Delayed Cerebrospinal Fluid Rhinorrhea Seven Months After Transsphenoidal Surgery for Pituitary Adenoma

—Case Report—

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Abstract

A 51-year-old female had undergone transsphenoidal surgery for pituitary adenoma producing growth hormone. Cerebrospinal fluid (CSF) leakage occurred during surgery. The sella turcica and sphenoid sinus were packed with abdominal fat and fibrin glue, buttressing the closure with a fragment of sphenoid bone. No CSF rhinorrhea occurred postoperatively. Severe meningitis developed 7 months later. CSF rhinorrhea occurred 10 days after readmission. Exploration through the transsphenoidal approach identified a small hole at the floor of the sella and CSF leaking into the sphenoid sinus through the hole. The CSF leakage stopped after the second surgery. Delayed CSF rhinorrhea without bromocriptine administration is very rare. The cause of delayed CSF rhinorrhea remains unclear. CSF rhinorrhea should be suspected if meningitis develops even months after transsphenoidal surgery.

Key words: transsphenoidal surgery, cerebrospinal fluid rhinorrhea, cerebrospinal fluid leakage

Introduction

Cerebrospinal fluid (CSF) rhinorrhea is the most common complication of transsphenoidal surgery, occurring in 1.3% to 9.6% of all cases of this approach.^{2,4,5,7,12,13)} CSF leakage usually happens within several days of the operation and stops within a few weeks after treatment by spinal lumbar drainage.^{2,4,10,12)} We report a case of delayed CSF leakage occurring 7 months after transsphenoidal surgery with intraoperative CSF leakage despite the absence of postoperative CSF leakage and no administration of bromocriptine after the operation.

Case Report

A 51-year-old female was admitted because of severe headaches and vomiting on May 19, 1997. She had undergone transsphenoidal surgery for a pituitary adenoma producing growth hormone (GH) on October 11, 1996 (Fig. 1). The diaphragma sellae had descended during the operation and was damaged, resulting in CSF leak. The sella turcica was packed

Fig. 1 Preoperative magnetic resonance images showing a large pituitary adenoma.

with abdominal fat and fibrin glue, buttressing the closure with a fragment of sphenoid bone. Furthermore, the sphenoid sinus was also sealed with abdominal fat (Fig. 2). Spinal drainage was placed for 6 days after the operation. No CSF rhinorrhea occurred postoperatively. Preoperative left upper 1/4

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Fig. 2 Magnetic resonance images 1 month after transsphenoidal surgery showing fat grafts in the sella turcica and sphenoid sinus. The diaphragma sellae has descended into the sellar cavity.

Fig. 3 T₁-weighted magnetic resonance images on the second admission showing hypointense or isointense areas in the sella turcica and sphenoid sinus.

hemianopsia was resolved, and she was discharged with no neurological deficit on November 2, 1996. The GH level fell from 16.4 ng/ml preoperatively to 4.09 ng/ml (0.66–3.68 ng/ml) postoperatively. She complained of nausea and vomiting after taking bromocriptine, so no bromocriptine was given.

She was fine until May 15, 1997. She suffered headache on the night of May 16 which increased day by day, so she was readmitted on May 19. T₁-weighted magnetic resonance (MR) imaging showed hypointense or isointense areas in the sella turcica and the sphenoid sinus, which suggested infection

Fig. 4 Intraoperative photograph showing a small hole in the floor of the sella (arrow).

Fig. 5 Magnetic resonance images 3 months after the second operation showing fat in the sella. The grafted fat in the sphenoid sinus has already disappeared.

or retention of fluid (Fig. 3). The diagnosis was severe meningitis caused by *Streptococcus pneumoniae* infection. She was treated with intravenous and intrathecal injections of antibiotics. CSF rhinorrhea occurred 10 days after admission, which continued despite continuous spinal drainage for 2 weeks. Exploration was performed through the transsphenoidal approach. The graft bone was not found and a small hole was identified at the floor of the sella. CSF was leaking into the sphenoid sinus through the hole (Fig. 4). The sella was opened. CSF was leaking with pulsation through the diaphragma damaged at the first operation. However, no fistula was found in the diaphragma. The sella was packed with much more abdominal fat and oxidized cellu-

lose with fibrin glue. The floor of the sella was reconstructed using a bony part of the nasal septum. The sphenoid sinus was packed with a much greater volume of abdominal fat than at the first operation. Spinal drainage was placed for 10 days after the operation. The CSF leakage stopped. The patient was discharged with no neurological deficit. MR imaging showed the grafted fat had already disappeared in the sphenoid sinus, but was still present in the sella 3 months after the second operation (Fig. 5).

Discussion

Delayed CSF rhinorrhea after transsphenoidal surgery has been reported in very few cases.^{1,3,8)} Bromocriptine had been administered in most cases.^{1,8)} Delayed CSF rhinorrhea occurred 6 weeks and 18 months postoperatively, and the second patient had been receiving bromocriptine for about 12 months.³⁾ In our case, CSF rhinorrhea not associated with bromocriptine administration occurred 7 months later, although no leakage occurred after the operation. There are two possible mechanisms for the delayed CSF rhinorrhea 1 month after the first operation (Fig. 2). Firstly, the diaphragma sellae had descended into the sellar cavity and the delayed CSF rhinorrhea resulted from continuous CSF pulsatile forces within this enlarged subarachnoid space like an empty sella.¹¹⁾ Secondly, the grafted fats were absorbed before fibrosis of the diaphragma and sella was completed. However, the true cause of delayed CSF rhinorrhea in our case remains unclear.

CSF rhinorrhea resolves spontaneously or after spinal drainage or serial lumbar puncture in up to two thirds of cases.²⁾ However, CSF leak requires reoperation in about 1% of the cases.^{2,10)} In our case, severe meningitis was treated by intravenous and intrathecal administration of antibiotics. Since CSF rhinorrhea manifested at the healing stage of the meningitis, continuous spinal drainage was tried at first. However, the rhinorrhea did not stop. Therefore, the second operation was performed through the transsphenoidal route.

Intraoperative CSF leakage can be corrected by various methods.^{4,6,9)} Fascia lata placed against the arachnoid followed by packing fat in the sella⁴⁾ and then the sphenoid with fat and autologous fibrin glue is effective.⁹⁾ Some surgeons prefer to use muscle for packing, but muscle may shrink more than fat.⁹⁾ Careful packing of the sella and the sphenoid sinus with autologous fat and fascia is best for the prevention of CSF rhinorrhea if the diaphragma sellae has been damaged.⁶⁾ Substantial CSF leakage at operation can be corrected by exenteration of the

sphenoid sinus and packing with fat and oxidized cellulose.²⁾ We modified this method in the second operation, as the sella was packed by both fat and oxidized cellulose. However, only fat was used in the sphenoid sinus. The MR imaging findings 3 months after the second operation indicated that we should have packed much more fat in both the sella and sphenoid sinus (Fig. 5).

Delayed CSF rhinorrhea 18 months postoperatively may be associated with meningitis.³⁾ Severe meningitis also developed in our case after the operation. Delayed CSF rhinorrhea should be suspected, if meningitis occurs even months after transsphenoidal surgery.

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