Frontal sinus post-traumatic mucocele secondary to a cactus spine

Depak Patel, John Clarkson, Satya Amirapu

Forty-eight year-old gentlemen presented to our otolaryngology clinic with a six-month history of a cystic swelling over his right forehead with unilateral clear nasal fluid expressed with pressure over the mass. His general practitioner prescribed a course of oral antibiotics and the swelling reduced in size with improvement of the rhinorrhea. Ten years prior the patient suffered a cactus injury to the right forehead requiring manual extraction of a large cactus spine. He remained asymptomatic for nine years. He denies post-nasal drip, hyposmia and facial pain. No significant past medical history.

More recent examination demonstrated no other facial swellings or wounds. Endoscopic examination of the nasal cavity was normal. Computed tomography (CT) scan demonstrated a homogenous, cystic mass arising within the right frontal sinus with erosion of the anterior and posterior table (Figure 1). Hyperostosis was seen in the frontal recess with complete opacification of the frontal sinus, suggesting obstruction of the drainage pathway. Magnetic resonance imaging (MRI) demonstrated high T2 signal intensity and low T1 signal intensity consistent with a mucocele (Figure 2). The lesion abutted the frontal lobe, without any dural enhancement.

Treatment options were discussed with the patient and surgical intervention was agreed upon to confirm the diagnosis, marsupialise the mucocele and prevent reformation. A frontal drillout was performed, involving the endoscopic formation of a common drainage pathway between both frontal sinuses to form a large common outflow tract. Intra-operatively, a friable lobular mass among granulation tissue was found in the superior aspect of the frontal recess with no grossly identifiable mucocele. Biopsies were taken and sent in formalin for histology. The patient made an excellent postoperative recovery.

Histology showed multiple small morphologically normal bony spicules, vegetative matter in the form of palisade cortical cells along with necrotic debris within the cortical cells and a fibrous reaction (Figure 3). Fragmented epithelial lining cells are seen with no atypia or malignancy. No inflammatory infiltrate, granulomata or foreign body reaction is visible. Histologically, longstanding fibrosis along with necrosis and evidence of vegetative matter concludes a diagnosis consistent with the cactus spine injury.

On request, the patient was able to provide us with a stem of the cacti causing the injury (Echinopsis destericola) to enable us to compare the histological features in both biopsy and the cactus stem (Figure 3). This particular cactus has white spines up to 10cm long. The histological examination of the cactus stem showed identical palisade cortical cells as seen in the biopsy tissue. The spine was needle-like and non-cellular.

A mucocele is an epithelial-lined sac containing intissipated mucus with locally erosive properties. Bone erosion has been shown to occur both from direct positive pressure effects within the mucocele and from local production of bone resorption factors such as prostaglandins, interleukin 1 and tumour necrosis factor. These factors have been identified at the interface between mucocele and bone. Capra suggests that the cause of a mucocele may be inflammatory due to sinus outflow obstruction, trauma (of which most are blunt trauma
Figure 1: CT sagittal demonstrating a homogenous, cystic mass arising within the right frontal sinus with erosion of the anterior and posterior table. Hyperostosis is seen in the frontal recess.

counting fracture), previous surgery or tumour distortion of outflow tracts. Seventy to 90% of mucoceles occur in the frontal-ethmoidal complex, 10% in the maxillary sinus and rarely in the sphenoid. Current management is directed at endoscopic marsupialisation of the cyst wall. A single case of a vegetative granuloma found in the nasal cavity was reported in the literature due to regurgitation of leguminous food. No other cases were identified in the literature. We present the first case of a cactus spine causing a post-traumatic frontal sinus mucocele.
Figure 2: MRI T1 sagittal demonstrating a cystic lesion abutting the frontal lobe, without dural enhancement.

Figure 3: Left image—frontal sinus lesion showing multiple small morphologically normal bony spicules, vegetative matter in the form of palisade cortical cells along with necrotic debris within the cortical cells and a fibrous reaction. Middle image—*Echinopsis destericola* provided by patient from the same cactus causing the injury. Right image—histological examination of the cactus spine provided by the patient shows identical palisade cortical cells as seen in the biopsy tissue. The spine was needle-like and non-cellular.
Competing interests:
Nil.

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Author information:
Depak Patel, ORL Trainee Registrar, Department of Otolaryngology, Waikato Hospital, Waikato; John Clarkson, ORL Consultant, Department of Otolaryngology, Waikato Hospital, Waikato; Satya Amirapu, Histopathology Consultant, Department of Anatomy, Auckland University, Auckland.

Corresponding author:
Dr Depak Patel, Waikato Hospital, Pembroke Street, Hamilton West 3204, Waikato.
d_patel89@hotmail.com

REFERENCES:

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