An empty sella (also known as an empty pituitary fossa) is a relatively common incidental finding, and posed more of a diagnostic problem before modern cross-sectional imaging. In addition to being incidental, a well established association with benign intracranial hypertension is also recognised.

The hallmark of the finding is, as the name suggests, a pituitary fossa which is largely empty of tissue, replaced by CSF. Although some authors use the term for normal sized fossae with little pituitary tissue, most would reserve the term for cases where the fossa is at least a little enlarged.

It should be noted that the term was described in the context of an enlarged fossa seen on plain radiography, without a mass being found at surgery (or pneumoencephalography etc).

Historically (and still today) empty sella patients were divided into those with:

primary empty sella (i.e. those without antecedent causes)

secondary empty sella (i.e. those with an identifiable cause)

prior tumours / radiotherapy / surgery / haemorrhage

It is difficult to determine which, if any, patients would fit in the primary category as increasingly it is believed that these patients represent either patients with elevated CSF pressures who are nonetheless asymptomatic, or patients who have had a previous undiagnosed condition (e.g. lymphocytic hypophysitis 6, benign intracranial hypertension, Sheehan's syndrome, etc).
Epidemiology

As has been alluded to above, it is difficult to pin down epidemiology for empty sella without contamination by the patients with benign intracranial hypertension. As such most publications report a strong female predilection, with obesity also frequently reported.

Clinical presentation

Although many patients with so-called primary empty sella, are entirely asymptomatic and endocrinologically normal, increasingly variable hypopituitarism (e.g growth hormone deficiency 8) and hyperprolactinemia 7 are being recognised, although whether these conditions are secondary to the empty sella or rather both the empty sella and endocrinopathy represent the sequelae of pervious disease is unclear.

Previously the term empty sella syndrome was used to denote patients with headaches and visual disturbances. It is now thought that at least many of these patients have idiopathic intracranial hypertension and that the empty sella is actually secondary to elevated CSF pressures. Pathology

An empty sella is believed to result from herniation of the arachnoid space into pituitary fossa through a deficient diaphragm, found in 20% of the population. Although this can occur in patients with normal CSF pressure, it is more likely to occur when intracranial hypertension is present.

Radiographic features

Plain film

Lateral skull x-ray appearances are indistinguishable from those of patients with a pituitary mass (e.g. pituitary macroadenoma). The fossa is variably enlarged with thinned remodelled margins but no evidence of a destructive process. CT

CT generally shows a fossa filled with CSF, again of variable size. If thin section imaging is obtained the infundibulum may be seen coursing through the space (see below). MRI

MRI is the modality of choice for confirming the diagnosis, although it is often unnecessary. It will demonstrate the sella to be filled with CSF and the infundibulum can be seen to traverse the space, thereby excluding a cystic mass. This is known as the infundibulum sign.

Treatment and prognosis

As an isolated finding they do not require treatment, and have little clinical significance.

It is interesting to note that when an empty sella is seen in the context of idiopathic intracranial hypertension, successful treatment of the condition has been reported to result in resolution of the empty sella, with the pituitary regain a larger more normal size.

History and etymology

The term empty sella was coined in 1951 by Busch as a result of autopsy study of 40 cadavers 4,10.
Differential diagnosis

The main differential is that of other cystic lesions of the pituitary region, all of which displace the infundibulum to the sides of the fossa (i.e absent infundibulum sign). Nonetheless the differential includes:

arachnoid cyst

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      very similar in appearance other than mass effect on the infundibulum
      on high resolution imaging the margins of the cyst may be visible
superiorly
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Rathke's cleft cyst

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      usually do not exactly follow CSF
      may have a small T2 hypointense dot (cyst with dot sign)
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craniopharyngioma

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      usually do not exactly follow CSF
      usually have visible solid components
      often calcified
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cystic pituitary macroadenoma

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      usually do not exactly follow CSF
      usually have visible solid components
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epidermoid

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      usually do not exactly follow CSF
      demonstrate restricted diffusion
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[1].

[1]

http://radiopaedia.org/articles/empty-sella