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Case Report

Findings of subarachnoid fat after trauma to a tarlov cyst ☆

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ABSTRACT

Subarachnoid fat is an uncommon finding that has several etiologies. It is important to determine the etiology in order to plan appropriate treatment. We present a case report of an 80-year-old female brought to the emergency department after a fall with complaints of headache and pain in the sacral region. Computed tomography and magnetic resonance images of the head demonstrated fat in the subarachnoid space. Computed tomography and magnetic resonance images of the sacrum demonstrated a Tarlov cyst with a sacral fracture extending into the cyst, likely representing the origin of the fat in the subarachnoid space. This case demonstrates a rare etiology of fat in the subarachnoid space.

Introduction

Fat in the subarachnoid space is an uncommon finding but when present is most commonly associated with ruptured dermoid or epidermoid cysts, postsurgical changes after removal of these cysts, or fat containing tumors of the spinal cord [1]. In this case we report an extremely rare etiology of subarachnoid fat: a sacral fracture extending into a Tarlov cyst. Tarlov cysts are a relatively common incidental finding, with an estimated prevalence of 5% in the general population, but are rarely symptomatic [2]. This case demonstrates that in the setting of trauma this etiology should be considered in the differential when determining the origin of subarachnoid fat.

Case report

An 80-year-old female presented to the emergency department after being found down for an unknown amount of time by emergency medical services. She reported falling some time the previous night. On scene, emergency medical services reported a large amount of blood present around the

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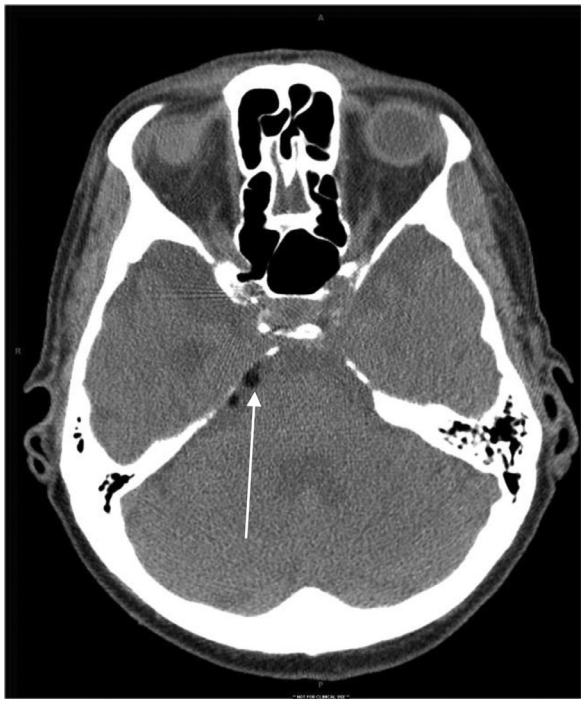

Fig. 1 – Axial view of computed tomography Head demonstrating small hypoattenuating areas in the right basilar cistern. Hounsfield unit analysis of these areas demonstrated numbers compatible with fat.

patient. The patient complained of nausea, abdominal pain, and pain over the sacrum. She had a history of recurrent dizziness episodes and hyponatremia, as reported by the family. On physical exam a laceration was noted on the posterior aspect of the skull, the presumed source of the blood found on scene. Ecchymoses were found over the bilateral lower extremities and a tender hematoma was noted over the sacrum. The patient was alert and oriented to person, place, and time with a Glasgow coma score of 14. There was no numbness or deficits in strength noted and the cranial nerves were grossly intact. The patient was evaluated by the trauma team in the emergency department and a trauma workup was started. This included labs and multiple imaging studies of the head, spine, and sacrum.

The head computed tomography (CT) ordered during the trauma workup showed small hypoattenuating areas in the basilar cistern (Fig. 1). Hounsfield unit analysis of these areas demonstrated values compatible with fat. CT imaging of the lumbosacral region revealed a Tarlov cyst (Figs. 2A and B), but no obvious fracture was visualized. Follow up magnetic resonance images (MRI) of the brain confirmed the findings of subarachnoid fat. MRI of the lumbosacral region was ordered to better characterize the findings in the sacrum. This study demonstrated a fluid level within the Tarlov cyst, likely representing hemorrhage, and bone edema in the sacrum, extending into the cyst, consistent with a fracture, likely nondisplaced due to the inability to visualize it on CT (Figs. 3–5).

The patient was evaluated by neurosurgery as well as orthopedic spine surgery. Both teams deemed there was no intervention necessary at that time. The patient was admitted and remained alert and oriented with no focal neurological deficits.

Discussion

Subarachnoid fat appears as a hypoattenuating lesion on CT head optimized for examining brain parenchyma [1]. It can be mistaken for pneumocephalus, a concerning finding in the

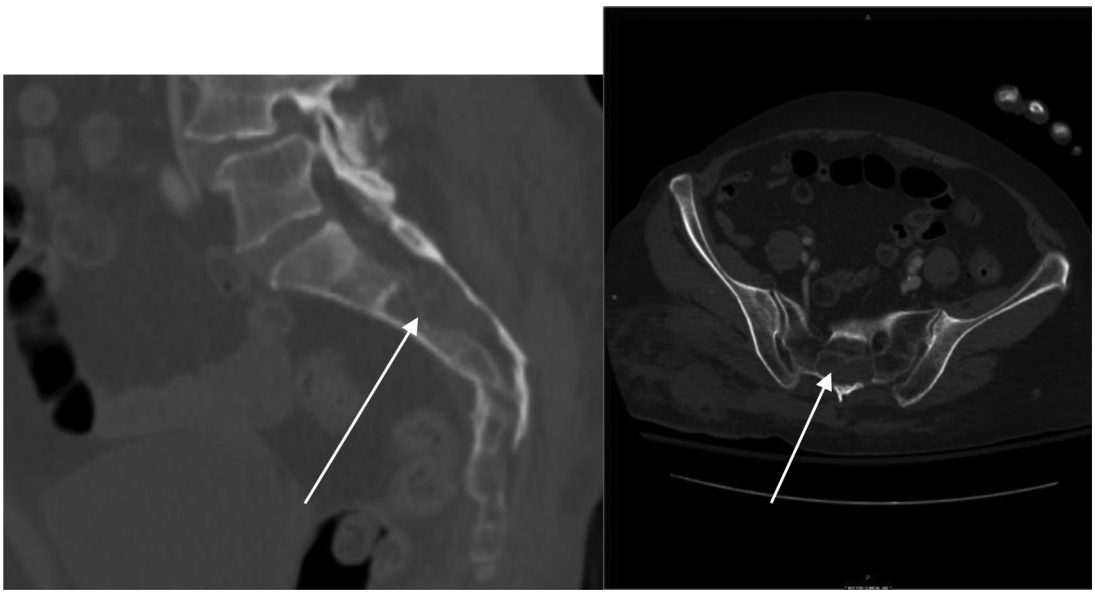

Fig. 2 – Sagittal (A) and Axial (B) computed tomography images of the lumbosacral spine demonstrating a Tarlov cyst.

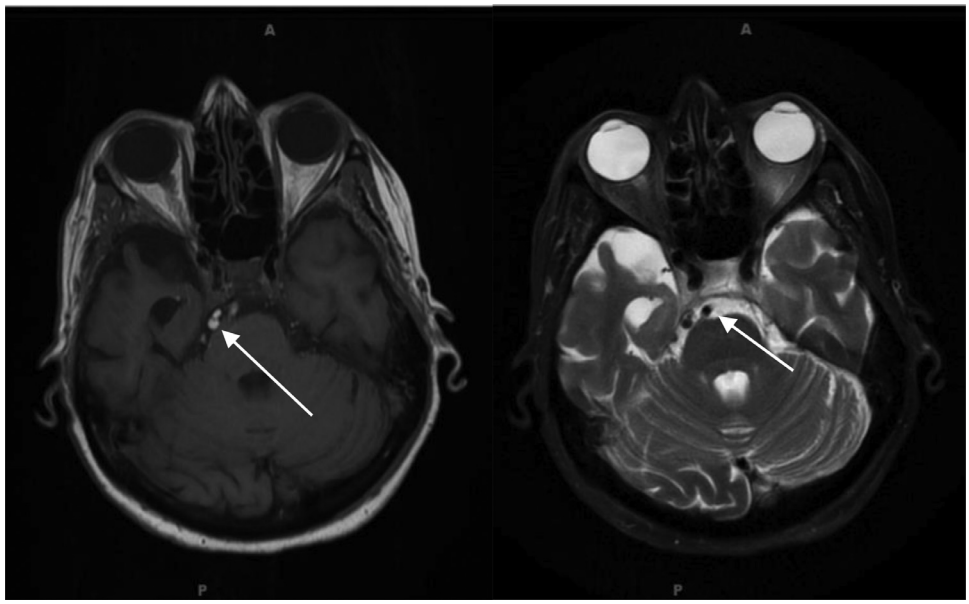

Fig. 3 – (A) Axial T1-weighted magnetic resonance images (MRI) image of the brain demonstrating high signal intensity in the right basilar cistern. (B) Axial fat saturated T2-weighted MRI image of the brain demonstrating low intensity signal in these areas. These findings confirmed the lesions to be subarachnoid fat.

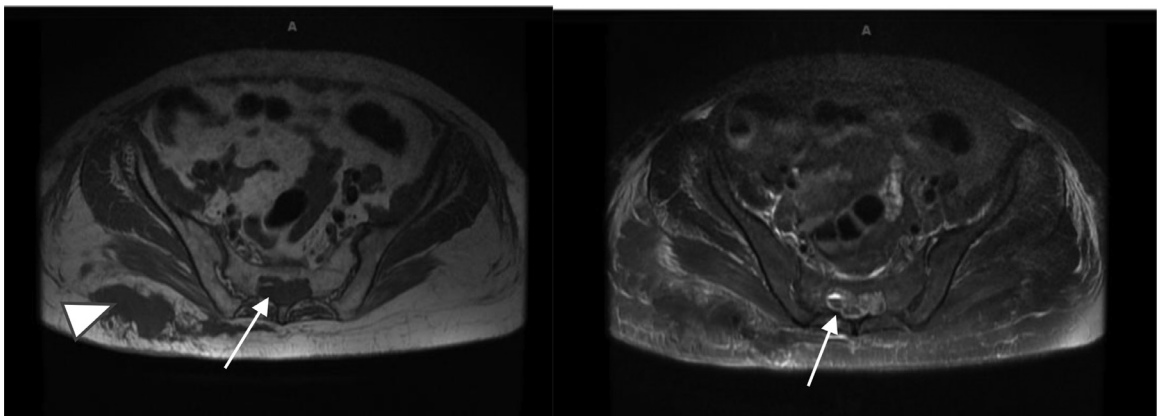

Fig. 4 – Axial T1-weighted (A) and fat saturated T2-weighted (B) MRI of the sacrum demonstrating the presence of a Tarlov cyst. A fluid level is seen within the Tarlov cyst, likely representing hemorrhage. A hematoma in the right buttock can also be seen (tip of triangle).

setting of trauma [3]. Adjusting the window, measuring the Hounsfield units, or obtaining further imaging studies can easily allow for differentiation of these lesions and enable a proper diagnosis.

Intracranial fat emboli are associated with orthopedic injuries, although they may be less commonly associated with bone marrow transplantation, liposuction, or closed chest injuries. In these instances, fat embolizes through the vasculature and has a “starfield” or embolic pattern on brain imaging [4]. Fat present in the subarachnoid space is less common and necessitates its own differential. Subarachnoid fat is associated with fat containing tumors of the spinal cord, ruptured dermoid, or epidermoid cysts, postsurgical changes after the removal of these cysts, and spinal trauma [1]. In the absence of these cysts or other tumors it is important to review the clinical history and other imaging studies to determine the etiology.

In this case, the history of a fall prompted further imaging studies which revealed the cause of the subarachnoid fat: a sacral fracture extending into a Tarlov cyst. Tarlov cysts, also called perineural cysts, are cerebrospinal fluid filled dilatation of the posterior nerve root sheath that communicate with the subarachnoid space. They are common cysts that form in the lumbosacral area and have an estimated prevalence of about 5% in the general population, approximately only 1% of these cysts are symptomatic [5]. When symptomatic they typically cause radicular pain, paresthesias, or bowel or bladder incontinence [2]. Tarlov cysts have multiple radiologic findings. On sacral radiograph, erosion of the sacral bone may be present, however, more consistent findings are present on CT. On CT,

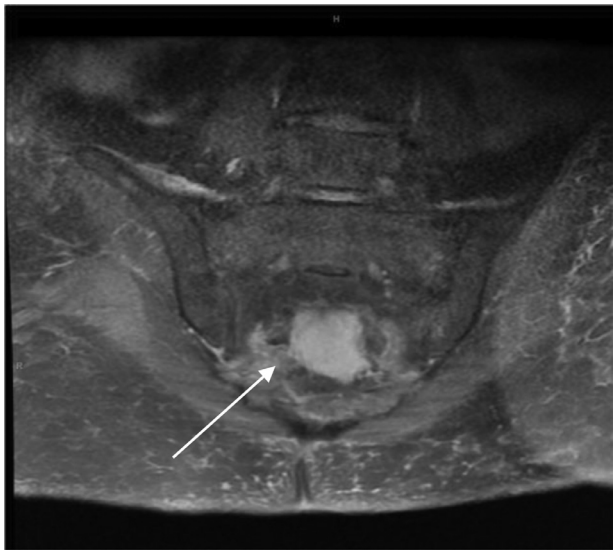

Fig. 5 – Coronal T2-weighted Fat Sat MRI image of the sacrum demonstrating bone edema consistent with a sacral fracture.

Tarlov cysts are isodense with cerebrospinal fluid (CSF) and it may be easier to detect bony erosions [2]. The preferred initial imaging when a Tarlov cyst is suspected however, is an MRI. On MRI, the similarity with CSF is preserved and Tarlov cysts have low signal intensity on T1-weighted imaging and high signal intensity on T2-weighted images [2]. In this case, the initial imaging of the lumbosacral region was acquired with the use of CT scanning as part of the trauma workup in the emergency department. Findings consistent with a Tarlov cyst and sacral fracture were seen on CT and follow up MRI was ordered to better characterize these findings which confirmed a fracture of the sacrum extending to the Tarlov cyst: the proposed origin of the intracranial fat in this case.

In conclusion, fat in the subarachnoid space can have numerous etiologies, especially in the setting of trauma. This case report demonstrates subarachnoid fat originating from an injury to the sacrum after a fall. Given the relatively common incidence of Tarlov cysts, they should be considered in the differential when determining the origen of subarachnoid fat.

Patient consent

Written, informed consent for publication of the case was obtained from the patient. Images have been de-identified.

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