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Intracranial fat migration: A newly described complication of autologous fat repair of a cerebrospinal fluid leak following supracerebellar infratentorial approach

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ABSTRACT

INTRODUCTION: Intracranial fat migration following autologous fat graft and placement of a lumbar drain for cerebrospinal fluid leak after pineal cyst resection surgery has not been previously reported.
CASE PRESENTATION: The authors present a case of a 39-year-old male with a history of headaches who presented for removal of a pineal cyst from the pineal region. He subsequently experienced cerebrospinal fluid leak and postoperative *Escherichia coli (E. Coli)* wound infection, and meningitis, which were treated initially with wound washout and antibiotics in addition to bone removal and primary repair with primary suture-closure of the durotomy. A lumbar drain was left in place. The cerebrospinal fluid leak returned two weeks following removal of the lumbar drain; therefore, autologous fat graft repair and lumbar drain placement were performed. Three days later, the patient began experiencing right homonymous hemianopia and was found via computed tomography and magnetic resonance imaging to have autologous fat in the infra- and supratentorial space, including intraparenchymal and subarachnoid spread. Symptoms began to resolve with supportive care over 48 hours and had almost fully resolved within one week.
DISCUSSION: This is the first known report of a patient with an autologous fat graft entering the subarachnoid space, intraparenchymal space, and ventricles following fat graft and lumbar drainage.
CONCLUSION: This case highlights the importance of monitoring for complications of lumbar drain placement.

1. Introduction

We present a novel complication of intracranial fat migration following placement of a lumbar drain and fat graft due to a cerebrospinal fluid (CSF) leak in a patient who had undergone pineal cyst removal. Pineal cysts typically are asymptomatic and are often discovered incidentally on imaging [1,2]. Manifestations of pineal cysts are usually secondary to mass effect on nearby structures and can include non-specific symptoms such as headaches, nausea, and vomiting [3,4]. Pineal cysts can be removed with radical surgical resection and the procedure is often curative [5].

Complications following surgery include CSF leakage (5.7%), aseptic meningitis (1.9%), and superficial wound infection (1.9%) [6]. Our patient demonstrated postoperative wound infection and CSF leak that eventually required use of an autologous fat graft and lumbar drain. Complications following placement of lumbar drains include subdural or subarachnoid hemorrhage (1.7%), low-pressure headache (1.7%), and local infection (.8%) [7]. While early CSF leaks can be treated with lumbar drain alone, delayed CSF leaks often require surgery [8]. CSF leaks can be repaired with autologous fat grafts, which have been associated with few complications and have proven to be an effective method of controlling CSF leaks [8]. The use of autologous fat grafts presents 1% complication rates, which include fat necrosis, CSF leakage, and lipoid meningitis [9]. There are currently no case reports in the literature that present a patient with an autologous fat graft entering the subarachnoid and intraparenchymal space theoretically due to reduced pressure from lumbar drainage.

2. Case presentation

Patient P.S. is a 39-year-old male with a history of headaches dating back to 2000. He was diagnosed with a small pineal cyst at that time, and routine follow-up was recommended. In 2010, his headaches worsened, and he began having daily left eye pain and double vision on upward and left lateral gaze. His gait was normal with mild unsteadiness on heel-to-toe tandem walking. Magnetic

Abbreviations: CSF, cerebrospinal fluid; CT, computed tomography; MRI, magnetic resonance imaging.

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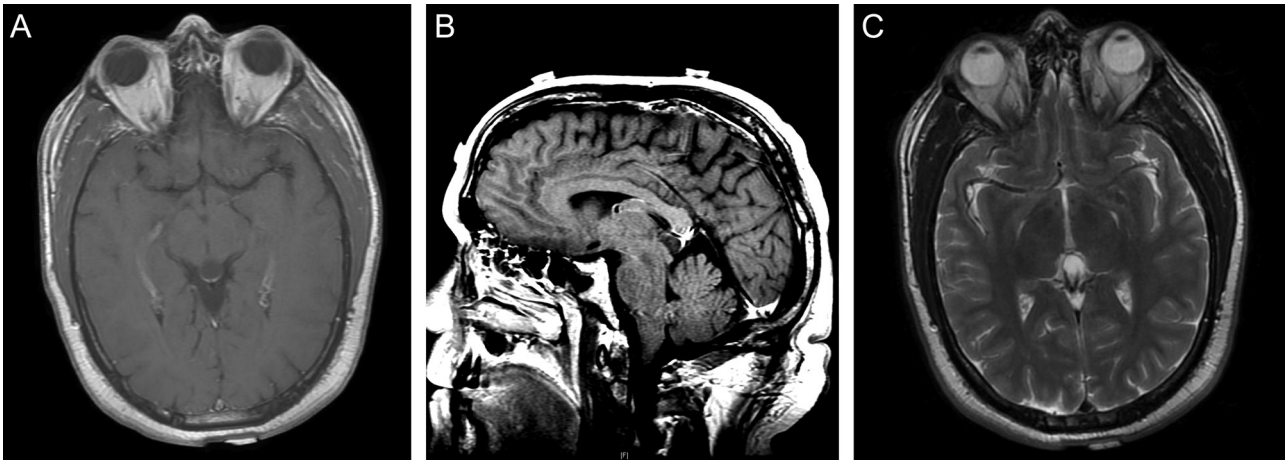

Fig. 1. Preoperative magnetic resonance imaging demonstrated a pineal cyst in the quadrigeminal cistern. (A) T1 axial post-contrast; (B) T1 sagittal post-contrast; (C) T2 axial.

resonance imaging (MRI) demonstrated an approximately 1.5 cm diameter pineal cyst in the quadrigeminal cistern causing significant compression of the underlying superior colliculus and inferior colliculus of the midbrain (Fig. 1). This had been slowly enlarging. A stereotactic-guided supracerebellar infratentorial approach was used for resection of the pineal cyst. The incision was made from slightly above the inion at the midline to the level of C2. A standard midline scalp and muscle dissection was performed and a standard suboccipital craniotomy was performed. The superior portion of the craniotomy allowed for visualization of the lower half of the transverse sinus but did not extend above the transverse sinus. The dura was opened in a Y-shaped fashion and care was taken to gently retract the cerebellum inferiorly while coagulating and cutting the veins between the tentorium and the cerebellum. The arachnoid overlying the quadrigeminal plate cistern was opened. The precentral cerebellar vein was coagulated and divided before the pineal cyst came into view. After exposing the pineal cyst, the cyst was drained. Then the entire cyst was meticulously dissected from the surrounding cistern and from the tectal plate of the midbrain. The tentorium was not incised at any point during the case. There were no immediate postoperative complications and he was ambulating and stable at the time of discharge.

On the afternoon of his discharge, he started to have a severe headache that he described as the worst headache of his life. He, therefore, called the ambulance to bring him back to the hospital. A head computed tomography (CT) scan was obtained that showed

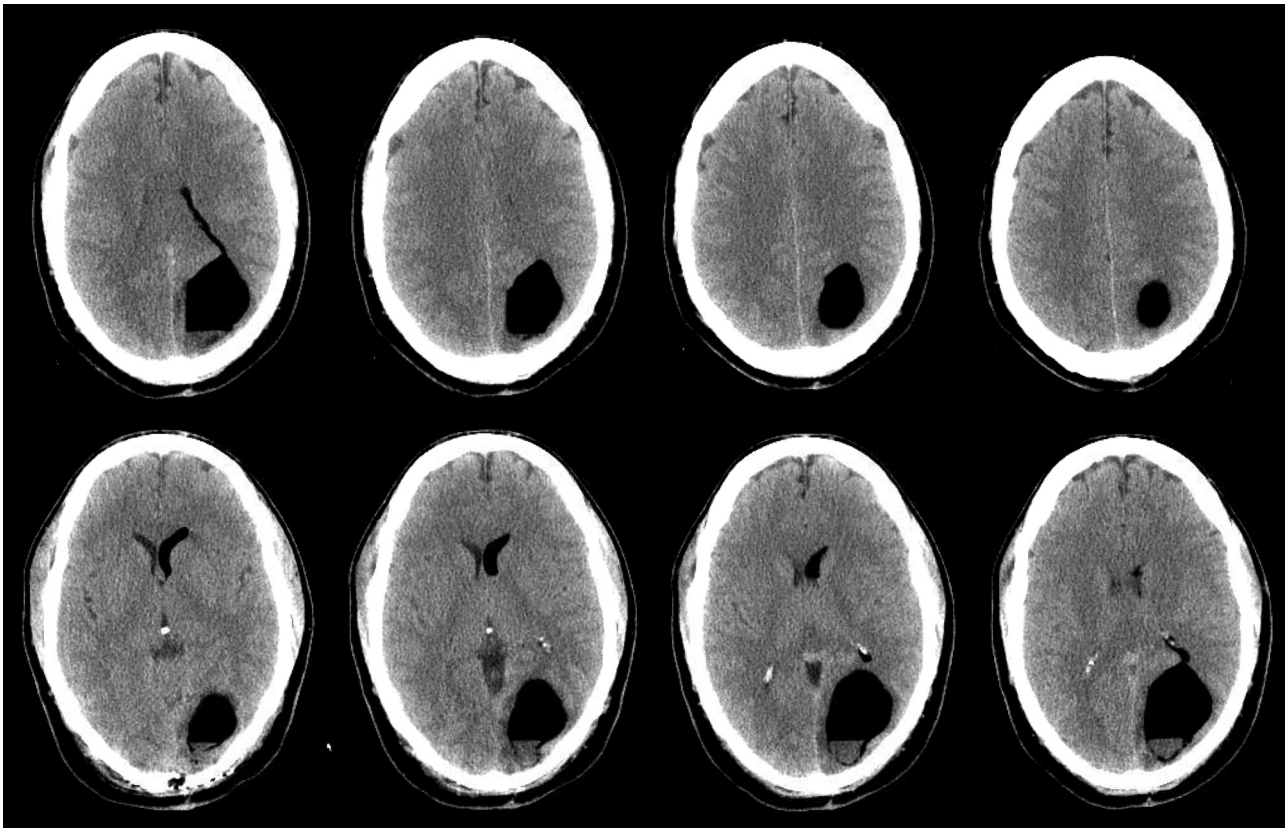

Fig. 2. Postoperative axial computed tomography scan following autologous adipose tissue graft repair, demonstrates fat in the intraparenchymal space of the occipital lobe as well as in the ventricular system.