col. The combination of two antibiotics – azithromycin (AZM) and chloramphenicol (CAP) was tested as antimicrobial part of dressing material for preventing growth and biofilm formation of opportunistic bacteria *S.aureus* ATCC 25923 and *P.aeruginosa* PA01. Developed wound dressing collagen-based material successfully inhibited biofilm development of both Gram-positive and Gram-negative infection agents. The use of chloroform sterilization for collagen preparation successfully reduced cell attachment level of both studied strains and could be considered as anti-fouling approach for wound dressing material preparation. Developed collagen-based wound dressing with antimicrobial and antibiofilm effects could be used for wound treatment in further clinical studies.

Key words: collagen dressing, wounds, biofilms, antimicrobials.

ORCID and contributionship:
Maslak V. I.: 0009-0001-3516-2283 BC
Kalinichenko O. O.: 0009-0008-4188-9914 BC
Okhmat O. A.: 0000-0003-0927-8706 AED
Kotlyar M. M.: 0009-0008-0217-7578 BC
Iungin O. S.: 0000-0001-8876-6075 AED

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There is no conflict of interest referring to this research.

Corresponding author
Iungin Olga Serhiyivna
Kyiv National University of Technologies and Design
Ukraine, 01011, Kyiv, 2 Mala Shiyanovska str.
Tel.: 0939822644
E-mail: olgaungin@gmail.com

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Moskalyk O. Ye., *Bilash S. M., *Pronina O. M., Rudnytska Kh. I., Dats I. V., Haba M. Ye.

A CLINICAL CASE OF CLUSTER HEADACHE IN A PATIENT WITH RECURRENT RHINOSINUSITIS

Danylo Halytsky Lviv National Medical University (Lviv, Ukraine)
***Poltava State Medical University (Poltava, Ukraine)**
kristinarudnytska@gmail.com

Rhinosinusitis is a widespread disease in most countries of the world, has an annual prevalence of 6-15% and is usually a consequence of Acute Respiratory Viral Infection. The purpose of our work was to study the clinical case of a patient with cluster headaches on the background of recurrent rhinosinusitis.

The article presents a clinical case of cluster headache in a patient with recurrent rhinosinusitis, who, according to the treatment protocol, was prescribed an antibiotic, nasal rinsing with saline solutions, complex herbal preparations with decongestant, anti-inflammatory and secretolytic effects, analgesics and intranasal glucocorticoids.

On the background of the prescribed treatment, inflammation of the mucous membrane of the nasal cavity and paranasal sinuses began to regress; however, the headache intensity did not change. Improvement in the patient's general condition and clinical recovery was achieved only after consultation and treatment correction by a neurologist. This clinical case indicates that patients with rhinosinusitis, in which the nature of the pain is atypical, does not correspond to the severity of inflammation of the nasal mucosa and paranasal sinuses, and is not treatable, should consult related healthcare specialists to determine further treatment tactics.The analysis of clinical cases of patients with sinus pathology and the study of their structural features, innervation and blood supply significantly complement the teaching of human anatomical variability in age, gender and constitutional aspects.

Key words: *rhinosinusitis, frontal sinus, maxillary sinus, cluster headache, nasal septum.*

Connection of the publication with planned research works.

The study was carried out as part of the comprehensive research work of the Department of Normal Anatomy and the Department of Operative Surgery with Topographic Anatomy of Danylo Halytsky Lviv National Medical University «Morphofunctional features of organs in the pre- and postnatal periods of ontogenesis, under the influence of opioids, nutritional supplements, reconstructive surgery and obesity (state registration number 0120U002129).

Introduction.

Rhinosinusitis is a widespread disease in most countries of the world, that has an annual prevalence of 6-15% and is usually a consequence of Acute Respiratory Viral Infection [1]. Rhinosinusitis in adults is defined as inflammation of the mucous membrane of the nose and paranasal sinuses, characterized by the presence of two or more symptoms, one of which must be either nasal congestion (obstruction), congestion, or secretion from the nasal cavity (front/back to the nasopharynx), which combined with pain/pressure in the face area and decreased or loss smell [1]. So, pain in the face area is one of the symptoms of rhinosinusitis. But its causes in most cases should be sought outside the nose. Nevertheless, practice shows that pain in the facial area of the head is perceived by patients and doctors as a manifestation of rhinosinusitis. EPOS 2020 indicates that pain and intensity have a temporal relationship with the intensity of other nasal symptoms [1]. Primary headache syndrome, which causes pain in the face, is also distinguished, which includes: migraine, trigeminal neuralgia, paroxysmal hemicrania and histamine headache. The inability to differentiate rhinogenic from non-rhinogenic headache leads to overdiagnosis of rhinosinusitis and, in turn, to unnecessary treatment. An important aspect of headache of non-rhinogenic origin is its connection with nasal symptoms. Vegetative innervation of the paranasal cavities, which is provided by the trigeminal nerve, can cause such symptoms as congestion, rhinorrhea, lacrimation, and swelling of the periorbital area. The literature describes a number of studies that emphasize the presence of nasal symptoms in patients with migraine, which indicates a possible connection between migraine and vasomotor rhinitis [1, 2, 3]. So Schreiber et al. reported that 63% of patients who met criteria for migraine had nasal congestion and 40% of them had rhinorrhea [2]. Research was carried out by Lambru et al. also testified that 40% of patients with facial migraine were diagnosed with nasal congestion or rhinorrhea [3].

The aim of our study.

To study the clinical case of a patient with cluster headaches on the background of recurrent rhinosinusitis.

Object and research methods.

A clinical case was studied: Patient X, 38 years old, complained on paroxysmal, intense burning pains in the frontal area of the head on the left side, which occurred at night and were accompanied by a feeling of congestion, tickling and itching in the nose and a small amount of mucous secretions. The pains lasted up to 2-3 hours, their intensity did not decrease after taking nonsteroidal anti-inflammatory drugs. The patient also noted a one-time vomiting on the background of pain, after which it decreased somewhat and left a feeling of stinging (bruise) in the area of the eyebrow on the left.

Research results and their discussion.

From the anamnesis, it is known that similar symptoms were observed in this man two years ago. Then he underwent a course of treatment, which included an antibiotic, mucolytics, nonsteroidal anti-inflammatory drugs, washing the nasal cavity with an isotonic seawater solution. Clinical recovery occurred after the treatment.

Objective examination data: during palpation and percussion of the projection of the paranasal sinuses, there is local soreness in the suprabrow area on the left above the inner corner of the eye. There were no signs of involvement of the subcutaneous tissue in the area of the orbit, exophthalmos, or oculomotor dysfunction. During rhinoscopy, it was found that the mucous membrane of the nasal cavity was slightly cyanotic and swollen. The nasal passages are free, there is no secretions. Significant curvature of the nasal septum to the left and vicarious hypertrophy of the inferior concha on the right were observed. During oropharyngoscopy, the flow of exudate along the back wall of the pharynx was not noted.

Since the patient was bothered by pain in the face, but the nature of the pain was not typical for rhinosinusitis, and taking into account the fact that similar symptoms had already occurred several times (two and four years ago), the patient was prescribed a CT scan of the nasal cavity and paranasal sinuses [1, 4].

CT examination **(fig.)** revealed: curvature of the entire outer part of the nose to the right, deformation of the nasal septum on the left up to 9 mm, with the formation of a bony ridge up to 8 mm, with contact with the side wall of the nasal cavity, displacement of the left concha in the direction of the side wall of the nasal cavity, with narrowing of the left meatus to 1.5 mm. In the structure of the distal part of the plate of the right middle concha, there is an air cell, measuring 6x6x6 mm, without pathological filling. The thickness of the mucous membrane of the conchas was up to 2-3 mm, the width of the right meatus – from 2-3 mm.

When examining the frontal sinuses, it was found that the basal 1⁄2 of the left sinus cavity is filled with a combination of thickening of the mucous membrane and a thick, liquid component with a level. The mucous membrane of the basal part of the right sinus is unevenly thickened to 4-6 mm. The orifices and frontal infundibulums are obturated with a homogeneous soft tissue component.

Along the contour of the walls of both maxillary sinuses, there is a combination of uneven thickening of the mucous membrane and a thick, liquid component, up to 14 mm high in the right sinus, up to 4-5 mm in the left. The right orifice and the ethmoidal infundibulum are obturated with a homogeneous soft tissue component, the left parts are not obturated.

In some cells of the ethmoidal labyrinth, there is a visual thickening of the mucous membrane up to 2 mm – according to the type of catarrhal changes.

Visual thickening of the mucous membrane by the contours of the front walls of both lobes up to 2 mm was found in the sphenoidal sinus, the orifices were not obturated.

No prominent periapical changes are observed in the thickness of the cellular process of the upper jaw.

In the area of the nasopharynx, hyperplasia of the soft tissues of the dorsal wall up to 10 mm, air space up to 16 mm wide was found.

According to the conclusion of the computer tomographic examination, the described changes are evidence of KPKT-signs of frontal and maxillary-sinusitis changes, deformation of the membrane on the left with the formation of a prominent bone crest.

In the general blood test, ESR is 12 mm/h.

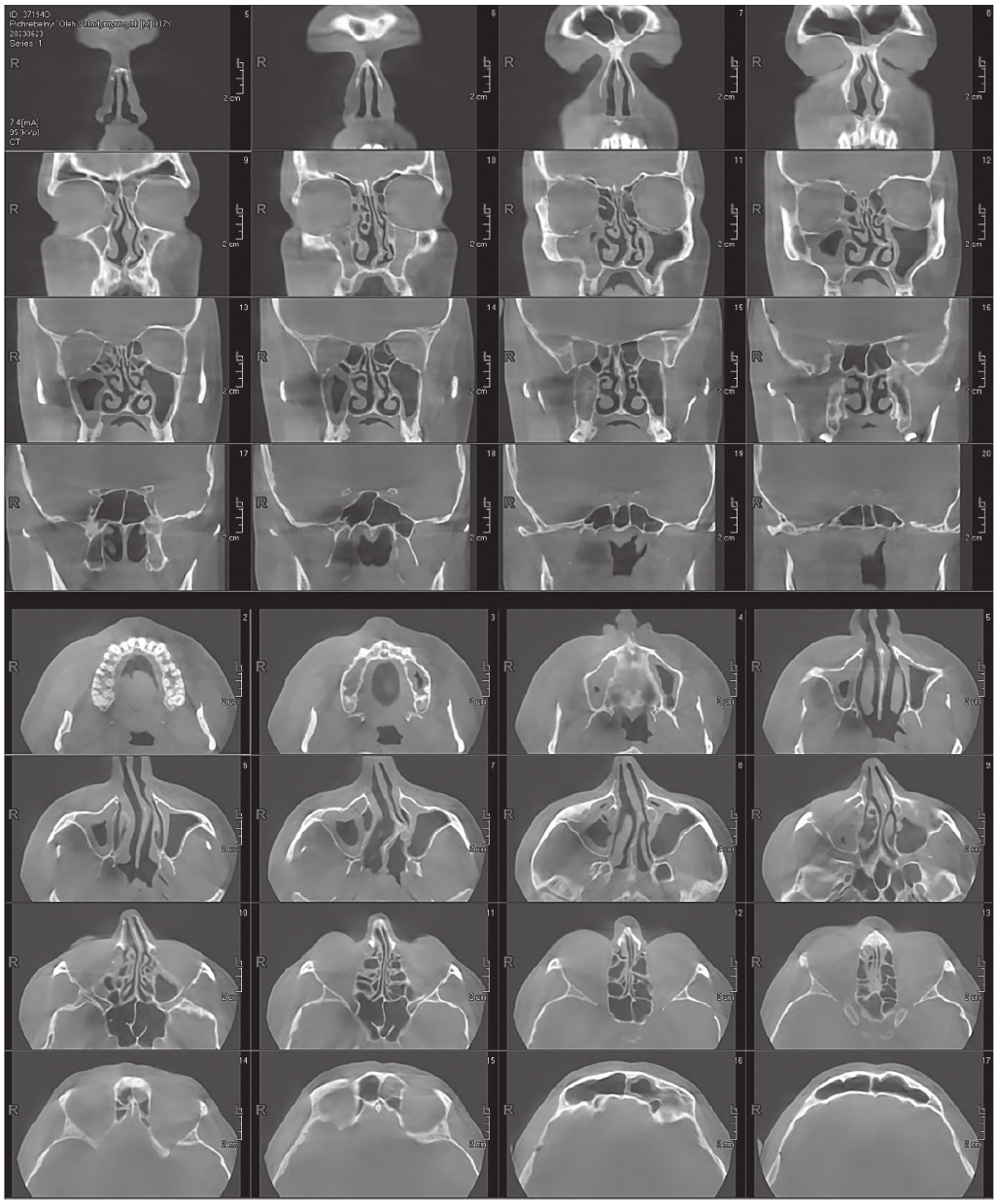

Figure – Computed tomogram of the front part of the head. KPKT-signs of frontal and maxillary-sinusitis changes, deformation of the septum on the left with the formation of a prominent bone ridge. The patient is 38 years old.

The patient was diagnosed with recurrent rhinosinusitis. Distortion of the nasal septum with impaired nasal breathing.

The patient believed that this was the cause of facial pain and insisted on antibiotic therapy. He was prescribed the following treatment: an antibiotic of the cephalosporin series [1, 4, 5] (since he finished taking the antibiotic of the penicillin series three weeks ago, due to the removal of a tooth on the lower jaw), rinsing the nasal cavity with saline solutions, complex herbal preparations with anti-edematous, anti-inflammatory and secretolytic effects, analgesics and intranasal glucocorticoids. After three days of treatment, according to the patient's words, nasal breathing improved, there was little discharge from the nose, but night paroxysmal headaches in the frontal area persisted. The patient is scheduled for consultation with a neurologist [1, 5].

Examination of a neuropathologist. Objectively: orientation in space and time is not disturbed. Pupils: D=S, wide. There is no nystagmus. The tongue is on the middle line, swallowing is not disturbed. Cranial nerves without visible pathology. There are no meningeal signs at the time of examination. Sensitivity is not impaired. The strength in the limbs is preserved. Tendon reflexes from the upper limbs D=S, from the lower limbs D=S. Pathological reflexes are not caused. Muscle tone is within normal limits. Romberg's pose is stable. Performs cerebellar tests satisfactorily. Tension symptoms are negative. The congitive sphere is unchanged. Based on the results of the examination, the patient was given a diagnosis: Recurrent rhinosinusitis. Distortion of the nasal septum with impaired nasal breathing. Cluster headache. In accordance with the amended diagnosis, the treatment was adjusted: recommendations were given on the regime of work and rest, vitamins of group B and a systemic corticosteroid.

After the corrected treatment, the patient noted a decrease in the intensity of facial pain on the first

night. After 3 days, the pain went away. The patient completed a course of antibiotic therapy and continued intranasal corticosteroid treatment for up to 1 month. He was recommended surgical treatment for the curvature of the nasal septum.

Conclusions.

Given the polygamy of symptoms of rhinosinusitis, including pain in the frontal part of the head, it is sometimes difficult to differentiate the cause of the latter. Therefore, patients with rhinosinusitis, in whom the nature of the pain is not typical, does not correspond to the severity of inflammation of the mucous membrane of the nasal cavity and paranasal sinuses, and is not amenable to treatment, need consultation with related specialists to determine further treatment tactics.

Prospects for further research.

The analysis of clinical cases of patients with sinus pathology and the study of their structural features, innervation and blood supply significantly complement the teaching of human anatomical variability in age, gender and constitutional aspects.

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КЛІНІЧНИЙ ВИПАДОК КЛАСТЕРНИХ БОЛЕЙ ГОЛОВИ У ПАЦІЄНТА ІЗ РЕЦИДИВУЮЧИМ РИНОСИНУСИТОМ

Москалик О. Є., Білаш С. М., Проніна О. М., Рудницька Х. І., Дац І. В., Габа М. Є.

Резюме. Практика показує, що болі лицевої ділянки голови сприймаються пацієнтами і лікарями, як прояв риносинуситу. Неможливість віддиференціювати риногенний від нериногенного болю голови призводить до гіпердіагностики риносинуситу, а те, у свою чергу, до неадекватного лікування.

Метою нашого дослідження стало опрацювання клінічного випадку пацієнта з кластерними болями голови на тлі рецидивуючого риносинуситу.

Описано клінічний випадок пацієнта Х, 38 років, який звернувся із скаргами на приступоподібні, інтенсивні болі пекучого характеру у лобній ділянці голови зліва, що виникали вночі та супроводжувалися відчуттям закладеності, лоскотання і свербіжу в носі та незначною кількістю слизових виділень. Болі тривали до 2-3 годин, їх інтенсивність не зменшувалася після прийому нестероїдних протизапальних препаратів. Також пацієнт відмічав одноразову блювоту на фоні болю, після чого остання дещо зменшилася і залишилося відчуття ниття (синяка) у ділянці брови зліва.

Проведено аналіз анамнезу, результати об'єктивного обстеження та комп'ютерної томографії порожнини носа і приносових пазух. З'ясовано структурні та морфометричні особливості лобових, верхньощелепних, та клиноподібної пазух і комірок решітчастого лабіринту, проведено аналіз виявлених змін. Для корекції симптоматичного лікування призначено консультацію ненвропатолога. На підставі результатів огляду пацієнту доповнено діагноз та відкориговано лікування. Після відкоректованого лікування, пацієнт відмітив зниження інтенсивності лицевого болю.

Беручи до уваги полігамність симптомів риносинуситу, серед яких є і біль у лицевій ділянці голови, інколи важко віддифенціювати причину останнього. Тому пацієнтам із риносинуситами, у яких характер болю не є типовим, не відповідає важкості запалення слизової оболонки носової порожнини та приносових пазух та не піддається лікуванню, необхідна консультації суміжних спеціалістів для визначення подальшої тактики лікування.

Ключові слова: риносинусит, лобна пазуха, верхньощелепна пазуха, кластерний біль голови, носова перегородка.

CLINICAL CASE OF CLUSTER HEADACHE IN A PATIENT WITH RECURRENT RHINOSINUSITIS

Moskalyk O. Ye., Bilash S. M., Pronina O. M., Rudnytska Kh. I., Dats I. V., Haba M. Ye.

Abstract. Practice shows that pain in the facial part of the head is perceived by patients and doctors as a manifestation of rhinosinusitis. The inability to differentiate rhinogenic from non-rhinogenic headache leads to overdiagnosis of rhinosinusitis, and that, in turn, to inadequate treatment.

The purpose of our work was to study the clinical case of a patient with cluster headaches on the background of recurrent rhinosinusitis.

The clinical case of patient X, 38 years old, was described. He complained of paroxysmal, intense burning pains in the frontal part of the head on the left, which occurred at night and were accompanied by a feeling of congestion, tickling and itching in the nose and a small amount of mucous secretions. The pains lasted up to 2-3 hours, their intensity did not decrease after taking nonsteroidal anti-inflammatory drugs. The patient also noted a one-time vomiting on the background of pain, after which the latter decreased and left a feeling of stinging (bruise) in the area of the eyebrow on the left.

The anamnes was analyzed, the results of an objective examination and computer tomography of the nasal cavity and paranasal sinuses were performed. The structural and morphometric features of the frontal, maxillary, and sphenoid sinuses and the cells of the ethmoidal labyrinth were studied, and the identified changes were analyzed.

For the correction of symptomatic treatment, a consultation with a neuropathologist was recomended. Based on the results of the examination, the patient's diagnosis was supplemented and treatment was adjusted. After the corrected treatment, the patient noted a decrease in the intensity of facial pain.

Taking into account the polygamy of symptoms of rhinosinusitis, which include pain in the frontal part of the head, it is sometimes difficult to differentiate the cause of the latter. Therefore, patients with rhinosinusitis, in whom the nature of the pain is not typical, does not correspond to the severity of inflammation of the mucous membrane of the nasal cavity and paranasal sinuses, and is not amenable to treatment, need consultation with related specialists to determine further treatment tactics.

Key words: rhinosinusitis, frontal sinus, maxillary sinus, cluster headache, nasal septum.

ORCID and contributionship:
Moskalyk O. Ye.: 0000-0003-3284-3064 ABD
Bilash S. M.: 0000-0002-8351-6090 F
Pronina O. M.: 0000-0002-8242-6798 A
Rudnytska K. I.: 0000-0003-3284-3064 EF
Dats I. V.: 0000-0002-0453-2085 A
Haba M. Ye.: 0000-0001-5261-0669 AE

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Corresponding author
Rudnytska Khrystyna Ihorivna
Danylo Halytsky Lviv National Medical University
Ukraine, 79010, Lviv, 69 Pekarska str.
Tel.: +380671113077
E-mail: kristinarudnytska@gmail.com

A – Work concept and design, **B** – Data collection and analysis, **C** – Responsibility for statistical analysis, **D** – Writing the article, **E** – Critical review, **F** – Final approval of the article

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[1]Nekhlopochyn O. S., [1]Verbov V. V., [1]Cheshuk I. V., [2]Karpinsky M. Yu., [2]Yaresko O. V.

BIOMECHANICAL CHARACTERISTICS OF THORACOLUMBAR JUNCTION UNDER ROTATIONAL LOADING AFTER DECOMPRESSION-STABILIZATION SURGERY

[1]Romodanov Neurosurgery Institute National Academy of Medical Sciences of Ukraine (Kyiv, Ukraine)
[2]Sytenko Institute of Spine and Joint Pathology National Academy of Medical Sciences of Ukraine (Kharkiv, Ukraine)

korab.karpinsky9@gmail.com

Internal fixation is the most common method of surgical correction of most traumatic spinal injuries. The introduction of telescopic body replacement implants into clinical practice has significantly optimised the surgical treatment of fractures of the thoracolumbar junction, but the biomechanical features of such stabilisation have been little studied. This study aimed to conduct a detailed analysis of the load distribution in the simulation of resection of the Th12 vertebral body with its subsequent replacement with interbody support and additional stabilisation with an 8-screw transpedicular system. One of the most biomechanical unfavourable loading variants, rotational impact, was studied. The analysis was carried out using a finite element model developed in the biomechanics laboratory of the State Institution "Sytenko Institute of Spine and Joint Pathology National Academy of Medical Sciences of Ukraine". Different variants of transpedicular fixation were considered: using standard monocortical transpedicular screws or elongated bicortical screws. In addition, the effect of the presence of two transverse rod-to-rod ties was studied. As a result of the analysis, it was found that under rotational loads, the greatest stress is concentrated on the interbody support and the vertebral closure plates in contact with it. At the same time, the inclusion of 2 transverse ties in the stabilising transpedicular system allows for a significant normalisation of the load distribution, reducing the critical stress in the most vulnerable areas. At the same time, the use of long bicortical screws does not have a significant effect on the stress-strain state. The obtained results should be evaluated in combination with the analysis of other loading patterns to identify the most biomechanically favourable and stable variant of surgical intervention.

Key words: *thoracolumbar junction, traumatic injury, transpedicular fixation, body resection, rotational loading.*