

An isolated intracranial mucocoele herniated from the frontal sinus

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Abstract. *An isolated intracranial mucocoele herniated from the frontal sinus.* Mucocoeles are chronic mucosa-lined retention cysts that occur due to sinus ostium obstruction and expand along the path of least resistance, most commonly involving the frontal sinus. A frontal mucocoele typically appears as a smooth and rounded expansile enlargement of a completely opacified frontal sinus, with or without thinning of the bony wall of the sinus. Here we report a rare case of isolated intracranial mucocoele that presented with posterior herniation to the anterior cranial fossa through a small bony defect on the posterior table of the frontal sinus. The findings upon imaging could easily be confused with intracranial abscess, potentially leading to craniotomy drainage. In the present case of mucocoele, the frontal intracranial lesion was completely resolved following endoscopic frontal sinusotomy.

Introduction

Mucocoeles are chronic mucosa-lined retention cysts that occur due to sinus ostium obstruction caused by chronic sinusitis, polyps, tumours, trauma, or surgical interventions.¹ The frontal sinus is most commonly involved, followed by the ethmoidal, maxillary, and sphenoid sinuses.² Mucocoeles tend to expand along the path of least resistance, having the potential to erode into the orbit, nasal cavity, and skin and even to extend intracranially. Here we report a rare case of isolated intracranial mucocoele that presented with posterior herniation to the anterior cranial fossa through a small bony defect on the posterior table of the frontal sinus.

Case report

An 18-year-old female presented with a history of nasal obstruction, rhinorrhea, and postnasal dripping for many years and intermittent right nasal bleeding for the past month. She had no headache, blurred vision, fever, or history of trauma. Endoscopic examination revealed mucopus in the right nasal passage and obliteration of the middle meatus due to mucosal oedema. The contralateral nasal cavity and nasopharynx were unremarkable. A computed tomography (CT) scan with contrast showed opacification of the right maxillary, anterior ethmoid, and frontal sinuses. Additionally, a 2-cm

hypodense mass lesion with ring enhancement was detected in the right extracerebral anterior frontal region, immediately dorsal and superior to the obstructed frontal sinus (Figure 1). Magnetic resonance imaging (MRI) revealed an oval-shaped intracranial extra-axial lesion of about 2.3×1.9 cm in size in the right anterior cranial fossa region, which was hyperintense on T2-weighted images (Figure 2) and hypointense on T1-weighted images with peripheral ring enhancement (Figure 3).

Following these investigations, we performed right-side endoscopic sinus surgery. Clearance of the frontal recess enabled identification and enlargement of the right frontal sinus ostium, and copious mucopus was intraoperatively drained. No procedure was performed on the posterior wall of the frontal sinus. Postoperative treatment included antibiotics and routine wound care. The clinical course was uneventful and a follow-up CT scan showed a patent frontal sinus ostium at three months after surgery. Follow-up MRI at 6 months after surgery also revealed a clear frontal sinus and total resolution of the frontal intracranial lesion on the T1-weighted image (Figure 4).

Discussion

Frontal mucocoeles typically have a silent course such that the patients have no obvious symptoms until the mucocoele expands to surrounding structures. Upon expansion, the presenting symptoms



Figure 1

A CT scan with an injection of a contrast medium showed opacification of the right maxillary and frontal sinuses. A 2-cm hypodense mass lesion with ring enhancement was detected in the right extracerebral anterior frontal region.

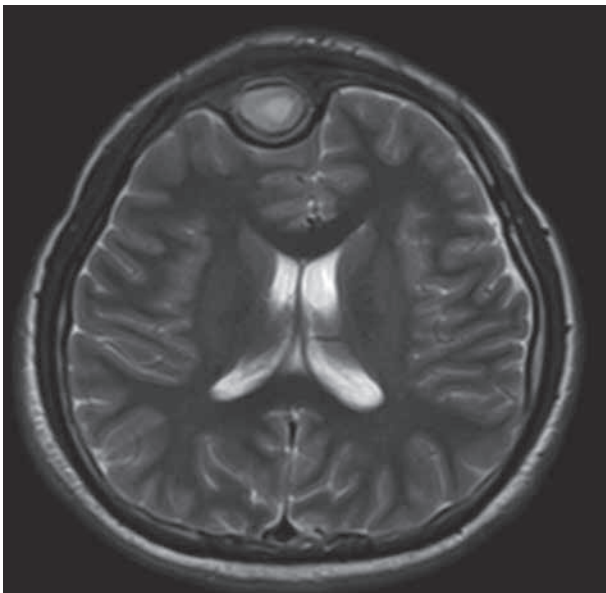


Figure 2

MRI revealed an oval-shaped intracranial extra-axial lesion of about 2.3×1.9 cm in size in the right anterior cranial fossa region, which was hyperintense on T2-weighted images.

vary based on the site of extension. Orbital extension causes pain, proptosis, loss of vision, ocular motility disturbances, and tearing. Cranial extension can lead to meningitis, headaches,

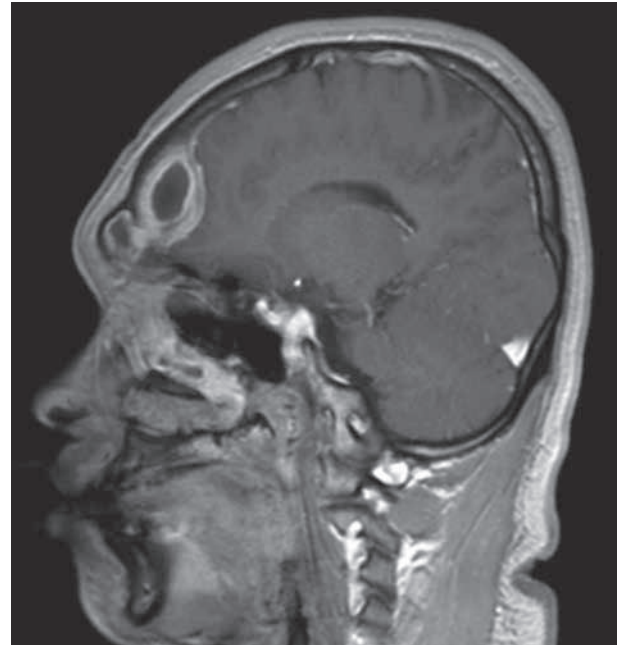


Figure 3

The lesion was hypointense on T1-weighted images with peripheral ring enhancement.

epidural abscess, subdural empyema, brain abscess, and cranial nerve palsies. Nasal expansion results in nasal blockage and loss of sense of smell, while skin extension creates a soft or fluctuant swelling over the forehead.^{3,4,5}

Radiographic examination of mucocoeles shows smooth and rounded enlargement of a completely opacified sinus cavity or air cell, reflecting the slow nature of the expansion. The walls are thinned and often barely visible, and areas of bone thinning are commonly noted due to severe chronic sinus inflammation and the expansile process.⁶ CT investigation typically reveals the mucocoele contents to be of low density without enhancement. This density may increase as the mucus becomes more inspissated.

On MRI, the intensity characteristics vary with the mucocoele's protein content and degree of hydration.⁷ The fluid within the mucocoele is hypointense on T1-weighted images but has a higher signal than cerebrospinal fluid, reflecting increased proteinaceous content. On the other hand, T2-weighted images show the mucocoele as hyperintense and with a relatively lower signal than cerebrospinal fluid, again because of the high protein content. T1-weighted images with gadolinium contrast and fat suppression show no

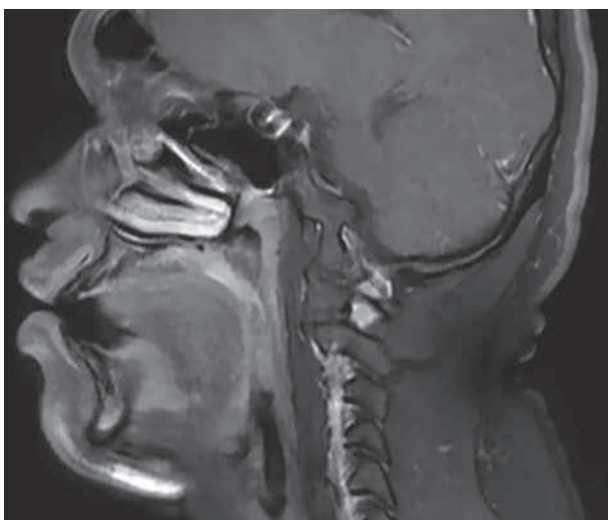


Figure 4

At 6 months after surgery, follow-up MRI showed a clear frontal sinus and total resolution of the frontal intracranial lesion on T1-weighted images.

enhancement within the mucocoele, but some enhancement of the mucosa along the mucocoele margin.

In the presently described case, the CT scan showed the rare appearance of isolated intracranial fluid accumulation in a cystic lesion, raising suspicion of an epidural abscess. However, the patient had no clinical symptoms or signs of an epidural abscess. Subsequent MRI disclosed that the fluid-like content was completely surrounded by a mucosal layer, and the T2 MRI image showed a lack of oedema, favouring a mucocoele rather than an abscess. Based on the image findings and the clinical course, the patient's final diagnosis was a rare intracranial mucocoele herniated from the frontal sinus. The mucocoele was herniated from the frontal sinus through an area of bony defect at the posterior wall, and was still connected with the frontal sinus (Figure 3). Therefore, the mucocoele could be reduced via frontal sinus drainage.

A frontal mucocoele typically appears as a smooth and rounded expansile enlargement of a completely opacified frontal sinus, with or without thinning of the bony wall of the sinus; however, here we found an isolated intracranial frontal mucocoele herniated from a small bony defect on the posterior table of the frontal sinus. The initial imaging results could easily have been confused with intracranial abscess, potentially leading to craniotomy drainage. In the present case of mucocoele, the frontal intracranial lesion was totally resolved following endoscopic frontal sinusotomy.

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