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Delayed Pneumocephalus Occurring Years After Pituitary Surgery

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Pneumocephalus following transphenoidal surgery is a rare event normally presenting immediately.¹ We present a case of pneumocephalus combined with cerebrospinal fluid (CSF) rhinorrhea in a patient whose transphenoidal pituitary surgery took place 24 years previously. Her interim history is further complicated by years of intranasal cocaine abuse. To our knowledge, pneumocephalus occurring at such an interval following transphenoidal surgery has not been previously reported. This case report was deemed exempt from review by the institutional review board at our institution.

Case Report

A 41-year-old woman was admitted with acute mental status changes. Initially, this was a suspected drug overdose secondary to the patient’s history of cocaine abuse. According to family, she developed dysarthria and dysgraphia following an episode of cocaine use. They further noted that she was having daily clear rhinorrhea for nearly 5 months. In addition, her history was significant for transphenoidal resection of a pituitary adenoma at age 17.

Initial neurologic evaluation was notable for expressive aphasia. She had a left-sided visual field defect that had apparently been present since her pituitary surgery. CSF was draining from the posterior aspect of the nasal cavity. A computed tomography scan of the head showed marked distension of the lateral ventricles along with a defect in the sella (Figure 1). Air-fluid levels were noted in the sphenoid sinus, and air was present within the sella turcica.

Two punctuate bony dehiscences in the superior aspect of the left sphenoid sinus were localized intraoperatively as the source of the CSF leak (Figure 2). After exposure of the defects, septal bone, abdominal fat, and fibrin tissue sealant were used to create a layered closure, and a lumbar drain was placed. The patient was maintained on standard CSF leak precautions. The lumbar drain was removed on postoperative day 4, and she was discharged on postoperative day 5. Her CSF leak had resolved. Postoperative imaging revealed resolving pneumocephalus. Clinically, her mental status changes cleared.

Discussion

Intranasal use of cocaine can cause several otolaryngologic complications, including rebound nasal congestion, osteolytic sinusitis, and nasal septal necrosis with resulting saddle-nose deformity. Pneumocephalus and tension orbital pneumocele have also been described.²,³ Mechanisms responsible for tissue

Figure 1. Coronal computed tomography showing significant dilation of the lateral ventricles with a sellar defect.

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destruction associated with cocaine use include vasoconstriction with resulting ischemia, avascular necrosis, and chemical irritation. These mechanisms may, in turn, slow mucociliary clearance and the local immune response.

Intranasal cocaine use, steroid ingestion, radiotherapy, diabetes mellitus, and facial fractures make up a partial list of risk factors for isolated sphenoid sinusitis. Intranasal cocaine use, steroid ingestion, radiotherapy, diabetes mellitus, and facial fractures make up a partial list of risk factors for isolated sphenoid sinusitis. We hypothesize that chronic inflammation associated with our patient's cocaine use led to breakdown of her prior operative repair. The resulting exposure of her intracranial defect to the nasal cavity caused a high-flow CSF leak with ingress of air, resulting in pneumocephalus. A solitary report of delayed pneumocephalus occurring after pituitary surgery occurred in a multiply operated and radiated patient 4 years after her last surgery. In a similar manner, a small aperture was encountered, resulting in a ball-valve effect facilitating the accumulation of air with negative pressure upon sneezing, which in this case was preceded with snorting.

Although symptomatic pneumocephalus is reported to occur in approximately 1% to 3% of patients undergoing transphenoidal surgery, it typically arises immediately after surgery. Development of complications known to occur with pituitary surgery occurring at such a delayed time point postoperatively has not been previously reported. The distinguishing variable to explain the findings in this case would be the patient’s protracted history of intranasal drug abuse.

Endoscopic repair of CSF rhinorrhea has high overall success rates. Fewer data are available concerning the management of pneumocephalus secondary to skull base defects, although recent reports show promising results. Because of the difficulty of transcranial access to the sphenoid, endoscopic repair of skull base defects may be preferable. Septal cartilage, with or without mucosa, is a readily available material for defect repair. In this case, abdominal fat was placed as an extra layer of biologic packing once the defect had been repaired with cartilage and sealed with fibrin tissue sealant.

Regardless of the surgical approach or the material used, definitive sealing of the defect remains critical.

**Author Contributions**

Brett T. Comer, manuscript writing and editing; Travis L. Lewis, manuscript writing and editing; Thomas J. Gal, operating surgeon, manuscript editing.

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