

**Case Report**

# A Confusing and Upsetting Case of Empty Sella: A Case Report

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**Abstract**

**Rationale:** Empty sella is usually found on cranial imaging in up to 25% of people.

**Patient concerns:** In this report, Here, we describe a confusing and upsetting case of empty sella.

**Diagnosis:** On cranial MRI, the pituitary fossa enlarged with long signals on T1WI/T2WI and isointense signal on DWI inside; the pituitary stalk was shifted towards the right; the optic chiasma was compressed to elevate; and the bones of the anterior clinoid process (ACP) and sellar floor got compressed and absorbed. Empty sella was considered.

**Interventions:** Elective (right) neuroendoscopic endonasal transsphenoidal surgery under general anaesthesia was performed.

**Outcomes:** High-flow cerebrospinal fluid (CSF) leakage occurred intraoperatively due to the rupture of the dura and was instantly managed using artificial dural patches, On day 3 after surgery, the patient developed intracranial infection and was treated by lumbar cistern drainage of CSF and anti-infective treatment using Vancomycin and Meropenem. Four weeks after surgery, the patient had communicating hydrocephalus and then underwent ventriculoperitoneal shunt. At semi-annual follow-up, the patient could only identify the number of figures within a distance of 1 meter.

**Lessons:** The development of visual impairment might be associated with the rapid loss of bulk CSF during surgery. Therefore, it is key to avoid intraoperative loss of bulk CSF that may lead to acute downward herniation of the optic chiasma. the patient vision was not significantly recovered after aggressive treatment, and we suspected that there might be a close relationship with the intracranial infection.

**Keywords:** Empty sella; Surgery; Complications.

**Abbreviations:** MRI: Magnetic resonance imaging; CT: Computed tomography; ECG: electrocardiogram; TSH: Thyroid stimulating hormone; ACTH: Adreno-Cortico-Tropic-Hormone; FT3: 3'-triiodo-thyronine; T1WI: T1 weighted image; T2WI: T2 weighted image; ACP: anterior clinoid process; CSF: cerebrospinal fluid.

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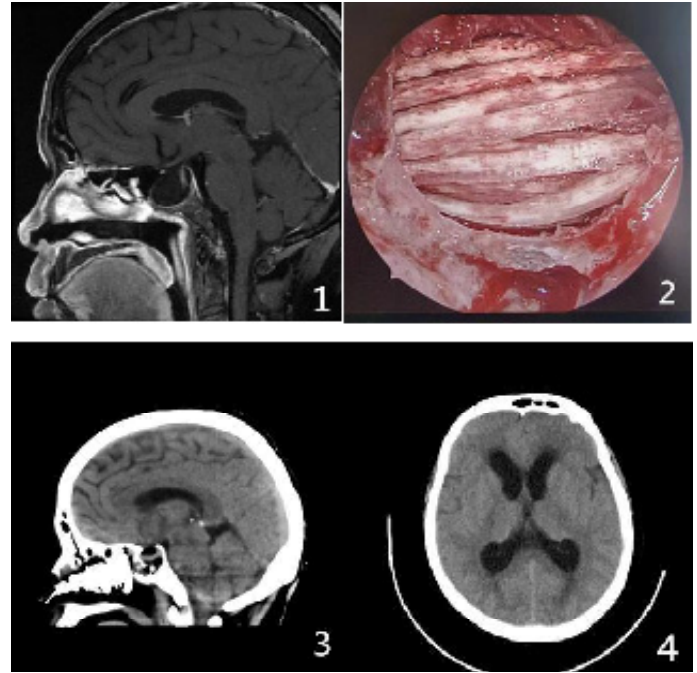
## Introduction

Empty sella is usually referred to as a syndrome. It was first reported by Busch in 1951 as an anatomical condition presenting as the herniation of subarachnoid space into the sella turcica, accompanying flattening of the pituitary gland to the sellar floor with or without enlargement of the sella turcica. Usually, it is divided as primary or secondary [1,2]. Here, we report a case of primary empty sella syndrome with postoperative visual impairment.

## Case report

A 55-year-old female presented with 10 years of recurrent headache and 3 months of exacerbation. She had no history of previous illness, and she was married with one son and one daughter. She had normal menses. On admission, she was in good general condition and normal on ophthalmologic examination. In addition, the cardiac ultrasound, abdominal ultrasound, chest CT and ECG were all normal on admission. Laboratory indices, including blood indices, biochemical indices, electrolytes, and coagulation function, were in normal range. Pituitary hormone test revealed the thyroid-stimulating hormone (TSH) of 0.03 mIU/L, adrenocorticotrophic hormone (ACTH) of <1 pg/ml, and free triiodothyronine (fT3) of 2.5 pmol/L. The cortisol, prolactin and growth hormone were in normal range. On cranial MRI, the pituitary fossa enlarged with long signals on T1WI/T2WI and isointense signal on DWI inside; the pituitary stalk was shifted towards the right; the optic chiasma was compressed to elevate; and the bones of the anterior clinoid process (ACP) and sellar floor got compressed and absorbed. Empty sella was considered.

Empty sella was diagnosed on admission. After discussion with the patient and her trustee, elective (right) neuroendoscopic endonasal transsphenoidal surgery under general anaesthesia was performed. The bone of the sellar floor was absorbed and thinned intraoperatively. After grinding, the dura was exposed as intact and thin. The dura mater was lifted, and the sella turcica was filled with allogenic bones in a cross-over fashion. Unfortunately, high-flow cerebrospinal fluid (CSF) leakage occurred intraoperatively due to the rupture of the dura and was instantly managed using artificial dural patches, fascia lata from the thigh, and fibrine adhesives, etc. The patient was returned to the ward after surgery and reported improvement in headache after waking from anaesthesia. However, she complained of visual impairment and could only sense light. No evidence of haemorrhage was revealed on instant cranial CT, and shock therapy with intravenous Methylprednisolone was ineffective. On day 3 after surgery, the patient developed intracranial infection and was treated by lumbar cistern drainage of CSF and anti-infective treatment using Vancomycin and Meropenem. Two weeks after surgery, pituitary test revealed the TSH of 0.03 mIU/L and ACTH of <1 pg/ml. Levothyroxine replacement therapy was performed, resulting in diabetes insipidus which was then treated by desmopressin acetates. Four weeks after surgery, the patient had communicating hydrocephalus and then underwent ventriculoperitoneal shunt. At semi-annual follow-up, the patient could only identify the number of figures within a distance of 1 meter.



**Figure 1:** 1.1 Enlarged sella turcica filled with fluid signal on T1WI. 1.2 Allograft bone cross fixed to fill the sella turcica. 1.3 CT plain scan of head after second operation. 1.4 Four weeks after surgery, the patient revealed communicating hydrocephalus on plain CT scan.

## Discussion

Surgery is not necessary for empty sella patients without significant symptoms or signs. While in patients with intractable headache, vision loss, visual field defects, hypopituitarism, or spontaneous CSF rhinorrhoea, surgical intervention is required. In these cases, surgery is usually performed to fill in the abnormally enlarged subarachnoid space within the sella turcica, removing the compression on the pituitary gland, dura and bone caused by CSF pulsation, thereby eliminating or reducing the corresponding symptoms and signs to delay disease progression [3,4].

Empty sella is a medical condition with the sella turcica filled with CSF. In this context, typical imaging findings of empty sella mainly include punctate signals (pituitary stalk transection) isointense to the brain tissue on axial image, "White-target sign" on T2WI, "Black-target sign" on T1WI, and "Funnel sign" on coronal positions. All these findings have significant value for diagnosis of empty sella syndrome [5].

Combining the treatment process of the patient reported here, the preoperative diagnosis of empty sella syndrome was relatively definitive. Intractable headache has a clear indication for surgery when drug therapy is ineffective. The patient reported here had CSF leakage during transsphenoidal surgery, resulting in rapid loss of bulk CSF. Besides, the patient also had visual impairment because of the acute downward herniation of the optic chiasma due to gravity. According to experience, patients who have visual impairment after endonasal transsphenoidal surgery may benefit from the treatment protocol of optic nerve injury, including early steroid pulse therapy, vasodilator drugs, and early hyperbaric oxygen therapy. The hypopituitarism after surgery was considered as a cause of intracranial infection in

this patient. Irrigation of operative field with hydrogen peroxide and iodophors throughout the endonasal transsphenoidal surgery may reduce the incidence of postoperative intracranial infection. In addition, tight patching of the dura mater is also of paramount significance. The patient here had significant improvement in headache after surgery but developed severe complications. However, her vision remained severe even after aggressive treatment, which is confusing and upsetting. For patients suffering from intractable headache, lumbar cistern drainage of CSF can be performed. While in cases with remission, ventriculoperitoneal drainage can be an option to further relieve headache [7] and reduce surgery-related trauma.

### Conclusion

Here, we describe a rare case of empty sella syndrome with severe visual impairment occurred postoperatively. The development of visual impairment might be associated with the rapid loss of bulk CSF during surgery. Therefore, it is key to avoid intraoperative loss of bulk CSF that may lead to acute downward herniation of the optic chiasma. Additionally, tight repair of the CSF leak with dural patches is vital to prevent the incidence of postoperative intracranial infection. Here, the patient vision was not significantly recovered after aggressive treatment, and we suspected that there might be a close relationship with the intracranial infection [7].

### Declarations

**Conflict of interest:** All authors state no conflict of interest.

**Statement:** Informed consent for publication was obtained from the patient and her surrogates. This case was published with written informed consent from the patient's son, which is a retrospective study and has nothing to do with ethics.

**Disclosures:** The authors report no conflict of interest in this paper.

### Author contributions

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9. Writing – review & editing: LiHua Qiu, Yong Yi

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