

Focal Encephalocele Secondary to Type II Sternberg's Canal Defect – A Rare Phenomenon

Case Report

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Article Information: Submission: 28/08/2025; Accepted: 17/09/2025; Published: 19/09/2025

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Abstract

Background: Sternberg's canal (lateral craniopharyngeal canal) is an embryonic remnant from incomplete fusion of the greater wings of the sphenoid with the basisphenoid, potentially predisposing to temporal lobe encephaloceles into the sphenoid sinus. The complications seen in this condition are CSF rhinorrhea, recurrent meningitis, seizures, misdiagnosed nasal mass.

Case Presentation: A 23-year-old male experienced recurrent headaches for one year, initially treated as vascular headache without relief. CT brain revealed focal thinning of the left sphenoid sinus superolateral wall. MRI demonstrated a focal encephalocele abutting the infraorbital segment of the optic nerve, consistent with a Type II Sternberg's canal defect. This patient was treated with surgical repair.

Discussion: Four types of sphenoid sinus defects are recognized based on location related to the foramen rotundum (FR) and vidian canal (VC)—Type II defects are medial to FR and are rare. Radiological imaging (CT and MRI) is essential for accurate diagnosis and surgical planning. Treatment could be conservative by using a temporary lumbar drain for small leaks or surgical management can be done by endoscopic endonasal repair or open transcranial repair. While most focal encephaloceles due to Sternberg's canal defect are isolated, they can be associated with neurocutaneous syndromes like NF1 (sphenoid wing dysplasia with basal encephalocele).

Conclusion: Type II Sternberg's canal defects, though rare, should be considered in unexplained chronic headaches or spontaneous CSF rhinorrhea. Early imaging facilitates diagnosis and guides neurosurgical intervention.

Keywords: Sternberg's canal, encephalocele, sphenoid sinus, CSF leak, headache

Introduction

Sternberg's canal, also known as the lateral craniopharyngeal canal, results from the incomplete fusion of sphenoid ossification centers and may serve as a weak point in the skull base, predisposing to herniation of the temporal lobe into the sphenoid sinus. While historically reported in up to 4% of adults, more recent imaging studies suggest the incidence is significantly lower. Clinically, patients may present with spontaneous CSF rhinorrhea, recurrent meningitis, or headache. The complications seen in this condition are

CSF rhinorrhea, recurrent meningitis, seizures, misdiagnosed nasal mass.

Case Report

A 23-year-old male without comorbidities presented with recurrent headaches for one year; these were initially attributed to vascular headache and failed to respond to treatment.

Investigations

- **CT Brain:**

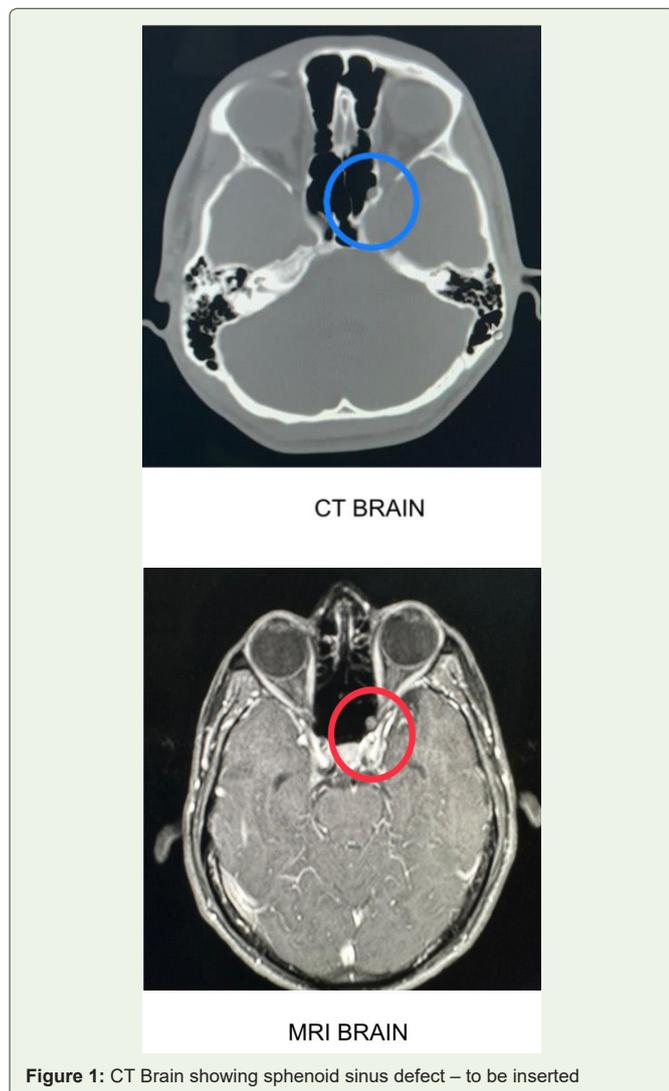


Figure 1: CT Brain showing sphenoid sinus defect – to be inserted

Revealed focal thinning and defect in the superolateral wall of the left sphenoid sinus.

• **MRI Brain:**

Demonstrated encephalocele abutting the infraorbital optic nerve segment, consistent with a Type II Sternberg’s canal defect. This patient chose surgical correction and underwent the same

Discussion

Sphenoid sinus encephaloceles due to persistence of Sternberg’s canal are exceedingly rare. Classification based on relation to FR and VC:

- Type I: Medial to FR and VC (traditional Sternberg’s canal)
- Type II: Medial to FR
- Type III: Lateral to FR
- Type IV: Through enlarged FR into sphenoid sinus

Treatment could be conservative by using a temporary lumbar drain for small leaks or surgical management can be done by endoscopic endonasal repair or open transcranial repair. While most focal encephaloceles due to Sternberg’s canal defect are isolated, they can be associated with neurocutaneous syndromes like NF1 (sphenoid wing dysplasia with basal encephalocele).

Our case corresponds to a Type II defect, which is rarely reported. Clinically, patients may present with CSF rhinorrhea, recurrent meningitis, visual disturbances, or persistent headaches. Radiological imaging with CT and MRI is essential for diagnosis, anatomical localization, and surgical planning.

Conclusion

Type II Sternberg’s canal defect represents a rare anatomical variant that may manifest as chronic headaches or CSF leak. Accurate diagnosis rests on high-resolution CT and MRI. Prompt recognition and intervention are critical to prevent complications like meningitis and to guide appropriate surgical repair.

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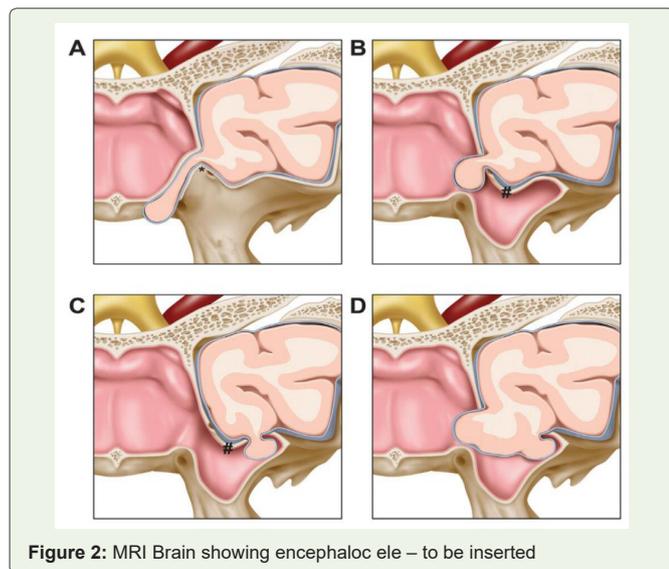


Figure 2: MRI Brain showing encephalocele – to be inserted