



Трудности в топичната диагностика на риноликвореята

Клиничен случай

Challenges in the topical diagnosis of cerebrospinal leak rhinorrhea
Case report

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Клиника по уши, носни и гърлени болести

Клиника по образна диагностика

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Резюме

Въведение: Изтичането на цереброспинална течност в носа и околоносните кухини е патологично състояние, свързано с дефекти в областта на предна черепна база с разнообразна топика. Риноликвореята може да се прояви спонтанно и дълго време да остане неразпозната и погрешно терапевтирана поради трудността в диагностиката и всеобща неяснота за диагностициране на дискретна такава. От своя страна това състояние може да бъде обвързано със сериозни животозастрашаващи състояния на асцендиращи бактериални инфекции от нестерилната носна кухина към субарахноидното пространство – менингит, менингоенцефалит, абсцес на мозъка и др. Топичната диагностика на риноликвореята е от изключителна важност за хирурга и определя оперативния път и техника.

Материали и методи: За периода от 2015 до 2017 година в Клиниката по уши, носни и гърлени болести към УМБАЛ „Св. Георги“ – гр. Пловдив са диагностицирани и оперирани 7 случая на пациенти с риноликворея. Приложени бяха потвърдителни лабораторни изследвания – глюкозен тест на назална секреция, както и бета 2 трансферин и образни такива – компютърна томография, магнитно-резонансна томография и цистернография. При един от случаите топичната диагностика на риноликвореята се осъществи ендоскопски интраоперативно, поради непотвърдена такава предоперативно.

Резултати: При шестима пациенти бяха потвърдени предоперативно наличието и локализацията на дефекта. При един от клиничните случаи не бе възможна топична диагностика на риноликвореята при позитивен резултат на бета 2 трансферин. При ендоскопия интраоперативно се откри дефект в областта на олфакторната рима. Болничният престой продължи 5 дни при постелен режим, без усложнения. При всички пациенти бе приложена ендоскопска пластика на дефекта.

Заключение: Топичната диагностика на риноликвореята е предизвикателство. При по-големи дефекти на ринобазата своевременната диагностика е от изключителна важност предвид риска от фатални последици. Неточното локализиране на дефекта на ринобазата може да създаде трудности на хирурга при ендоскопска интервенция предвид сложната клиничната анатомия на носа и околоносните синуси, сложните структурни комуникации и

Abstract

Introduction: The leak of cerebrospinal fluid in the nose and paranasal cavities is a pathological condition, associated with defects in the skull base. The rhinoliqorrhea may occur spontaneously and may be hidden for a long time, wrongly treated due to the complexity and difficulty of diagnosis. This condition may be linked to serious life treating illnesses, with ascending bacterial infections from the non-sterile nasal cavity to the subarachnoid space – meningitis, meningoencephalitis, brain abscess, etc. The topical diagnosis of rhinoliqorrhea is truly important for the surgeon, because it defines the operative approach and the technic that will be used.

Materials and methods: Seven cases of rhinoliqorrhea where diagnosed and treated from 2015 to 2017 in the ENT department in University Hospital St George, Plovdiv. Laboratory tests such as glucose test of the nasal secretion and beta 2 transferrin were made. Computer tomography (CT), Magnetic resonance (MRI) and cisternography were also performed. In one of the cases we localized endoscopically the CSF defect without imaging preoperative confirmation.

Results: In six of the patients preoperatively was confirmed the presence and the localization of the defect. In one of the cases the topical diagnosis of the rhinoliqorrhea with positive beta 2 transferrin test wasn't possible. A defect in the area of the olfactory rhyme was localized intra-operatively, via an endoscopic approach. The post-operative period lasted for 5 days without complications. In all of the patients an endoscopic repair of the defect was applied.

Conclusion: The topical diagnostics of rhinoliqorrhea is a challenge. When the defects of rhino base are bigger, the timely diagnosis is of utmost importance given the risk of fatal consequences. The incorrect localization of the defect of the rhino base may cause difficulties for the surgeon when using endoscopic approach, given the complex anatomy of the nose and the sinuses, as well the complex structural communication and delicate sights (cribriform plate, the sphenopala-

деликатни зони (крибриформната пластина, областта на сфенопалатинална артерия, предна етмоидна артерия, каротидната артерия, оптичния нерв и др.). Диагностицирането на налична риноликворея и топиката на дефекта е от изключително значение предвид възможните усложнения, които могат да настъпят – инфекции на централната нервна система, нарушения в съзнанието, персистиращо главоболие, както и с оглед на сигурното оперативно възстановяване на целостта на ринобазата.

Ключови думи: риноликворея, ринобаза, предна база на черепа, бета-2 трансферин

Introduction

Cerebrospinal fluid (CSF) leak rhinorrhea is a condition of abnormal communication between the subarachnoid space and the sinonasal cavities. Etiology includes blunt or perforating trauma, sequelae of endoscopic endonasal surgery or skull base surgery (external approach), infiltration of dura mater by neoplasms, congenital defects, and inflammatory lesions, but could be idiopathic. The most common cause is the accidental trauma- up to 80%, following by iatrogenic- 12%. Spontaneous CSF leaks occur only 4%. Idiopathic is related with elevated intracranial pressure. Untreated and persistent CSF leaks rhinorrhea may leads ascending meningitis and other complications.

CSF leaks rhinorrhea can be classified according to location. The knowledge of the site of the leak is the most important thing in the surgical repair. It can be in the posterior fossa, middle fossa, cribriform plate, ethmoidal sinus, sphenoidal sinus, frontal sinus. Identification of the site is sometimes challenge for the physician and could be severe difficulty for diagnosis. The use of different methods like high resolution computer tomography (HRCT), CT- cisternography, magnetic- resonance cisternography and intrathecal fluorescein could localise the CSF fistula, but in our clinical case, they are insufficient.

The aim of this article is to present the challenges in our clinical case to localise the CSF leak defect.

Materials and methods

In University Hospital St George, Plovdiv in the ENT department for the period of 2 years (2015-2017) we diagnosed seven cases of CSF rhinorrhea. We used for confirm the presence of rhinoliqorrhoea the laboratory tests like a glucose test of the nasal secretion and beta 2 transferrin. HRCT and MRI- cisternography were also performed which showed the CSF leak defect excluding one of the cases.

tines arteries, the anterior ethmoidal arteries, the carotid artery, optical nerve, etc). The diagnosis of a present rhinoliqorrhoea and the topic of the defect are of utmost importance giving the fact of possible complications that may occur such as infections of central nerve system, disturbance in consciousness, persistent headache and it is also related to the precise surgical repair to the skull base.

Key words: CSF leak rhinorrhea, rhinoliqorrhoea, skull base, beta 2 transferrin, endoscopic repair of skull base

We present a patient, female, of 48 years old with complaints of persistent rhinorrhea with uncoloured secretion and headache. 5 years ago, she had a neurosurgical procedure after a head trauma. She had a periodic rhinorrhea, but lately the symptoms aggravated. The secretion was positive for beta 2 transferrin. We performed a MRI cisternography without confirmation of the localization of CSF leak rhinorrhea. (fig 1)

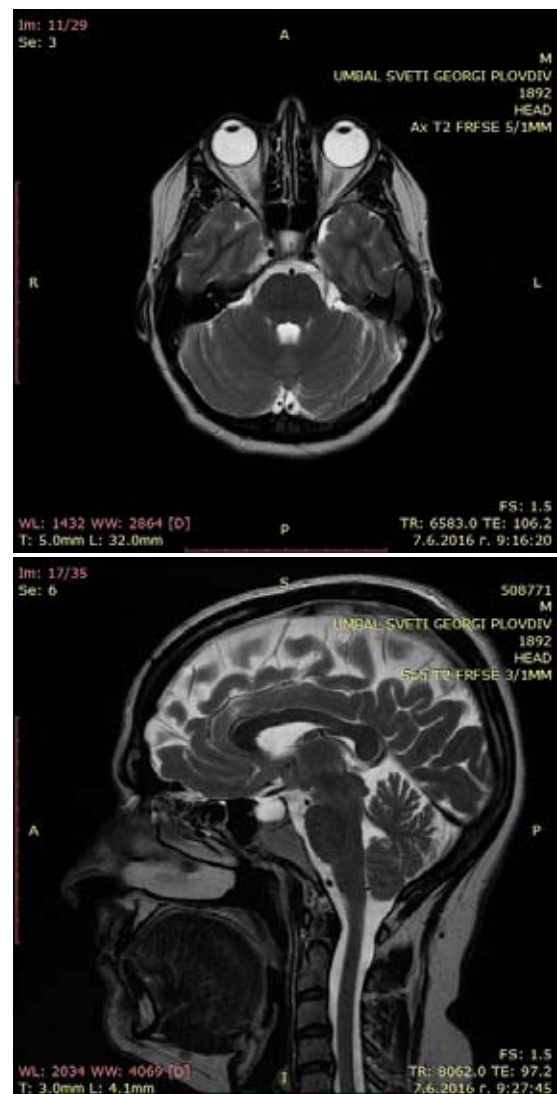


Fig. 1. T2 weighted MRI imaging in sagittal and axial projections.



Via endoscopic approach, we localized intraoperatively the defect in the olfactory area. We used on lay endoscopic technique for surgical repair.

Results

In six cases preoperatively was confirmed the presence and the localization of the defect by using biochemical tests like glucose oxidase test and beta 2 transferrin and performing imaging like HRCT and MRI- cisternography. In one of the cases the topical diagnosis of the rhinoliquorrhea with positive beta 2 transferrin test wasn't possible. A defect in the area of the olfactory rhyme was localized intraoperatively, via an endoscopic approach. We performed on-lay technique for repair the defect using mucosal flap. The post-operative period lasted for 5 days without complications. In all of the patients an endoscopic repair of the defect was applied. After six months and 1 year later, we didn't register any recurrence.

Discussion

A skull base CSF leak or fistula is a pathologic communication of the sterile subarachnoid space with sinonasal cavity, and presents clinically with clear rhinorrhea, caused by the presence of both an osseous and dural defect. The flora of the sinonasal cavity creates a conduit for the spread of infection that results in meningitis and in life-threatening complications. Leaks most commonly occur at the cribriform plate (35%), sphenoid sinus (18%), frontal sinus (10%), posterior ethmoid sinus (9%) and inferior clivus (2%).

The causes include skull base surgery, endoscopic sinus surgery, spinal surgery and trauma. Post-traumatic CSF leaks account for 50-70% of CSF leaks. Rarely, congenital defects, such as meningoceles lead to CSF leaks. Those are the cases where there is no identifiable causes for CSF leaks and so called spontaneous. Empty sella has been implicated in some of these spontaneous cases of CSF leak as well as benign intracranial hypertension. Intracranial tumours, those near the skull base have the potential for erosion of the bone and the dura with resultant CSF leak. Radiation osteitis is also a predictable cause of CSF leak.

The confirmation and location of the skull base defect is a significant element in predicting surgical repair success. The diagnostic approach should include the physical examination, the confirmation

tests- biochemical testing of the nasal secretion and imaging techniques for detection of the defect.

The clinical diagnosis is difficult because of various non-specific symptoms and in specially in the case of intermittent and slow CSF leaks. A history of trauma and surgery may be obtained. Physical findings include a unilateral profuse watery discharge and headache relieved by leakage of CSF through the nostril. Clinical findings are unreliable and may be mistaken for vasomotor rhinitis.

The biochemical testing for CSF- specific proteins which are beta2 transferrin and beta trace protein, are very specific and with outstanding diagnostic characteristics. Beta 2 transferrin is a protein produced by neuraminidase activity in the brain. It is found only in CSF, aqueous humour and perilymph. Beta trace protein is also present in CSF and has been used as an immunological marker. False positives can occur in patients with chronic liver disease and inborn errors in glycoprotein metabolism.

Imaging modalities are the essential element in determine the site of the leak and aid in preoperative planning. These modalities include plain radiography, computed tomography (CT), CT cisternography, magnetic resonance imaging (MRI), MRI cisternography (with/without intrathecal contrast) and radionuclide cisternography. Application of fluorescein intrathecal is a specific and high informative quality method for demonstrate the CSF leak defect, but it is related with severe complications (cardiac arrhythmias, seizures, headache, cranial nerve defects).

Performance of plain film radiography is not adequate. It is so insensitive in establishing the diagnosis of CSF leak, but may demonstrate pneumocephalus and identify the fractures in critically unstable patients. High resolution CT gives excellent bone details. It is the best modality for imaging base of skull fractures and in cases of rhinoliquorrhea, the technique involves thin sections through the anterior and middle cranial fossa. HRCT has a report sensitivity of 90%. False negative results can occur in patients with small bony defects.

The CT cisternography(CTC) is invasive imaging method, which carries the risks associated with a intrathecal application of contrast via lumbar puncture. The CTC findings in patient with CSF leak include concentration of contrast in a sinus or a stream of contrast at the fistula site.

Radionuclide cisternography is a very specific

method involves the intrathecal injection of radioisotopes. It can be used in case with very slow or intermittent CSF leak, but nowadays it is not widely used due to greater sensitivity provided by HRCT.

Magnetic Resonance imaging (MRI) can be used to demonstrate a CSF fistula in multiple planes, non-invasively without disadvantages of ionizing radiation or intrathecal injection of contrast. Coronal MRI T2 weighted fat suppressed sequences demonstrates the CSF fistula (dural tear) as a high signal cleft traversing low bone signal. Whereas CT may show more precisely the extent of a bony defect, in the case of meningoceles, MRI will be more valuable in differentiating the contents of the sac. Combined CT and MRI with independent observers accurately localize the site of CSF leak with high sensitivity -90%.

In our case MRI imaging didn't demonstrate the defect in the olfactory area. Positive biochemical result showed us the presence of CSF in nasal secretion. It was necessary to perform endoscopic endonasal surgery and intraoperatively present the defect in the suspected site. The knowledge for the past neurosurgery procedure and the location of the repair have helped us to navigate and properly find the defect.

In the last five years for Bulgaria, we haven't found any other articles related to our topic of the case except one article – Dzhambazov K., Markov S, Topalova A. CSF Fluid rhinorrhea- diagnostic methods review and clinical cases demonstration. International bulletin of Oto Rhino Laryngology 2015. It is very difficult, without unified algorithm, to diagnose the presence and localisation of CSF leaks rhinorrhea. It is necessary to focus on this topic and find the right combination of methods to easily identify CSF leaks rhinorrhea.

Conclusion

The high risk of future complications in cases of CSF leak rhinorrhea underlines the importance of early detection, precise diagnosis, and well-timed repair of CSF fistula. The detection of CSF leak defect can be serious obstacle for the surgeons. It is important to have an algorithm for the approach to this challenging clinical problem. There is no unified method for localization of the CSF leak. Most of the time it is necessary to combine plural imaging methods in order to better demonstrate the CSF leak defect. Additional high level research is needed to better understand the best diagnostic method for CSF leaks.

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