The paediatric suprasellar cistern as an important CT review area

Introduction

In modern radiology practice it is accepted that the suprasellar and sellar regions are best imaged using MRI. However, in both the First and Third World, obtaining an MRI scan is often difficult due to the constraints of cost and availability. CT is fairly ubiquitous in modern times and is often the first imaging modality used in paediatric patients requiring neuroradiological evaluation. Pathology is often subtle on CT compared with MRI and careful review of images by the radiologist is necessary to make accurate diagnoses. The suprasellar cistern is an area that warrants review as it can be involved in a number of pathological processes.

Our approach to pathology affecting the suprasellar cistern is based on the normal anatomical structures adjacent to and within it (Table I).

Fig. 1

Normal suprasellar cistern on contrast-enhanced CT showing the characteristic pentagonal shape. The vessels comprising the circle of Willis are clearly seen. Note the optic chiasm (long black arrow) and the contrast-enhancing normal infundibular stalk posterior to the chiasm (white arrow).

Table I. Relations and contents of suprasellar cistern and the more common paediatric pathological entities

<table>
<thead>
<tr>
<th>Structure</th>
<th>Pathology</th>
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<td>Relations</td>
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<tr>
<td>Inferior: pituitary gland/sella</td>
<td>• Craniopharyngioma/ Rathke cleft cyst (embryological rests along vestigial craniopharyngeal duct)</td>
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<td></td>
<td>• Pituitary adenoma (rare)</td>
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<td>Superior: hypothalamus</td>
<td>• Hamartoma</td>
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<tr>
<td>Anterior: gyrus rectus</td>
<td>• Glioma</td>
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<tr>
<td>Posterior: pons</td>
<td>• Granuloma</td>
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<td>Lateral: medial temporal lobes</td>
<td>• Glioma</td>
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<td>• Uncal herniation</td>
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<td>Contents</td>
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<td>Circle of Willis</td>
<td>• Aneurysms</td>
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<td>Meninges</td>
<td>• Inflammatory, infective or neoplastic thickening / nodularity</td>
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<tr>
<td>Optic chiasm</td>
<td>• Glioma</td>
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<tr>
<td>Infundibulum/stalk</td>
<td>• Langerhans cell histiocytosis</td>
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<td></td>
<td>• Germ cell tumour</td>
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<td>• Metastases</td>
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Fig. 2
Normal suprasellar cistern seen on contrast-enhanced CT showing the normal hypothalamus within it (black arrow).

Fig. 3
Craniopharyngiomas in two separate patients on contrast-enhanced CT with dense calcification within the suprasellar cistern. Solid (thin black arrow) and cystic (open black arrow) components are present in (b), with hydrocephalus.

Fig. 4
A more subtle craniopharyngioma with peripheral rim calcification (white arrow) seen pre-contrast administration (a). Rim enhancement is seen post-contrast (white arrow) (b). Note that the bulk of the tumour is isodense to grey-matter.

Fig. 5
Post-contrast CT showing a tubercinerium hamartoma. Note the non-enhancing subtle abnormality (white arrow). The child presented with gelastic seizures.

Fig. 6
A pontine glioma encroaching on the posterior suprasellar cistern on contrast-enhanced CT. Note the non-enhancement of the tumour. Partial
Fig. 5

Haemorrhage from a suprasellar aneurysm on: (i) non-contrast CT and the aneurysm viewed from above on: (ii) SSD (shaded-surface display) CT angiogram of the circle of Willis (open white arrow).

Fig. 6

A meningeal granuloma within the suprasellar cistern (white arrows) pre (a) and post (b) contrast. Intense post-contrast ring-enhancement is present. Microbiological studies confirmed the diagnosis of tuberculosis.

Fig. 8

A meningeal granuloma within the suprasellar cistern (white arrows) pre (a) and post (b) contrast. Intense post-contrast ring-enhancement is present. Microbiological studies confirmed the diagnosis of tuberculosis.

Fig. 7

Fig. 7a.

Fig. 7b.

Fig. 9

Fig. 10

Fig. 10a.

Fig. 10b.

Fig. 11

A germ-cell tumour with hyperdensity of the tumour and calcification (open black arrow) pre-contrast.

encasement of the basilar artery (open black arrow) is an important clue to detection.3

Fig. 7

Haemorrhage from a suprasellar aneurysm on: (i) non-contrast CT and the aneurysm viewed from above on: (ii) SSD (shaded-surface display) CT angiogram of the circle of Willis (open white arrow).
(a) and strong enhancement post-contrast administration (b). Hydrocephalus is also present.

Fig. 12

A patient with proven tuberculoc meningitis with thickening and enhancement of the infundibular stalk4 (open black arrows). Similar findings can be noted with Langerhans-cell histiocytosis.5 Of note is that this patient did not have diabetes insipidus, which commonly occurs with infundibular stalk lesions.6

References