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Empty Sella Syndrome: A Case Report

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Abstract | **Case Report**

Empty Sella Syndrome (ESS) is a rare condition characterized by herniation of the subarachnoid space into the sella turcica through a defect in the diaphragma sellae, resulting in a partially or completely empty sella on imaging. It may present with neurological, endocrine, or ophthalmological symptoms. We report the case of a 62-year-old man with recurrent meningitis and chronic rhinorrhea. CT and MRI revealed an intrasellar arachnoidocele communicating with the suprasellar cistern. MRI remains the diagnostic modality of choice. Management primarily involves addressing hormonal abnormalities and repairing cerebrospinal fluid (CSF) leaks when present.

Keywords: Empty Sella syndrome, Arachnoid Cele, Pituitary gland, MRI, Cerebrospinal fluid leak.

INTRODUCTION

Empty Sella Syndrome (ESS) refers to the herniation of the subarachnoid space into the sella turcica, compressing and flattening the pituitary gland, usually due to a defect in the diaphragma sellae or increased cerebrospinal fluid (CSF) pressure [1].

ESS can be:

- **Primary**, related to congenital diaphragmatic weakness and intracranial hypertension, often seen in middle-aged, obese, hypertensive women [2].
- **Secondary**, following pituitary surgery, apoplexy, infarction, or radiotherapy [3].

The prevalence of primary ESS ranges between 2% and 20%, and pituitary hormonal deficiencies are found in about 50% of cases, most frequently involving the gonadotropic and somatotropic axes [4]. While often asymptomatic, ESS can also present with endocrine, neurological, ophthalmologic, or psychiatric manifestations. Visual disturbances, headaches, and CSF rhinorrhea are typical findings in symptomatic cases [5].

MRI is the imaging modality of choice, providing excellent visualization of the sellar region and the pituitary gland morphology [6].

CASE REPORT

A 62-year-old man was followed for recurrent meningitis associated with chronic rhinorrhea. Clinical examination was unremarkable, and no visual or neurological deficits were identified.

IMAGING FINDINGS

A CT scan of the brain in parenchymal window settings demonstrated an enlarged sella turcica appearing empty and filled with CSF density material. There was moderate hydrocephalus and a communication between the frontal lobe and anterior ethmoidal cells through a small bony defect suggestive of an osteomeningeal breach (Figure 1).

An MRI study revealed an intrasellar fluid collection that was hypointense on T1-weighted and hyperintense on T2-weighted images, identical in signal to cerebrospinal fluid. There was no enhancement after gadolinium administration, and the cavity communicated with the suprasellar optochiasmatic cistern, confirming the diagnosis of an intrasellar arachnoidocele (Figures 2 and 3).

The pituitary gland was thinned and flattened along the sellar floor without evidence of mass lesion. The optic chiasm was slightly displaced inferiorly.

MANAGEMENT

Given the coexistence of CSF rhinorrhea and recurrent meningitis, neurosurgical management was recommended for endoscopic repair of the skull base defect. The patient was also referred for an endocrine

evaluation to detect possible pituitary hormonal deficiencies.

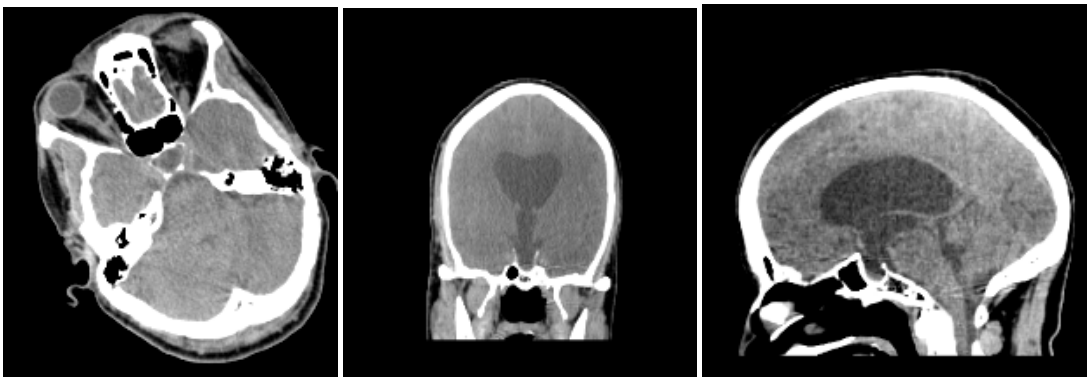

Figure 1: Axial CT scan in parenchymal window showing an enlarged sella turcica filled with cerebrospinal fluid density (empty sella appearance)

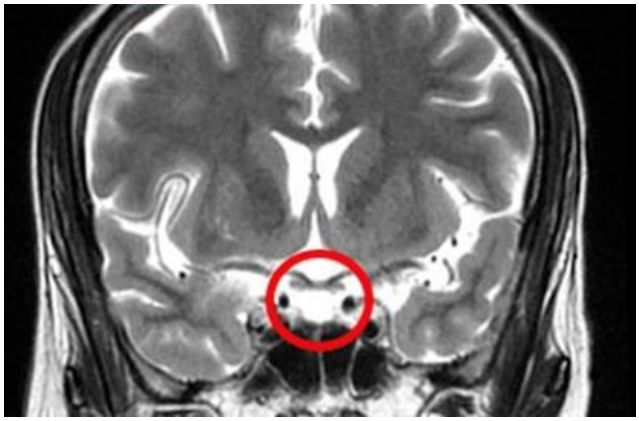

Figure 2: Coronal T2-weighted MRI demon strating a fluid-filled sella turcica (CSF signal intensity) with a flattened pituitary gland along the sellar floor

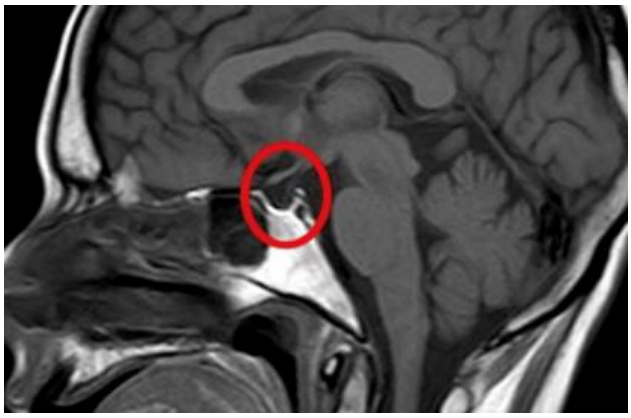

Figure 3: Sagittal T2-weighted MRI showing communication between the intrasellar cavity and the suprasellar cistern (intrasellar arachnoidocele)

DISCUSSION

ESS is a radiological and anatomical entity characterized by partial or complete filling of the sella turcica with CSF, resulting in pituitary gland flattening [7]. Primary ESS arises from a congenital defect of the diaphragma sellae or elevated intracranial pressure, while secondary ESS follows pituitary damage due to surgery, apoplexy, or necrosis [8].

Clinical Spectrum

Symptoms may include:

- **Endocrine disorders:** hypopituitarism, hyperprolactinemia, or menstrual irregularities.
- **Neurological findings:** headaches, dizziness, and CSF rhinorrhea.
- **Ophthalmological complications:** visual field defects due to optic chiasm herniation [9].

CSF rhinorrhea is a rare but serious complication, predisposing to recurrent meningitis as seen in our case.

Imaging

MRI is the gold standard for diagnosis, showing CSF signal intensity within the sella and a flattened pituitary gland. The infundibulum sign, where the pituitary stalk traverses the fluid-filled sella, is pathognomonic [10]. CT may complement MRI by detecting bone defects and evaluating for CSF fistulas.

Management

Treatment depends on clinical presentation:

- **Asymptomatic ESS:** no specific intervention; regular follow-up is sufficient.
- **Endocrine abnormalities:** require hormone replacement therapy.
- **CSF leaks or recurrent meningitis:** managed surgically via transsphenoidal or endoscopic approaches to seal the osteomeningeal defect [11].

CONCLUSION

Empty Sella Syndrome is a rare but important diagnostic consideration in patients presenting with recurrent meningitis or spontaneous CSF rhinorrhea. MRI is the reference imaging modality, enabling accurate visualization of intrasellar arachnoidocele and pituitary morphology. Management depends on symptomatology, focusing on endocrine evaluation and surgical repair when CSF leakage occurs.

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