

Case report

Management of Fulminant Rhinogenic Intracranial Complication

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Abstract

We report a case of rhinosinusitis complicated by epidural abscess and meningitis. A 16-year-old boy consulted his local otolaryngology clinic and was diagnosed with acute polysinusitis. As his condition worsened, he applied to the neurosurgery clinic, where he was diagnosed with an additional epidural abscess in addition to acute polysinusitis, and was referred to the ENT clinic; the patient underwent surgery in the otolaryngology clinic of our hospital, post-Op 2 days, the patient's condition worsened, his consciousness was completely disturbed, he did not respond to pain irritation. Contrast CT and MRI again were conducted, during the examination, the meninges were stained with contrast and the patient was diagnosed with rhinogenic meningitis. The patient was treated in the ICU for 2 days, and selected antibiotics according to the antibiotic sensitivity test, intravenously (maxipen/vankopol) were administered. When his condition was satisfactory, the treatment was continued at the ENT clinic and resulted in recovery. Tenth days postoperatively, the patient's condition had improved, his consciousness was completely clear, and the puncture fluid of sinuses was clean. He was discharged from the hospital on the thirteenth postoperative day for outpatient treatment and it was recommended to continue antibiotic therapy at home for 1 more week.

Thus, in the presented report, the occurrence of rhinogenic intracranial complications in the first days of sinusitis, when the process is at its most acute, indicates hematogenous spread. Therefore, in the case of rhinogenic intracranial complications, therapy should first be initiated according to the results of the antibiogram, and it is advisable to perform interventions in the paranasal sinuses against the background of adequate detoxification therapy.

Keywords: acute rhinosinusitis, rhinogen intracranial complication, epidural abscess.

1. Introduction

Although rhinogenic intracranial complications are much less frequent than otogenic complications, they are more severe and often manifest themselves after the process has been turned down in the paranasal sinuses

[1,2]. Rhinogenic intracranial complications are most often associated with frontitis and ethmoiditis, and less frequently with maxillar sinusitis [3,4,5]. Untreated or inadequately treated infections with highly virulent

microbes can result in inflammation of the paranasal sinuses with acute intracranial complications, in which case the infection enters the skull most often by contact pathway, and sometimes due to retrograde thrombophlebitis -vascular pathway [6,7]. These complications include extra and subdural abscesses, meningitis, brain abscesses, cavernous and sagittal sinus thrombosis [8,9].

2. A clinical case

On 07.12.2024, the patient "B" at the age of 16 suffered from severe headaches after a common cold, the pains intensified in the evening, the patient's temperature rose to 39.0 C, and the patient consulted an

Although rhinogenic complications are rare, they are life-threatening and still maintain their critical importance. In this case report, we describe the complication of acute purulent inflammation of the frontal sinus with epidural empyema and meningitis which is managed by ENT [10].

ENT doctor at his local residence the next morning with these complaints. The patient was examined by an ENT doctor, and hematological tests and a CT scan were also prescribed to the patient (Figure 1).



Figure 1 – Coronal sections of paranasal sinuses

After examinations, the patient was diagnosed with acute polysinusitis and antibacterial therapy was prescribed. On the 2nd day of outpatient treatment, the patient became unconscious and could not adequately answer questions. On 10.12.2024, the patient's relatives applied to the emergency room. The patient was rushed

to the neurosurgery clinic, the patient already had meningeal symptoms, a radiological examination was performed, and an epidural empyema was diagnosed against the background of acute polysinusitis, and he was referred to the ENT clinic (Figures 2, 3).

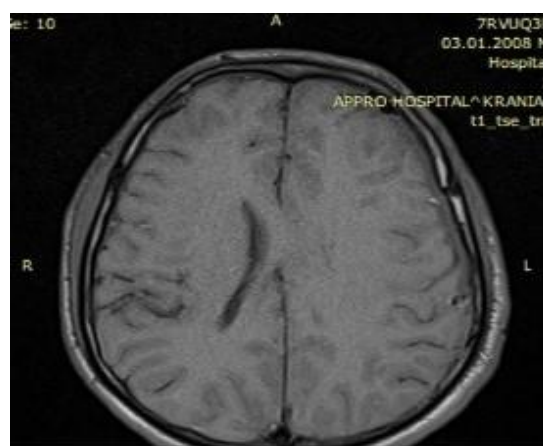


Figure 2 – Axial section MRI of left sided epidural abscess

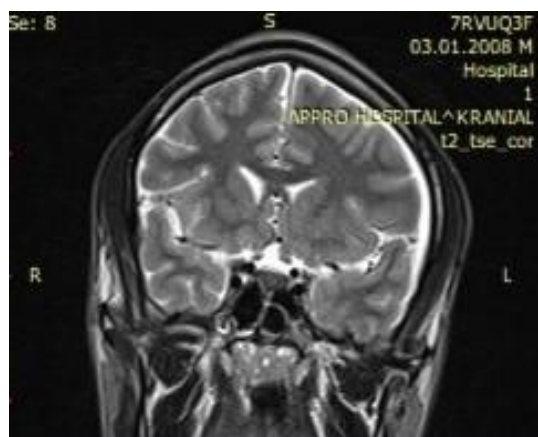


Figure 3 – Coronal section cerebral MRI, coronal section

On 11.12.2024, when entering our clinic, the patient had severe headaches, and blurring of consciousness and did not answer questions. In the objective examination, the mucous membrane of the nasal cavity is edematous. After local decongestion, purulent discharge is determined in the middle nasal meatus. The tension of the neck muscles is 4 transverse fingers, Kernig's symptom is 160 degrees. After the patient was prepared, the right maxillar sinus was punctured, 10 ml of clear green pus was collected, and the collected content was sent for bacteriological examination. Pre-Op hematological indicators: ESR-90; CRP-64.55; RBC-3.89; HGB-10.8; HCT-32.4; RDW-SD-35.9; RDW-CV-11.7; BAS-0; EOS-0.01; LYM-0.84; LYM%-10.7 (decreased); NEUT%-76.2; MON-1.02; MON%-13; (increased) The next day, on 12.12.2024, the patient underwent an extranasal frontotomy, the intersinus septum was removed, the frontal sinuses were completely filled with solid pus. A connection between the frontal sinus and the nasal cavity was established and drained with a tube. The patient's consciousness worsened after two days due to the prescription of 3 antibacterial drugs. The patient was assigned for re-examining MRI. In the contrast MRI examination, the meninges were stained with contrast and the development of meningitis in the patient was determined. The patient was consulted by neurosurgeons, the worsening of the patient's general condition could not be explained by the MRI

examination, the patient's general brain symptoms could not be reconciled with the changes in the MRI examination. On 14.04.2024, the patient was transferred to the intensive care unit in a state of complete unconsciousness, unresponsive to pain irritation, on that date, the hematological parameters changed - CRP-40,23; WBC-12.5; MCHC-35,1; PLT-475; MPV-8.7; NEUT-10,51; NRBC-0; IG-0.14; LYM%-10.9; NEUT%-84.1: The result of the antibiotic sensitivity test was obtained, the obtained microbial colonies were resistant to the penicillin group, and the sensitivity of *Staphylococcus epidermis* was determined to glycopeptides (vancomycin), metronidazole and carbapenem group (meropenem). Antibacterial therapy to the patient according to the antibiotic sensitivity test-Maksipen 1.0 intravenous; Vankopol-1.0 i/v was prescribed. On the 3rd day of etiological treatment, body temperature normalized, Relatively positive dynamics are noted in hematological indicators dated 12.16.2024- CRP-14.05; ALB-3.48; P-LCR-16.9; IG-0.05; ESR-35mm/h: Coagulation indicators are high - PT-16.2; INR-1.57: On 17.12.2024, the patient's consciousness began to clear, and positive dynamics were observed in the hematological indicators (ECS-29 mm/h; CRP- 12.66; PT-16.1; INR- 1.56), the patient was transferred from the intensive care unit to the ENT department. Post-Op -10 days, the patient's consciousness became clear, and meningeal symptoms completely passed. Post-Op 14 days the patient was admitted to outpatient treatment.

3. Discussion

Rhinogenic intracranial complications include such as brain abscess, meningitis, subdural abscess, epidural abscess that accompany inflammatory diseases of the nose and sinuses [1,2,6]. While recent advances in the development of antibiotics have reduced the chances of contracting these diseases, some patients are still at risk. Since these conditions can be life-threatening,

patients should be monitored for symptoms of these diseases [3,9]. Regarding the etiology, in this case, the patient had undergone surgery for frontal sinusitis via an external incision.

According to our experience, rhinogenic intracranial complications most often originate in the frontal sinuses, route of infection into the cranium, the

pathways are contact and hematogenous. So, the process is related to the vascular pathway passing through the bones. Because the wall of the frontal sinus bordering the skull is thin, the vessels pass perpendicularly to the bone, and due to the short length of the thrombosed vessel in the bone cavity. Therefore, rhinogenic intracranial complications are less likely to occur by contact pathway [6,7].

Thus, in the presented report, a rhinogenic intracranial complication occurred in the first days of sinusitis when the process was acute, indicating a hematogenous pathway. On the other hand, the surgical operation performed during this period, increasing the absorption surface of bacterial endotoxins by disturbing the tissue barriers, was evaluated as the reason for the deterioration of the patient's postoperative condition [5].

On the other hand, rhinogenic intracranial complications appear after the process is extinguished in the sinuses, but after the process is completely suppressed in the sinuses, the intracranial process is persistent as a free process. The approach to treating rhinogenic intracranial complications varies between

neurosurgeons and otorhinolaryngologists. During the management of such a pathology, they tried to ensure the cooperation of the infectious disease specialists [4].

In neurosurgical clinics, in cases such as epidural processes and meningitis, they try to limit the process and cure the patient only by prescribing antibacterial therapy, and in many cases, they succeeded. Suppose the process is continuous, as a result of long-term antibacterial treatment. In that case, the inflammatory process in the sinuses is completely extinguished and at this stage, rhinologists do not see the necessity for intervention because the process has already died down. However, in many cases, it is not possible to stabilize the process without eliminating the primary source. During the eradication of the primary infection process, the defense barriers are disturbed, and the course of the disease can worsen. A very important nuance is to get the causative agent before elimination surgery, surgical intervention aimed at the primary focus post-prescription of adequate antibacterial therapy leads to a successful treatment result [2,3,8,9].

4. Conclusion

Thus, in the presented report, the occurrence of rhinogenic intracranial complications in the first days of sinusitis, when the process is at its most acute, indicates hematogenous spread. Therefore, in the case of rhinogenic intracranial complications, therapy should first be initiated according to the results of the antibiogram, and it is advisable to perform interventions in the paranasal sinuses against the background of adequate detoxification therapy.

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Ethics approval. Our institution does not require ethical approval for reporting individual cases or case series.

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Күрт дамыған риногендік бассүйекішілік асқынуды емдеу тактикасы

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Түйіндеме

Біз бұл мақалада эпидуральды абсцесс пен менингитпен асқынған риносинуситтің клиникалық жағдайын сипаттаймыз. 16 жасар бала жергілікті отоларингология клиникасына келіп түсті. Клиникада науқасқа жедел полисинусит диагнозы қойылды. Жағдайы нашарлағандықтан әрі қарай науқас нейрохирургиялық бөлімге долданды және онда науқасқа жедел полисинуситке қосымша эпидуральды абсцесс диагнозы қойылды. Содан кейін науқасқа біздің аурухананың отоларингология бөлімінде ота жасалды. Отадан кейінгі екі күннен соң науқастың жағдайы күрт нашарлады: есін жоғалтып, тітіркендіргіштер мен ауырсынуға жауап реакция бермеді. Контрастпен күшейтілген КТ және МРТ қайта жасалды, нәтижесінде ми қабықтары контрастты затпен боялды, ал науқасқа риногенді менингит диагнозы қойылды. Науқас екі күн бойы жансақтау бөлімінде болды, антибиотиктерге сезімталдықты тексеру нәтижелері бойынша көктамыр ішіне антибиотиктер (Максипен/Ванкопол) қабылдады. Жағдайы жақсарған кезде, емдеу ЛОР клиникасында жалғасты және сауығумен аяқталды. Отадан кейінгі оныншы күні науқастың жағдайы жақсарды, есі анық, синус сұйықтығы мөлдір болды. Отадан кейінгі он үшінші күні науқас амбулаториялық емдеу үшін ауруханадан шығарылды, оған антибиотикалық терапияны тағы бір апта жалғастыру ұсынылды.

Осылайша, ұсынылған клиникалық есепте синуситтің алғашқы күндерінде, яғни процесс ең жедел фазасында болған кезде риногенді бассүйекішілік асқынулардың пайда болуы оның гематогенді жолмен таралуын көрсетеді. Сондықтан, риногенді бассүйекішілік асқынулар жағдайында терапияны ең алдымен

антибиограмма нәтижелеріне негіздеп бастау керек және тиісті детоксикация терапиясымен қатар мұрын қуыстарына араласуларды жүргізу ұсынылады.

Түйін сөздер: жедел риносинусит, риногенді бассүйекішілік асқынулар, эпидуральды абсцесс.

Тактика лечения молниеносного риногенного внутричерепного осложнения

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Резюме

Нами описан клинический случай риносинусита, осложненного эпидуральным абсцессом и менингитом. 16-летний юноша обратился в местную отоларингологическую клинику, где ему был поставлен диагноз острого полисинусита. По мере ухудшения состояния он обратился в нейрохирургическое отделение, где, помимо острого полисинусита, у него был диагностирован дополнительный эпидуральный абсцесс. Далее пациент был направлен в ЛОР-клинику. Пациенту была проведена операция в отоларингологическом отделении нашей больницы. Через 2 дня после операции состояние пациента ухудшилось, его сознание было полностью нарушено, он не реагировал на раздражающие болевые ощущения. Были повторно проведены контрастные КТ и МРТ, во время обследования мозговые оболочки были окрашены контрастным веществом, и пациенту был поставлен диагноз риногенного менингита. Пациент находился в отделении интенсивной терапии в течение 2 дней, где ему внутривенно вводили антибиотики в соответствии с результатами теста на чувствительность к антибиотикам (максипен/ванкопол). Когда его состояние улучшилось, лечение продолжилось в ЛОР-клинике и привело к выздоровлению. На десятый день после операции состояние пациента улучшилось, сознание стало полностью ясным, а жидкость в пазухах была чистой. На тринадцатый день после операции он был выписан из больницы для амбулаторного лечения, и ему было рекомендовано продолжить антибиотикотерапию дома еще в течение одной недели.

Таким образом, в представленном клиническом отчете возникновение риногенных внутричерепных осложнений в первые дни синусита, когда процесс находится в наиболее острой фазе, указывает на гематогенное распространение. Следовательно, в случае риногенных внутричерепных осложнений терапию следует начинать в первую очередь по результатам антибиограммы, и целесообразно проводить вмешательства в околоносовых пазухах на фоне адекватной детоксикационной терапии.

Ключевые слова: острый риносинусит, риногенные внутричерепные осложнения, эпидуральный абсцесс.