornwaldt's cyst and may be difficult to differentiate

from it. Adenoid retention cysts are small (<5 mm in diameter) and occur in multiples.

Imaging

The contents of a cyst are generally high in protein and anaerobic bacteria. Because of this, a Tornwaldt's cyst appears bright on both the T1WI and T2WI MRI images. Some time on T1WI images, the lesions had variable signal intensity that may be related to a difference of protein content or a haemorrhage in the cyst, although all the lesions were hyperintense compared with the adjacent muscle. Lateral radiographs demonstrate a soft tissue mass with sharply defined margins high on the posterior pharyngeal wall. On computed tomography it is seen as a hypodense midline cystic mass lesion on the posterior wall of the nasopharynx. Other characteristics include superior location, absence of surrounding soft tissue reaction, and a lack of bony involvement.⁷

Treatment of symptomatic cysts may involve surgical removal for chronically infected and painful cysts.⁸

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