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CASE REPORT

ENDOSCOPIC TRANSNASAL SURGERY IN PATHOLOGICAL CONDITION ACCOMPANIED BY CEREBROSPINAL FLUID LEAKAGE: CLINICAL CASE SERIES

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Abstract

Cerebrospinal fluid (CSF) leakage due to anterior skull base defect is considered a topical issue in otorhinolaryngology and neurosurgery. An abnormal relation between the nasal cavity, the sinuses and the subarachnoid space causes CSF leakage.

The clinical manifestations, diagnosis, surgical approaches and results of treatments of two cases, spontaneous and tumor-induced CSF leakage, have been described in this work.

Keywords: *Anterior cranial defect, Cerebrospinal fluid, Liquorrhea.*

INTRODUCTION

Leakage of cerebrospinal fluid (CSF) due to defects in the anterior parts of the skull is an actual problem in otolaryngology and neurosurgery. Anomalous relations between the nasal cavity, parietal sinuses and subarachnoid space are at the basis of liquorrhea. The main causes are brain trauma, neoplasms, iatrogenic (often as a complication of endoscopic operations), spontaneous (increased intracranial pressure).[1,2] The most frequent places of formation of fistulas are the lattice perforated plate, the back and side walls of the sinuses. Defect of the posterior wall of the frontal sinus occurs less often.[3]

A detailed anamnesis is necessary for diagnosis, since cerebrospinal fluid leakage can easily be confused with allergic rhinitis. With cerebrospinal fluid leakage, there is a constant runny nose, especially when the head is hanging, which can be very profuse (handkerchief). Clinical manifestations: metallic taste in the mouth, meningeal symptoms: headache that goes away in a horizontal position. Complications may include (orthostatic headache), nausea, vomiting, meningitis, meningoencephalitis, myelitis, pneumocephalus, cranial nerve dysfunction, gastritis and other complications.

For diagnostics, a bacteriological examination of the fluid is performed to determine the glucose level in the fluid, which is normally 2/3 of the blood glucose level. The determination of the β-2-transferrin fraction (tau protein) and beta-trace protein is considered. as the gold standard.[4-7] cisternography with contrast, which is also considered the gold standard, if necessary, magnetic resonance cisternography is performed.[8-16]

For diagnostic purposes, intrathecal administration of 5% fluorescein diluted with Na solution (spinal cord - subarachnoid space) is also performed, as a result of which the cerebrospinal fluid changes color to gray-green, thereby making the fistula site and fluid leak more noticeable (the method is not always applicable, as it can cause serious neurological disorders).[17-30]

In case of small defects, treatment is conservative. Dehydration therapy, antibiotic therapy, antibacterial, hypotensive drugs, bed rest, lumbar drainage (3-5 days) are indicated.

If the symptoms are not relieved within 10 days, surgical treatment is indicated. There are intranasal and extracerebral approaches to eliminating the defect. Currently, endoscopic intranasal (transnasal) access is considered a modern and low-traumatic method. The following materials can serve as autografts for defect restoration: free mucosal grafts, pedicled mucosal graft, mucoperichondrium, fat, flap, muscle, turbinate bone (nasal turbinate bone), septal bone, fusiform ilium, deaf homologous pericardium.[31] The following approaches are used intranasally: the “bath plug” technique, the “sandwich transplant” technique , and the tissue reinforcement technique.[32-34] There are 3 possible options for tissue placement: flap placement between the dura mater and bone (underlay/inlay technique), flap placement on the bone defect of the dome of the nasal (parinasal) cavity (overlay/onlay), and a combined method.[35]

CLINICAL CASES

Clinical case 1

The patient, a 41-year-old man, came to the Astghik Medical Center complaining of headaches for about 2 months, and was referred to the neurosurgery department. An MRI of the brain was performed (Figure 1), which revealed a cystic-solid tumor in the area of the junction of the optic nerve and the sella turcica (macroadenoma). Available sizes: width 3.3 x 4.7 cm, width anteriorly and posteriorly up to 4.9 cm. At its lower pole, it penetrated the ground compartment. Deformations of the floor of the third ventricle were observed, the fourth ventricle was intact. Drug treatment was prescribed (dostinex, vit. D). After 2 months, a double MRI was performed, according to which, against the background of taking the drug, a decrease in the tumor size was observed: width: 2.9 x 3.3 cm, anteroposterior size: 2.6 cm. Subtotal invasion of the formation into the intrathoracic sinus, deformation of the floor of the third ventricle, the fourth ventricle is intact. Due to a decrease in the tumor and deformation of the floor of the third ventricle, the patient began to complain of a constant runny nose and was referred to the CSA department with suspected cerebrospinal fluid rhinorrhea. To identify a defect in the sinus wall, computed cisternography of the head was indicated, but the patient had a contraindication to the use of a contrast agent. Thus, 1 week after the previous MRI, MRI of the temporal sinuses was performed (Figures 2, 3), a formation measuring 1.3 x 2.5 cm around the sella turcica, erosion of the upper wall of the right temporal sinus, 1, Induction. formations of 1 cm into the bottom cavity, horizontal liquid level in the cavity.

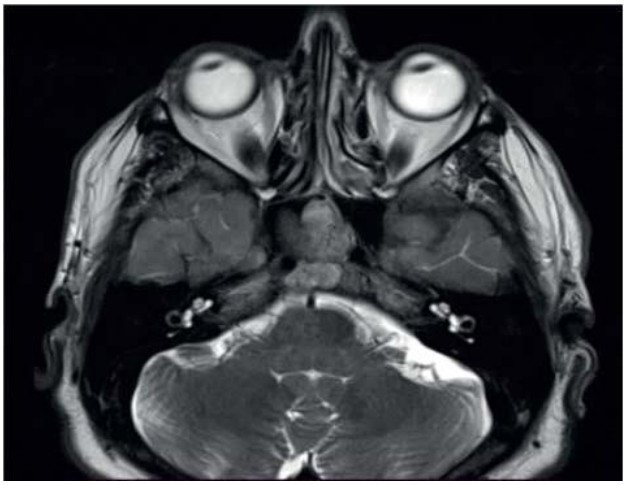
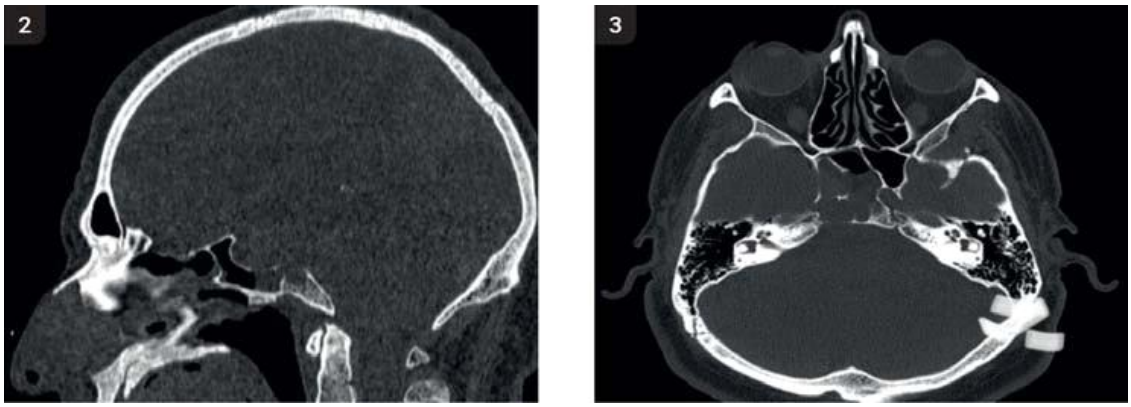
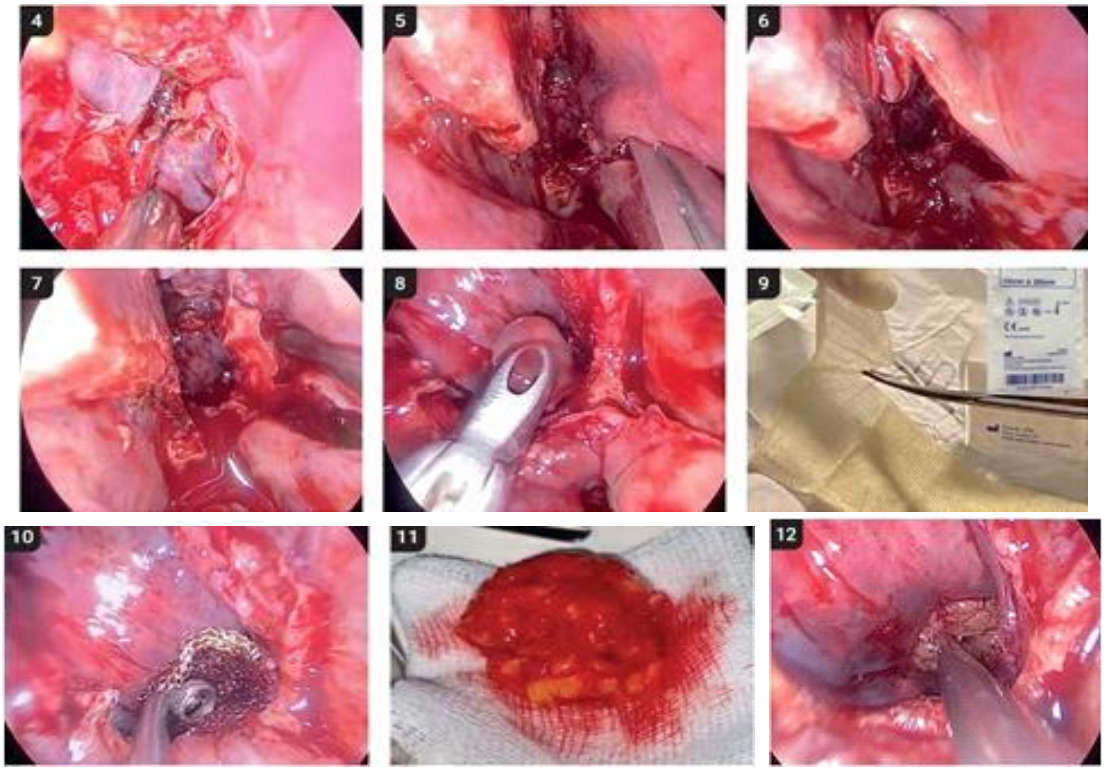


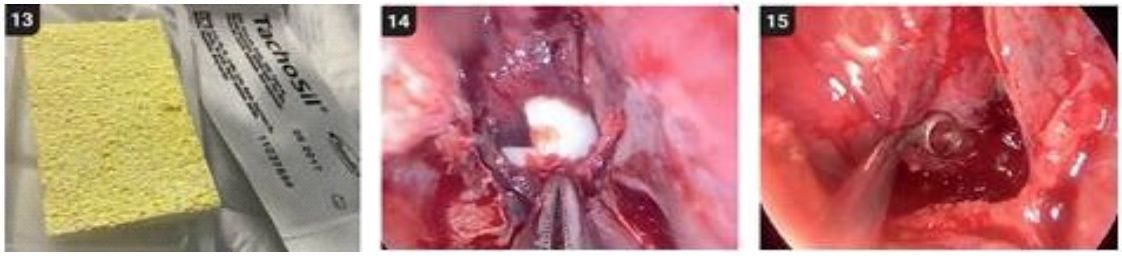
Figure 1. *Cystic-solid formation of MRS of the brain in the region of the junction of the optic nerve and the Turkish saddle*



Figures 2, 3. *Penetration of the thoracic sinus formation into the maxillary sinus, erosion of the upper wall of the right maxillary sinus, horizontal fluid level in the sinus*

A bacteriological examination of the cerebrospinal fluid was performed, the presence of cerebrospinal fluid was confirmed. At the preoperative stage, as well as during the operation, fluorescein staining was not performed. After 14 days, an operation was performed to eliminate the defect. Wall of the upper sinus using an endoscopic method. The nasal cavity was opened (Figure 4). A horizontal incision was made in the mucous membrane behind the nasal septum and the mucous membrane was separated in order to create a vascular flap (Figures 5, 6). The segments, rostrum, interseptal septum of the histal bay were removed, after which the tumor was visualized and removed (Figures 7, 8). Cellulose was placed inside the defect (Figures 9, 10), a collagen sponge (tachosil) was applied to the fat. 13, 14). The flap formed on the mucous membrane of the septum was turned over to ensure further nutrition (Figure 15). Finally, a hemostatic sponge (gel foam) was applied. Broad-spectrum antibiotics were prescribed in the postoperative period. head position, interventions that increase intracranial pressure were avoided. The patient was examined in the nearest (after 3 months) and distant (after 1 year) regions. During the objective examination, the doctor did not note any pathological changes.





Figures 4 - 15. *Reconstruction of the defect of the upper wall of the temporal sinus by endoscopic transnasal method*

Clinical Case 2

A 50-year-old male patient presented with a 24-day history of metallic taste in the mouth and persistent drooping of the head. No cause was given. The patient had a history of high intracranial pressure in his younger years, which was normal. A CT cisternography was performed, which revealed a crack in the perforator plate of the jaw (contrast accumulation is visible in Figure 16).

An operation to close the perforator plate defect was performed endoscopically transnasally.

First, fat was transported from the port region. The cerebrospinal fluid leak was visualized without the use of fluorescein (Figure 17). The fat was placed inside the defect (Figure 18), onto which a collagen sponge (tachosil) was applied (Figure 19). Then the mucous membrane of the middle shell was peeled off from the bone segments and the free flap of the mucous membrane was everted over the defect to ensure further vascularization (Figure 20). Then a hemostatic sponge (gel-foam) was applied to the mucous membrane (Figure 21). In the postoperative period, drug treatment was prescribed: dicarb 250 mg, 3 days, broad-spectrum antibiotics, any actions that increase intracranial pressure were excluded.

Two months after the operation, the doctor noted a headache, but did not mention a runny nose. Neurosurgeons diagnosed increased intracranial pressure and hydrocephalus. Ventriculoperitoneal shunting was performed to provide additional drainage of cerebrospinal fluid and, thus, reduce intracranial pressure. Five months later, an MRI of the brain was performed. No pathological changes were observed. Conclusion

Thus, endoscopic plastic surgery of anterior skull defects accompanied by cerebrospinal fluid leakage is safe and effective. "Bath-blyuga" is a reliable, effective method, ensures an easy course of the postoperative period, does not require tamponade of the nasal cavity, reduces the patient's feeling of discomfort.

Figure 16. *CT cisternography was performed, which revealed a crack in the perforator plate of the jaw*

Figure 17. *The cerebrospinal fluid leak was visualized without the use of fluorescein*

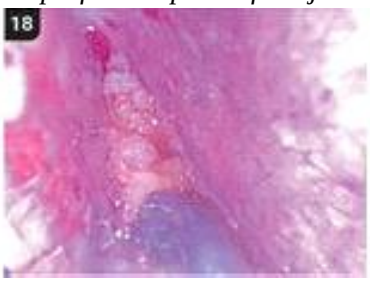


Figure 18. *The fat was placed inside the defect*

Figure 19. *Collagen sponge (tachosil) was applied*

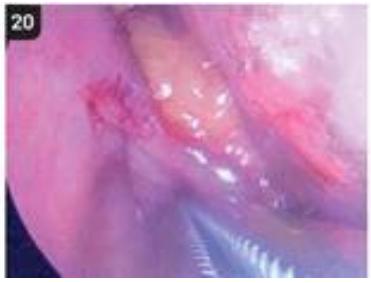


Figure 20. *Endoscopic transnasal closure of a perforating plate defect*

Figure 21. *Mucous membrane was everted over the defect to ensure further vascularization. Hemostatic sponge (gel-foam) was applied to the mucous membrane*

CONCLUSION

Thus, endoscopic repair of anterior cranial defects accompanied by cerebrospinal fluid leakage is safe and effective. "Bath-plug" is a reliable, effective method, provides a light course of the postoperative period, does not require tamponade of the nasal cavity, it reduces the patient's feeling of discomfort.

DECLARATIONS

Conflicts of interest and financial disclosures

The author declares that he has no conflict percent and there was no external source of funding for the research in question.

Ethical approval

The study was approved by the Institutional Ethics Committee and was conducted in accordance with the Declaration of the World Medical Association.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Source of funding

The work was not funded.

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