



Case Report

Aspergillus sphenoiditis growth on long cut ends of a non-absorbable sellar floor dura closure suture

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ABSTRACT

Background: Cerebrospinal fluid (CSF) rhinorrhea is a common complication after transsphenoidal surgery (TSS). Suturing of sellar dura is effective in the prevention of postoperative CSF rhinorrhea, but it may cause rare postoperative infections. Herein, we report a case of *Aspergillus* sphenoiditis with the growth noted on cut ends of a polyvinylidene fluoride (PVDF) suture used for dural closure.

Case Description: A previously healthy 51-year-old woman complained of abnormal odor 5 years after TSS for null cell adenoma. A white mass in the sphenoidal sinus was detected on rhinoscopy. Fungal balls were found clustered around the ends of a PVDF suture used for dural closure at the initial surgery. She underwent removal of both the fungal ball and dural suture. The pathological diagnosis was *Aspergillus* hyphae. It is thought that a dural suture protruding out of the sphenoid sinus mucosa can cause *Aspergillus* infection even in immunocompetent patients. A rapid and accurate diagnosis followed by surgical removal of the fungal ball and follow-up with oral antimycotic drugs result in good clinical outcomes.

Conclusion: It is crucial to cut short the suture end and cover it with sphenoid sinus mucosa to avoid such complications.

Keywords: *Aspergillus* sphenoiditis, Endoscopic transsphenoidal surgery, Polyvinylidene fluoride suture

INTRODUCTION

Cerebrospinal fluid (CSF) rhinorrhea is a major complication of transsphenoidal surgery (TSS). The rate of postoperative CSF leak is approximately 10%,^[11] and to avoid it, several approaches have been reported. Nishioka *et al.* reported that direct suturing of the sellar dura is a simple, safe, and reliable surgical technique to prevent this complication.^[13] Postoperative infection associated with CSF rhinorrhea is also a serious complication. Bacterial meningitis and sphenoiditis are the most common postoperative infectious complications. Moreover, pituitary abscess following TSS has also been reported.^[8] Fungal infection in the sphenoid sinus is a rare pathology.^[9] Fungi responsible for sphenoidal infections include *Aspergillus*,^[12] *Candida*,^[2] and *Cryptococcus*.^[14] *Aspergillus* is a species of fungus in the soil or dust suspended in the air. The principal route of infection is by spore inhalation through the respiratory tract or paranasal sinus. The incidence of sphenoid sinus aspergillosis is estimated to be 0.5–1.2%/year.^[16] In the invasive types of sphenoid sinus aspergillosis such as fulminant and indolent forms,^[1] the fungal hyphae invade sphenoidal

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mucosa and also produce osteolytic changes. In these cases, the mortality rate is between 85% and 100%.^[4] Herein, we report a case of sphenoid sinus aspergillosis that grew on cut ends of a polyvinylidene fluoride (PVDF) suture used for dural closure during the TSS in an immunocompetent patient.

CASE DESCRIPTION

A healthy 51-year-old woman underwent a neurologic checkup because of persistent, severe headache. An intrasellar, multilobular, and cystic lesion extending to the suprasellar region was detected by brain magnetic resonance imaging (MRI) [Figure 1]. The lesion compressed the optic chiasma upwards. Her endocrinological function was normal, based on the results of several hormone loading tests. She underwent surgical treatment by endoscopic transsphenoidal approach, and the tumor was completely removed. During surgery, the dura on the sellar floor was sutured with a PVDF suture to avoid postoperative CSF rhinorrhea, though intraoperative CSF leakage was not detected. Subsequently, reconstruction of the sellar floor with an autogenous bone graft from the anterior wall of the sphenoid sinus was performed. The pathological diagnosis was null cell adenoma. She took 5 mg oral hydrocortisone daily for 2 weeks after surgery for the prevention of temporary central adrenal failure. She had an uncomplicated postoperative course without recurrence of the tumor. She did not require hormone replacement because her postoperative endocrine function was normal.

Five years after the TSS, she complained about abnormal odor and visited an otolaryngologist at a local clinic. On rhinoscopy, a white mass was detected in the sphenoidal sinus. A diagnosis of bacterial sphenoiditis was made, and daily intake of oral antibiotic drugs for 2 weeks improved her symptoms. However, after 3 months, the unusual odor recurred. Brain MRI showed a thickened sphenoid sinus mucosa, well-enhanced on T1-weighted images [Figure 2]. During the second rhinoscopy, a fungal ball was suspected,

and a second surgery was performed. In the second operation, while the sphenoid sinus mucosa was intact, the end of a dural suture was focused to be the focus of the fungal ball [Figure 3]. The suture protruded into the sphenoid sinus though the gap in the reconstructed sellar floor. We removed the lesion as well as the suture completely. Postoperatively, she was treated with oral voriconazole 400 mg daily for 3 months because pathological examination of the fungal ball confirmed the presence of *Aspergillus* hyphae [Figure 4]. Since then, she has been free from recurrence for more than 2 years.

DISCUSSION

It is important to repair CSF leakage with suitable material to avoid postoperative infection because the mortality rate from bacterial meningitis is as high as 12.0%.^[10] In our hospital, we routinely suture the sellar dura with a PVDF suture and reconstruct the sellar floor with an autogenous bone graft. Fibrin glue is also used to cover the sutured dura and reconstructed floor. *Aspergillus* often affects immunocompromised hosts such as those on oral immunosuppressant drugs after organ transplantation.^[15] Hypercortisolemia secondary to Cushing disease also suppresses the immune system. Dubey has reported that diabetes mellitus was the most immunocompromising factor, presents in 40% of their cases with fungal infections.^[5] Aspergillomas are also associated with a history of sellar surgery, occurring more often in women and in patients middle aged and older.^[6]

In our case, the patient developed aspergilloma despite her immunocompetent state. She underwent TSS 5 years earlier, but the tumor did not secrete hormones such as adrenocorticotrophic hormone or growth hormone. She took a small dose of oral hydrocortisone for only 2 weeks during the postoperative course. Nevertheless, in her case, fungal balls of *Aspergillus* were detected encasing the end of the PVDF suture. PVDF is a synthetic, non-absorbable

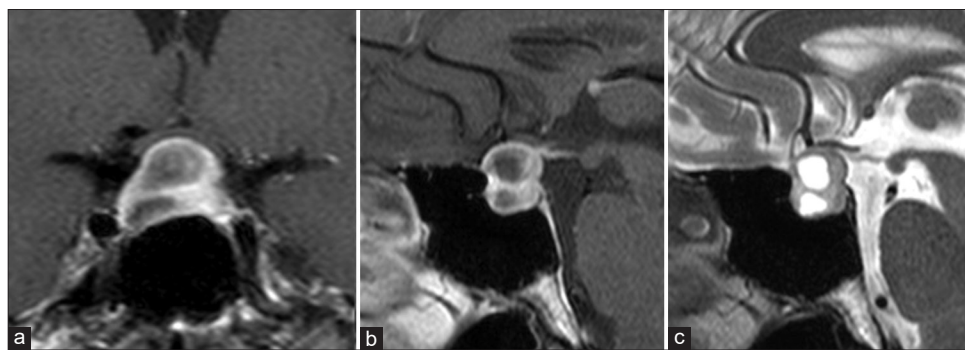


Figure 1: Brain magnetic resonance imaging before initial endoscopic transsphenoidal surgery. Coronal (a) and sagittal (b) sections of T1-weighted images and sagittal T2-weighted image (c) show a multilobular lesion compressing the optic chiasma upwards. No sphenoiditis can be detected.

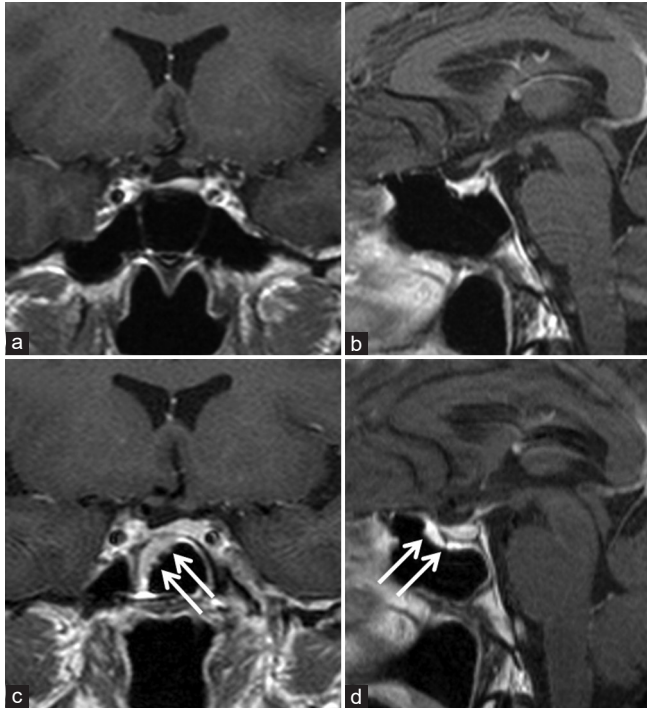


Figure 2: Brain magnetic resonance imaging, 4 years after the initial operation (a and b) and just before the second surgery (c and d). Coronal (a and c) and sagittal (b and d) sections of T1-weighted images. Thickened sphenoid sinus mucosa well enhanced by gadolinium is seen (arrow).

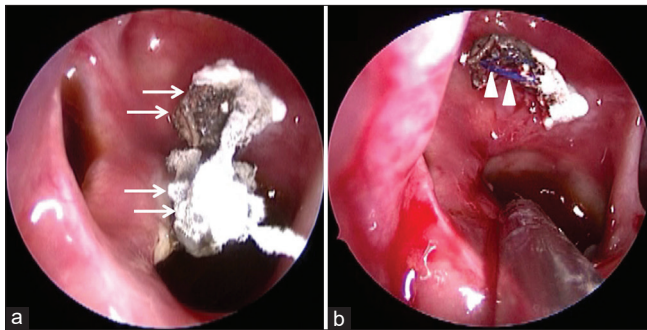


Figure 3: Intraoperative endoscopic views during the second surgery. A fungus ball (arrow) is seen forming around the polyvinylidene fluoride suture used for dural closure.

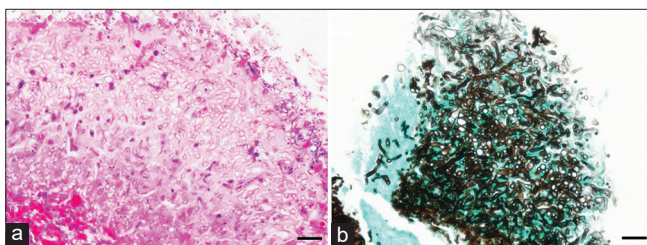


Figure 4: Histologic photomicrographs of fungal ball specimen. Staining with both hematoxylin and eosin (a) and Grocott's methenamine silver (b) shows Y-shaped fungal hyphae consistent with *Aspergillus*. The scale bar indicates 20 μ m.

monofilament suture which is highly resistant to infection and contamination.^[3] Non-absorbable, non-degradable materials are encapsulated by fibroblasts, adjacent macrophages, and foreign body giant cells, which cause granuloma formation.^[3] Because of these mechanisms, the ends of the suture are usually covered by granulation tissue or regenerated sphenoid sinus mucosa within a month. We hypothesized that the long suture ends, which could not be covered by these reactive tissues, might have caused *Aspergillus* infection in the present case. Fukui *et al.* also reported that an artificial bone graft used for sellar floor reconstruction caused *Aspergillus* sphenoiditis.^[7] They concluded that the graft was surrounded by infected granulation tissue because it could not be covered with sinus mucosa. We usually intended to cut the suture long to prevent the knot from being untied after the surgery. Therefore, this case may be an example of malpractice concerning surgical technique. It is important to cut the suture ends short and cover it with mucosa. In the present case, the patient did not have a history of respiratory fungal infection or hematomycosis after the first TSS. Therefore, we think that *Aspergillus* in the air could have invaded the paranasal cavity through the respiratory tract and adhered to the naked suture ends. A possible explanation for the infection taking 5 years after surgery to manifest is the patient being exposed to airborne spores from molds in her air conditioner. We must always be aware of fungal infection as a potential cause of nasal symptoms and should perform rhinoscopy. Surgical debridement to remove the infectious source followed by administration of the antifungal agents results in a good clinical course.

CONCLUSION

Suturing the dura on the sellar floor is an effective procedure for preventing postoperative CSF leakage and its potential infectious complications. However, even in immunocompetent patients, despite using a suture more resistant to infection, when the end of the suture is left exposed in the sphenoid sinus mucosa, it may act as a nidus for postoperative fungal infections. We should cut the dural suture end short and cover it completely with sphenoid sinus mucosa when performing TSS.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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