2025 • 3

ექსპერიმენტული და კლინიკური მედიცინა

EXPERIMENTAL AND CLINICAL MEDICINE

GEORGIA

JECM

GEORGIA

Journal of Experimental and Clinical Medicine

Print-ISSN 1512-0392
E-ISSN 2667-9736

საქართველოს XIV ეროვნული კონგრესი
ალერგიაში, ასთმასა და იმუნოლოგიაში

ასთმისა და ფქოდ-ის X ევროპის
კონგრესი

IV საერთაშორისო კონგრესი
„კორონავირუსული ინფექცია (COVID-19):
პრევენცია, დიაგნოსტიკა, მკურნალობა
და რეაბილიტაცია“

ალერგიის მსოფლიო ორგანიზაციის სკოლა-
ტრენინგი (WATS)

თბილისი, საქართველო
5-8 მაისი, 2025

XIV GEORGIAN NATIONAL CONGRESS ON
ALLERGY, ASTHMA & IMMUNOLOGY

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IV INTERNATIONAL CONGRESS "CORONAVIRUS
INFECTION (COVID-19): PREVENTION,
DIAGNOSIS, TREATMENT
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Tbilisi, Georgia
May 5-8, 2025

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ჟურნალში დაბეჭდილია კონგრესის სამეცნიერო მასალები - სტატიები და პრეზენტაციების აბსტრაქტები

Scientific materials of the Congress - articles and abstracts of presentations - are printed in the Journal

ISSN 1512-0392
E-ISSN 2667-9736

ნინო ჯავახიშვილის სახელობის
სამეცნიერო-პრაქტიკული ჟურნალი

ექსპერიმენტული და კლინიკური მედიცინა

NINO JAVAKHISHVILI
SCIENTIFIC-PRACTICAL JOURNAL

EXPERIMENTAL AND CLINICAL MEDICINE

№3

ჟურნალი ინდექსირებულია შემდეგ საერთაშორისო ინდექსაციის ბაზებში:
The journal is indexed in the following international indexing databases:
Google Scholar, Crossref, DRJI, Cosmos, WorldCat

ჟურნალში გამოქვეყნებულ სტატიებს მინიჭებული აქვთ **DOI**
Articles published in the journal are assigned a

სადისერტაციო საბჭოების მიერ ჟურნალი ჩართულია სამეცნიერო გამოცემების ნუსხაში,
სადაც რეკომენდებულია სადისერტაციო ნაშრომების ფრაგმენტების გამოქვეყნება

BY THE DISSERTATION COUNCILS JOURNAL IS INCLUDED IN A LIST OF SCIENTIFIC EDITIONS
RECOMMENDED FOR PUBLISHING OF THE DISSERTATION FRAGMENTS

სარჩევი / CONTENT

REVAZ SEPIASHVILI[1], MANANA CHIKHLADZE[1,2], SOPIO GAMKRELIDZE[1,2,3], DAREJAN KHACHAPURIDZE[1,2]

CHRONIC COUGH ASSOCIATED WITH GASTROINTESTINAL DYSFUNCTION

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Doi: https://doi.org/10.52340/jecm.2025.03.01

რევაზ სეფიაშვილი [1], მანანა ჩიხლაძე [1,2], სოფიო გამყრელიძე [1,2,3], დარეჯან ხაჭაპურიძე [1,2]

კუჭ-ნაწლავის დისფუნქციით გამოწვეული ხველა

[1] საქართველოს ალერგოლოგიის, ასთმისა და კლინიკური იმუნოლოგიის ინსტიტუტი, წყალტუბო, საქართველო; [2] აკაკი წერეთლის სახელმწიფო უნივერსიტეტი, ქუთაისი, საქართველო; [3] ევროპის ცენტრალური უნივერსიტეტი - CUE, ქუთაისი, საქართველო

რეზიუმე

ქრონიკული, მუდმივი ხველა არის საერთო კლინიკური პრობლემა, რომლის მიზეზი ზოგჯერ ამოუცნობი რჩება. გასტროეზოფაგური რეფლუქსი (GERD), როგორც კუჭ-ნაწლავის დისფუნქციის ერთ-ერთი გამოვლინება, ქრონიკული ხველის ყველაზე გავრცელებული მიზეზია. ასევე, ზოგიერთმა კვლევამ აჩვენა, რომ ჰელმინთები იწვევს ან ზრდის ხველის სიმძიმეს. ზემოაღნიშნულიდან გამომდინარე, წარმოდგენილი კვლევა მიზნად ისახავს კუჭ-ნაწლავის დისფუნქციის სკრინინგს და გამომწვევი მიზეზების იდენტიფიცირებას, ქრონიკული ხველის მქონე დასავლეთ საქართველოს მოსახლეობაში. კვლევაში ჩართული იყო 46 პაციენტი (18-დან 75 წლამდე, 24 ქალი და 22 მამაკაცი), რომლებმაც მიმართეს საქართველოს მეცნიერებათა აკადემიის ალერგოლოგიის, ასთმის და კლინიკური იმუნოლოგიის ეროვნულ ინსტიტუტს (წყალტუბო, საქართველო) დიაგნოსტიკისთვის. კვლევის დიზაინი მოიცავდა: 1) ანამნეზის შეგროვებას - სპეციალურად შემუშავებული კითხვარის მეშვეობით; 2) Helicobacter pylori-ზე საერთო IgM, IgG ტიტრების განსაზღვრას; 3) ასევე შეფასდა საერთო IgA, IgM, IgG ტიტრები ჰელმინთებზე: Giardia, Ascaris, Toxocara. სამედიცინო ისტორიისა და სპეციფიკური ინსტრუმენტულ-ლაბორატორიული მარკერების ანალიზის საფუძველზე 46 პაციენტიდან 17 პაციენტში ქრონიკული ხველით გამოვლინდა კუჭ-ნაწლავის დისფუნქცია. Helicobacter pylori-ის კვლევამ აჩვენა ამ მარკერის დონის მატება 17-დან 6 (35%) პაციენტში. ლაბორატორიულმა გამოკვლევებმა გამოავლინა მთლიანი IgM-ის დონის მატება 1 (5,8%) შემთხვევაში, ხოლო IgG მაღალი ტიტრი Helicobacter pylori-ზე დაფიქსირდა 5 (29%) პაციენტში. გარდა ამისა, გამოვლინდა ანტისხეულები სამივე ანალიზატორის წინააღმდეგ ჰელმინთებზე: Giardia, Ascaris, Toxocara. ხველის სახელმწიფო პროტოკოლით/გაიდლაინებით მკურნალობის პარალელურად პაციენტებს უტარდებოდათ ანტიჰელმინთური თერაპია, რამაც გამოიწვია საიმედო გამოსავალი - გამოჯანმრთელება. საბოლოო ჯამში, გასტროენტეროლოგს შეუძლია გადამწყვეტი როლი ითამაშოს რეფრაქტერული ხველისადმი სისტემატური, მრავალდისციპლინური მიდგომის მხარდაჭერაში და ასევე გონივრულად გამოიყენოს დიაგნოსტიკური ტესტირებისა და მკურნალობის სტრატეგიები.

INTRODUCTION. Chronic cough is a burdensome symptom affecting a large number of patients and contributes significant cost to the healthcare system. Chronic, persistent cough is a common clinical problem, the cause of which sometimes remains unidentifiable. Many patients with chronic cough will have seen multiple physicians, including primary care, allergy, otolaryngology, and pulmonary specialists before referral to gastroenterology [1].

Gastroesophageal reflux disease (GERD) is one of the most common causes of chronic cough. Experts associate GERD cough with a protective cough reflex from the vagus nerve, which is responsible for digestion and breathing, when stomach contents rise into the esophagus a regurgitation or microaspiration (inhalation of very small amounts) of acid and other stomach contents that reach the

throat. In some cases, chronic cough may co-occur with GERD but have other causes, like asthma, postnasal drip or bronchitis.

Before a cough can be attributed to GERD, other cardiopulmonary, infectious, and allergic causes should be ruled out. Patients should undergo spirometry, a bronchial provocation test, imaging, and bronchoscopy prior to referral to gastroenterology. If there are seasonal or other suspected allergic triggers, treatment with anti-histamines and/or nasal steroids may be appropriate in concert with an allergy evaluation. If these measures do not help, the gastroenterologist is faced with the choice of empirical treatment with acid suppressive therapy or further diagnostic testing for GERD.

Gastroesophageal reflux disease (GERD), such as common manifestation of gastrointestinal dysfunction, is due to the chronic exposure of the esophageal mucosa to acid secretion from the stomach. The relationship between GERD and H.pylori infection is still subject of debate. Pylori infection may be a factor associated with chronic cough and it may be associated with a decline in pulmonary function and reduced incidence of allergic conditions. Some studies have suggested that helminth infections induce or increase the severity of cough. The relationships between cough and Helminthes infections are not inconsistent [2,4].

Based on the above, the presented study is aimed at screening and identifying Gastrointestinal dysfunction such as extrapulmonary conditions, which are reasons for chronic, persistent cough in the West Georgian population.

MATERIAL AND METHODS. 46 patients (18 to 75 years of age, 24 women and 22 men) who applied to the National Institute of Allergology, Asthma and Clinical Immunology of the Georgian Academy of Sciences (Tskaltubo, Georgia) for diagnostic were involved in the study. Upon admission to the hospital, patients had coughs of unknown origin. To clarify gastrointestinal dysfunctions, such as the cause of cough the research design included: 1) collection of anamnesis - via a specially designed questionnaire for collecting the medical history; 2) To clarify the common etiologic factor of gastrointestinal dysfunction, conduction of laboratory examinations including detection of total IgM, IgG titers on Helicobacter pylori; also total IgA, IgM, IgG titers on helminths: Giardia, Ascaris, Toxocara, was scheduled.

RESULTS. Based on the analysis of medical history and specific instrumental-laboratory markers in 17 (37%) patients out of 46 with cough, gastrointestinal dysfunction was revealed. They had clinical manifestation of GERD associated cough: coughing mostly at night or shortly after a meal; increased coughing when lie down; persistent coughing in the absence of other common causes, such as tobacco use, respiratory infections, or medications (including ACE inhibitors) in which coughing is a side effect; coughing without asthma or postnasal drip; clear chest X-rays, normal spirometry.

Detection of Helicobacter pylori showed an increase in the level of this marker in 6 (35%) patients from 17, established the antibodies in blood on Helicobacter pylori. The laboratory examinations detected increased levels of total IgM in 1 (5,8%) case, and IgG titers were increased in 5 (29%) patients on Helicobacter pylori.

In addition, the antibodies against all three analyzers on helminths showed: Giardia, Ascaris, and Toxocara were revealed. 3 (17%) showed elevated immunoglobulin titer only to Toxocara, 1 (5,8%) only Giardia, and 2 (11%) only Ascaris, respectively. Giardia-specific Immunoglobulin antibody titers in the blood were on average 0,446 (norm <0.2); Ascaris - 0,922 (norm <0.3); Toxocara - 0,556 (norm <0.2), respectively. In parallel to the treatment under the Cough State Protocol/Guidelines, the patients were administered antihelminth therapy, resulted in a reliable solution – recovery (Table N1).

Table N1. *Analyzing the Laboratory Markers in Patients with Chronic Cough Condition*

Indicators	* I Study Group n =17			II Control Group n= 29			P value (Confidence Interval)
	Abs.	%	(M±m)	Abs.	%	(M±m)	
Helicobacter pylory	8	47	1,5±0.76	4	13	0,7±0,16	>0,05
Toxocara	3	17	0,556±0.02	2	6	0,236±0.012	>0,05
Ascaris	2	`11	0,922±0.15	1	4	0,456±0.05	>0,05
Giardia	1	5	0,446±0.06	1	4	0,235±0.06	>0,05

* I Study Group – Patients with chronic cough and gastrointestinal dysfunction; II Control Group - Patients with chronic cough, without gastrointestinal dysfunction.

Cough monitoring tools have been useful in evaluating the efficacy of cough medicines. Owing to differences in the pathology, the organs involved, and individual patient factors, treatment of chronic cough is progressing towards a personalized approach, and, in the future, novel ways to endotype patients with cough may prove valuable in management [3].

An occasional or persistent cough may be a sign of acid reflux and gastroesophageal reflux disease (GERD). Managing acid reflux often improves chronic cough and provides relief unless there are other underlying causes.

In parallel to the treatment under the Cough State Protocol/Guidelines, the patients were administered antihelminth therapy, resulting in a reliable solution – recovery. Consequently, the fact that the current study evidenced the etiologic role of helminths in the genesis of cough with unknown origin is undoubtedly actual in terms of providing target treatment and getting the desired clinical effect.

CONCLUSION. Screening for chronic cough is not carried out in clinical practice. How screening could be done and whether it would lead to clinical benefit is unclear. Screening patients with chronic respiratory disease may be beneficial as cough is often overlooked during clinical evaluation. Moreover, early identification may improve the quality of life (QOL) of patients and possibly avoid overtreatment by specifically targeting cough.

Chronic cough remains a burdensome symptom both at the patient and healthcare system level. Ultimately, the gastroenterologist can play a key role in supporting a systematic, multi-disciplinary approach to refractory cough that judiciously utilizes diagnostic testing and treatment strategies.

REFERENCES:

1. Andrew J Gawron, Peter J Kahrilas, John E Pandolfino - Chronic Cough: A Gastroenterology Perspective. https://pmc.ncbi.nlm.nih.gov/articles/PMC4120957/
2. Kian Fan Chung, Lorcan McGarvey, Woo-Jung Song, Anne B. Chang, Kefang Lai, Brendan J. Canning, Surinder S. Birring, Jaclyn A. Smith and Stuart B. Mazzone. Cough hypersensitivity and chronic cough 3 NATURE REVIEWS | DiSEASE PRimERS | Article citation ID: (2022)
3. Matsumoto H, Tabuena RP, Niimi A, et al. Cough triggers and their pathophysiology in patients with prolonged or chronic cough. Allergology Int. 2012;61:123–132. doi: 10.2332/allergolint.10-OA-0295.
4. Revaz Sepiashvili, Manana Chikhladze, Sopio Gamkrelidze, Darejan Khachapuridze, Nino Jojua, Dali Shovnadze. PULMONARY AND EXTRAPULMONARY POST-COVID-19 CHRONIC COUGH Experimental *and Clinical Medicine (JECM) 2024. p.10-14.*

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CHRONIC COUGH ASSOCIATED WITH GASTROINTESTINAL DYSFUNCTION

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SUMMARY

Chronic, persistent cough is a common clinical problem, the cause of which sometimes remains unidentifiable. Gastroesophageal reflux disease (GERD), such as manifestation of gastrointestinal dysfunction, is one of the most common causes of chronic cough. Some studies have suggested that helminth infections induce or increase the severity of cough. Based on the above, the presented study is aimed at screening and identifying gastrointestinal dysfunction such as extrapulmonary conditions, which are reasons for chronic, persistent cough in the West Georgian population. 46 patients (18 to 75 years of age, 24 women and 22 men) who applied to the National Institute of Allergology, Asthma and Clinical Immunology of the Georgian Academy of Sciences (Tskaltubo, Georgia) for diagnostic were involved in the study. The research design included: 1) collection of anamnesis - via a specially designed questionnaire for collecting the medical history; 2) To clarify the common etiologic factor of gastrointestinal dysfunction, conduction of laboratory examinations including detection of total IgM, IgG titers on Helicobacter pylori; also total IgA, IgM, IgG titers on helminths: Giardia, Ascaris, Toxocara, was scheduled. Based on the analysis of medical history and specific instrumental-laboratory markers in 17 (37%) patients out of 46 with cough, gastrointestinal dysfunction was revealed. Detection of Helicobacter pylori showed an increase in the level of this marker in 6 (35%) patients from 17, established the antibodies in blood on Helicobacter pylori. The laboratory examinations detected an increased level of total IgM in 1(5,8%) case, and IgG titers were increased in 5 (29%) patients on Helicobacter pylori. In addition, the antibodies against all three analyzers on helminths showed: Giardia, Ascaris and Toxocara were revealed. In parallel to the treatment under the Cough State Protocol/Guidelines, the patients were administered antihelminth therapy, resulting in a reliable solution – recovery. Ultimately, the gastroenterologist can play a key role in supporting a systematic, multi-disciplinary approach to refractory cough that judiciously utilizes diagnostic testing and treatment strategies.

Keywords: Chronic Cough, Helicobacter Pylori, GERD, Helminths

MARIAM ZATIASHVILI, TAMAR TABATADZE, MAIA MATOSHVILI, NINO ADAMIA, LAVRITA PACHUASHVILI, TAMAR ARAKHAMIA, MANANA KOBAKHIDZE, ANKA KOBAKHIDZE

ATOPIC DERMATITIS IN THE ERA OF INNOVATIONS

(Reviewing and exploring modern research and literature on treatment of atopic dermatitis with microbial transplantation)

M.Iashvili Childrens Central Hospital, TSMU

Doi: https://doi.org/10.52340/jecm.2025.03.02

მარიამ ზათიაშვილი, თამარ ტაბატაძე, მაია მათოშვილი, ნინო ადამია, ლავრიტა ფაჩუაშვილი, თამარ არახამია, მანანა კობახიძე, ანკა კობახიძე

ატოპიური დერმატიტი ინოვაციების ეპოქაში

(ატოპიური დერმატიტის მკურნალობის თანამედროვე კვლევებისა და ლიტერატურის განხილვა მიკრობული ტრანსპლანტაციის გამოყენებით)

მ.იაშვილის სახ. ბავშვთა ცენტრალური საავადმყოფო, თსსუ

რეზიუმე

ატოპიური დერმატიტი არის ქრონიკული ანთებითი კანის დაავადება, რომლის გავრცელებაც გლობალურად მუდმივად იზრდება და რომელიც გავლენას ახდენს როგორც ბავშვებზე, ასევე მოზრდილებზე. იგი ხასიათდება იმუნური სისტემის დისრეგულაციით, კანის ბარიერის დისფუნქციითა და გენეტიკური და გარემოს ფაქტორების რთული ურთიერთქმედებით.

ტრადიციული მკურნალობის მეთოდები, როგორიცაა ტოპიკური კორტიკოსტეროიდები, კალცინევრინის ინჰიბიტორები და ბიოლოგიური პრეპარატები, ფოკუსირებულია სიმპტომების მართვაზე, მაგრამ ისინი არ მოქმედებენ დაავადების ძირეულ მიზეზებზე. ამიტომ, სულ უფრო მეტ ინტერესს იწვევს მკურნალობის ალტერნატიული მიდგომები, მათ შორის მიკრობიომის თერაპიაზე დაფუძნებული მეთოდები.

ფეკალური მიკრობიოტის ტრანსპლანტაცია (FMT) ბოლო დროს გამოჩნდა, როგორც ახალი თერაპიული სტრატეგია ატოპიური დერმატიტის სამკურნალოდ. იგი ხელს უწყობს ნაწლავების მიკრობიომის მრავალფეროვნების აღდგენასა და იმუნური პასუხის მოდულირებას “მუცლისა და კანის ღერძის” მეშვეობით. უახლესი კვლევები მიუთითებს, რომ დისბიოზს (ნაწლავის მიკროფლორის დარღვევას) ატოპიური დერმატიტის პათოგენეზში მნიშვნელოვანი როლი აქვს, რაც ხელს უწყობს სისტემურ ანთებასა და დაავადების სიმძიმეს.

FMT-მა გამოაჩნა მისი პოტენციალი ატოპიური დერმატიტის სიმპტომების გაუმჯობესებაში, ნაწლავის მიკრობიომის ბალანსის აღდგენის, იმუნური რეგულატორული მექანიზმების გაძლიერებისა და ანთებითი ციტოკინების წარმოების შემცირების გზით. კლინიკური კვლევები ადასტურებს ამ მეთოდის ეფექტიანობას, თუმცა, სტანდარტიზაციის, დონორის შერჩევისა და გრძელვადიანი უსაფრთხოების კუთხით ჯერ კიდევ არსებობს გამოწვევები.

ამ მიმოხილვაში განხილულია ატოპიური დერმატიტის ეპიდემიოლოგია, FMT-ის იმუნოლოგიური მექანიზმები და მისი პოტენციალი, როგორც ხარჯეფექტური თერაპიის ალტერნატივა. მისი ხელმისაწვდომობისა და შესაძლო გრძელვადიანი სარგებლიანობის გათვალისწინებით, FMT-მა შესაძლოა უფრო ხელმისაწვდომი ალტერნატივა შექმნას ძვირადღირებულ ბიოლოგიურ თერაპიებთან შედარებით. დამატებითი კვლევებისა და რეგულაციების განვითარებასთან ერთად, FMT-ის ინტეგრაცია დერმატოლოგიურ პრაქტიკაში შეიძლება გარდამტეხი აღმოჩნდეს ატოპიური დერმატიტის მართვისთვის, რაც გააუმჯობესებს პაციენტების შედეგებს და შეამცირებს ჯანდაცვის სისტემაზე ზეწოლას.

Atopic dermatitis is remitting, relapsing, chronic eczematous pruritic disease. Atopic dermatitis is the leading contributor to skin-related disability and ranks 15th among all non-fatal disease globally. Nearly 5-9 million work days usually are lost due to atopic dermatitis.

According to the National eczema association atopic dermatitis affects approximately 10% to 20% of children and 2% to 10% of adults worldwide [1,2]. People of all skin color, races and ethnicities can be affected by atopic dermatitis [4,5]. 80% of individuals affected by atopic dermatitis experience disease onset prior to 6 years of age [48]. But atopic dermatitis is not solely a disease of childhood onset, 1 in 4 adults report adult-onset symptoms, and nearly 40% are affected with moderate to severe disease [3,6,7].

There are several factors that increase the risk of developing atopic dermatitis, one of the most prominent is genetic factor, individuals with a family history of eczema, asthma or allergies, have a higher risk of developing atopic dermatitis [8,9]. Pollution, climate and exposure to irritants can increase the likelihood of developing atopic dermatitis [10]. Children who live in urban environment have a higher risk for prolonged disease [11,12].

Itch is the most burdensome symptom of atopic dermatitis, followed by skin redness and sleep loss [13]. 60.5% of adults with moderate to severe atopic dermatitis have reported severe or unbearable itch in the past two weeks, 86% reported daily itch and 63% reported itching at least 12 hours per day [14]. During an atopic dermatitis flare, itch and redness are increased. Flare frequency, duration and average severity increases with disease severity [15]. Skin pain is another symptom of atopic dermatitis, with 61% of affected adults experiencing pain. Most often pain is reported as a burning sensation, it can also feel like tingling or stinging [16,17,46,47]. Between 20% to 40% of school-aged children and teens with atopic dermatitis experience bullying because of their disease [20].

More than 55% of adults with moderate to severe atopic dermatitis report inadequate disease control [13,18,19]. Despite the fact that treatments are available, over 50% of adults with atopic dermatitis still face concerns about long-term use, and over 50% have found a treatment to be ineffective [13]. Compared to the time of symptom onset, nearly half (48%) of atopic dermatitis patients report that at the present time, symptom severity even has worsened. Nearly two thirds (64%) report that more areas or different areas are affected; 49% indicate that frequency of flares is worse than at onset [13]. In modern times, many studies have been done about new treatment methods of this disease, and the microbiome of the skin has recently been shown to play an important role in the etiology of atopic dermatitis, as the microbiome functions as a regulator of innate and acquire immunity [21,22]. Studies have shown that the skin of atopic dermatitis patients is characterized by a high colony-formation rate of staph. aureus and reduced indigenous bacteria (Staphylococcus, Corynebacterium, Cutibacterium, and Proteobacteria) [21,22]. It has also been suggested that the diversity of the microbiome may correlate with the severity of atopic dermatitis [23].

Therefore, strategies to treat atopic dermatitis by regulating the skin microbiome (correcting dysbiosis) and replacing specific microorganisms are being investigated. Several studies suggest that gut microbiota may influence atopic dermatitis by immune system regulation, and many of them have very promising and positive results.

In humans, the intestinal microbiota is necessity for stimulating, educating and sustaining the immune system's equilibrium [41]. It is estimated that there are more than 1000 species-level phylotypes in human intestinal environments [42], of which Bacteroidetes and Firmicutes account for 90 percent [43]. As researchers study the links between gut microbiota composition and susceptibility

to disease, as well as how commensal microbiota and their metabolites affect human health, they are being spurred on to investigate targeted microbiota-based therapies [44].

FMT was evaluated for the first time in humans at Tel Aviv Medical Center for adults with moderate to severe AD. The results showed a marked improvement from baseline in signs and symptoms of AD. Following each FMT, the average Scoring Atopic Dermatitis value decreased significantly at week 4. In the total of 9 participants, there were 7 and 6 patients achieved reduction of 50 % and 75 % at week 18 (after 8 weeks since the last FMT), respectively.

However, two of the patients experienced quick relapse after treatment. The clinical results were hampered by the limited sample size, the lack of double-blinded design, and other factors that had to be taken into account [40,45]. Oral microbiome regulators are under development, with several being tested in phase I trials. The following describes these topical formulations. Staphylococcus hominid A9 (ShA9) a bacterium isolated from healthy human skin, has been shown in animal studies to have two activities: killing staph. aureus and inhibiting the production of staph. aureus derived toxins [24]. In a phase I/II study, ShA9 was applied twice daily for seven days in patients with moderate to severe atopic dermatitis, who were tested positive for staph. Aureus colony formation. The result showed that Sh9A reduced staph. aureus colony formation and improved. Nitrosomonas eutropha (B244) is a bacterium that produces nitric oxide [26]. Nitric oxide is an important mediator with potential anti-inflammatory effects, and thus, has therapeutic potential for atopic dermatitis [25]. In a phase II study in adults with atopic dermatitis, B244 administered as a spray significantly improved pruritus. A phase II study on B244 is also currently underway.

Widya Mandala Catholic University's department of dermatology and venerology (Indonesia) has published an article about "Gut-skin axis modulation via fecal microbiome transplant: An ecological approach for atopic dermatitis treatment". They made the article by reviewing publications related to fecal microbiome transplantation and atopic dermatitis in order to further elaborate its potential use in the management of atopic dermatitis. Fecal microbiota transplantation is a recently developed gut microbiome reconstruction procedure, which allows long-lasting reintegration of certain microbiome in the gut [26,27]. There are several methods to administer the donor derived FMT microbial filtrate and oral capsule is a new preparation which offers non inferiority compared to other methods [51]. FMT has an immunomodulatory action and is an FDA approved treatment [52]. It has been vastly investigated for other conditions such as autoimmune disorder, metabolic disease, and neurologic conditions [53].

FMT effectively alters the gut microbiome profile and furthermore modulates the immune regulation. There is a growing body of evidence in the use of fecal microbiome from healthy persons thus restoring gut microbiome balance. The restoration of microbiome homeostasis leads to the restoration of the systemic and gut-skin-axis immunomodulation. FMT has demonstrated its efficacy in conditions such as recurrent clostridium difficile infection, autoimmune disorders, and Crohn's disease, which is strongly correlated to atopic dermatitis. This article was reviewing the potential use of FMT to regain the gut-skin-axis balance for treatment of atopic dermatitis. Results of a large cohort study revealed that the gut microbiome of infants suffering from atopic dermatitis, had a higher colonization of e. coli and clostridium difficile, than in infants without atopic dermatitis [54]. Both these microbiomes induce eosinophilic inflammation and are associated with atopic dermatitis [55]. Although the presence of staph. aureus strain on the skin induces atopic dermatitis exacerbation, its

presence in the gut early in life may promote the maturation of the immune system and is inversely correlated with the incidence of atopic dermatitis [56,57]. Skin barrier of atopic dermatitis patient is further compromised due to gut dysbiosis evoked itch [58] and increased reactivity toward oxidative stress [59].

Oral capsule FMT allows alteration of microbiome profile to become similar to that of microbiome profile to become similar to that of the donor in adult patients with moderate to severe atopic dermatitis. Some subjects responded immediately after the first FMT while others improved after few weeks. With the administration of FMT, microbial engraftment occurs rapidly with recipient gut microbiome composition resembling that of the donor within 3 days post procedure. This composition was related until the 4-month, follow-up and was accompanied by amelioration of CDI symptoms [60]. Study done on animals also demonstrated the efficacy of oral capsule FMT in improving gut microbiome diversity, producing clinical improvement, and increasing skin barrier on dogs [61]. Not only does it exhibit clinical improvement, oral capsule FMT also reduces the risk of developing atopic dermatitis on dog [62].

The question is how gut microbiome restoration improves atopic dermatitis? Transplantation of the gut microbiome leads to greater alpha diversity with microbiome profile similar to that of the donor within the first week. The gut microbiome is essential in the differentiation of naive T cells into Th1, Th2, Th17, or Foxp3+ Tregs. Tregs terminates the proliferation of faulty T cells into Th cells and impede inflammatory activities of mast cells, eosinophils and basophils. Th cells also inhibit IgE production and induce IgG4 production [27]. FMT helps regain Th1/Th2 balance via Treg signaling. The concentrations of Th2 cytokines (IL-4, IL-5, and IL-13), which plays a role in the development of AD, were significantly decreased. On the other side, concentrations of Th1 cytokines, such as IL-12, IFN-γ, and TNF-α were significantly increased. Tregs secreted cytokines (i.e., IL-10 and IL-1β) were significantly lower. Serum levels of IgE and concentration of calprotectin were significantly decreased at the 8th week. This finding is concomitant with significantly lower dermatitis scores. This finding is also in line with a study done on off-spring of mouse models previously given gut microbiota which were then given oxazolone to induce AD. This study found a strong association between gut microbiome, clinical inflammation, and Treg cytokines production by the macrophage (IFN-γ, TNFα, IL-1 β, and IL-6). Off-spring of this mouse models demonstrated gut microbiome profile enriched with Firmicutes and Lactobacillus spp and had milder AD upon induction with oxazolone. Fecal gut bacteria donor specimen from a mouse exhibiting high AD response upon oxazolone induction showed a higher abundance of the genus Bacteroides, in which Bacteroides fragilis is proven to exert anti-inflammatory and contributes to development of host immunity [28,29].

Results of one study indicates the importance of microbial relative abundance and a higher ratio of donor to recipient relative species abundance in determining the success of microbial transplant in FMT. Microbial investigation in the first week post-transplant was characterized by abundance of both recipient's pre-existent microbiome and the donor transplanted microbiome. Over the subsequent 10-12 weeks, donor microbiome stably persisted while recipient pre- existent microbiome abundance continued to decrease. Data sets presented in this study suggested that gut microbiome genera such as Bacteroides, Blautia, Coprococcus and Eubacterium that are persistently identified in healthy individuals are frequently transplanted in rCDI patients in great relative abundance [32].

On the other hand, there is a study demonstrating correlation between strain persistence and engraftment in which microbiome strains that are persistently found in the gut of healthy persons and donors has a preeminent rate of engraftment in the recipient. Analysis of these microbiome strains showed high ecology competitiveness and fitness which is pivotal in order to compete against dysbiotic microbiome found in the gut [33]. The importance of strain fitness in gut colonization is also explained by a concept which described the tenacity of Bacteroides species as part of the host microbiome, in which the species was acquired by vertical transmission through birth and was persistently found as part of the host microbiome regardless of antibiotic use [34]. Owing to the great influence of the microbiome fitness in the success of transplant, each microbiome capacity to colonize against pathogens found in dysbiotic ecology [35] and endurance against ecological disturbance [36] must be taken into account, perhaps through an ecological identification of fitting microbiome [37].

A metagenomic gut microbial analysis suggests that microbiome fitness, which is estimated by their widespread presence over the gut, is a better predictor of colonization success compared to microbiome abundance from the donor. This finding demonstrated the potential role of adaptive rather than neutral ecological colonization processes in microbial transplant establishment. High fitness microbiome, which were able to globally colonize the gut, demonstrated a metabolic ability to biosynthesize seven of nine essential amino acids and a higher capacity to biosynthesize cobalamine, riboflavin, and tetrahydrofolate. Further analysis demonstrated that these microbiomes are [38] also capable of modulating the bioproduction of pantothenate, thiamine, biotin, and folate which are known to convey host microbiome interaction [39]. Low fitness microbiome also exerts these biosynthesis capacities, although in a rather low magnitude [38].

For patients suffering from AD, FMT might be a safe and efficacious therapeutic intervention. Further explorations are required to confirm the immune response, gut metabolites, and adverse effects in clinical studies. There is a disruption in the gut barrier among AD patients, which makes them more vulnerable to the risks of FMT. The development of alternative GM-targeted therapies by combining appropriate microorganisms or microbial metabolites may therefore be a rational approach for treating AD in the future. As more research solidifies its efficacy, FMT could become a game-changer, not only as an alternative but also as a complementary therapy to conventional treatments. Unlike immunosuppressants or biologics, which can be costly and come with potential side effects, FMT offers a more natural way to restore immune balance by addressing gut dysbiosis - one of the underlying contributors to atopic dermatitis. One of the key advantages of FMT is its cos-effectiveness compared to many biologic treatments currently available for atopic dermatitis. while biologics can be expensive and require long-term administration, FMT has the potential to offer lasting benefits with fewer application. This budget-friendly nature makes it an attractive option, especially in healthcare systems looking for sustainable and accessible treatment methods. However, before FMT can become widely available, certain priorities must be addressed. Standardization of procedures, rigorous safety protocols, and regulatory frameworks need to be established to ensure safe and effective use. Additionally, public awareness and education will be crucial in overcoming potential skepticism about the procedure. If these challenges are addressed, FMT could pave the way for a new era in dermatology, providing atopic dermatitis patients with a more holistic and long-lasting treatment option. Given its potential benefits, we hope to see FMT introduced in Georgia soon. As a budget-friendly and highly effective treatment, its integration into dermatological practice could

greatly improve patient outcomes while also reducing the financial burden on both individuals and the healthcare system. With continued research and support, FMT may soon become widely accepted and accessible therapy, offering hope to those struggling with chronic skin conditions.

References:

1. Laughter MR, Maymone MBC, Mashayekhi S, et al. The global burden of atopic dermatitis: lessons from the Global Burden of Disease Study 1990–2017*. British Journal of Dermatology. 2021;184(2):304-309.
2. Choragudi S, Yosipovitch G. Trends in the Prevalence of Eczema Among US Children by Age, Sex, Race, and Ethnicity From 1997 to 2018. JAMA Dermatol. 2023;159(4):454-456.
3. Chiesa Fuxench ZC, Block JK, Boguniewicz M, et al. Atopic Dermatitis in America Study: A Cross-Sectional Study Examining the Prevalence and Disease Burden of Atopic Dermatitis in the US Adult Population. J Invest Dermatol. 2019;139(3):583-590.
4. Chung J, Simpson EL. The socioeconomics of atopic dermatitis. Ann Allergy Asthma Immunol. 2019;122(4):360-366.
5. Croce EA, Levy ML, Adamson AS, Matsui EC. Reframing racial and ethnic disparities in atopic dermatitis in Black and Latinx populations. J Allergy Clin Immunol. 2021;148(5):1104-1111.
6. Abuabara K, Yu AM, Okhovat JP, Allen IE, Langan SM. The prevalence of atopic dermatitis beyond childhood: A systematic review and meta-analysis of longitudinal studies. Allergy. 2018;73(3):696-704.
7. Lee HH, Patel KR, Singam V, Rastogi S, Silverberg JI. A systematic review and meta-analysis of the prevalence and phenotype of adult-onset atopic dermatitis. J Am Acad Dermatol. 2019;80(6):1526-1532.e7.
8. Schuler CF 4th, Tsoi LC, Billi AC, Harms PW, Weidinger S, Gudjonsson JE. Genetic and Immunological Pathogenesis of Atopic Dermatitis. J Invest Dermatol. 2024;144(5):954-968.
9. Choragudi S, Yosipovitch G. Trends in the Prevalence of Eczema Among US Children by Age, Sex, Race, and Ethnicity From 1997 to 2018. JAMA Dermatol. 2023;159(4):454–456. doi:10.1001/jamadermatol.2022.6647
10. Lee W, Chaudhary F, Agrawal DK. Environmental Influences on Atopic Eczema. J Environ Sci Public Health. 2024;8(2):101-115.
11. Irvine AD, Mina-Osorio P. Disease trajectories in childhood atopic dermatitis: an update and practitioner's guide. Br J Dermatol. 2019;181(5):895-906.
12. Wan J, Mitra N, Hoffstad OJ, Yan AC, Margolis DJ. Longitudinal atopic dermatitis control and persistence vary with timing of disease onset in children: A cohort study. J Am Acad Dermatol. 2019;81(6):1292-1299.
13. McCleary KK. More Than Skin Deep "Voice of the Patient" Report.; 2020.
14. Simpson EL, Bieber T, et al. Patient burden of moderate to severe atopic dermatitis (AD): Insights from a phase 2b clinical trial of dupilumab in adults. J Am Acad Dermatol. 2016;74(3):491-498.
15. Bacci E, Rentz A, Correll J, et al. Patient-Reported Disease Burden and Unmet Therapeutic Needs in Atopic Dermatitis. J Drugs Dermatol. 2021;20(11):1222-1230.
16. Maarouf M, Kromenacker B, Capozza KL, et al. Pain and Itch Are Dual Burdens in Atopic Dermatitis. Dermatitis. 2018;29(5):278-281.
17. Huet F, Shourick J, Séité S, Taïeb C, Misery L. Pain in Atopic Dermatitis: An Online Population-based Survey. Acta Derm Venereol. 2020;100(14):adv00198.
18. Simpson EL, Guttman-Yassky E, Margolis DJ, et al. Association of Inadequately Controlled Disease and Disease Severity With Patient-Reported Disease Burden in Adults With Atopic Dermatitis. JAMA Dermatol. 2018;154(8):903-912.

19. Wei W, Anderson P, et al. Extent and consequences of inadequate disease control among adults with a history of moderate to severe atopic dermatitis. J Dermatol. 2018;45(2):150-157.
20. Stingeni L, Belloni Fortina A, Baiardini I, Hansel K, Moretti D, Cipriani F. Atopic Dermatitis and Patient Perspectives: Insights of Bullying at School and Career Discrimination at Work. J Asthma Allergy. 2021;14:919-928.
21. Bjerre, R.D.; Bandier, J.; Skov, L.; Engstrand, L.; Johansen, J.D. The role of the skin microbiome in atopic dermatitis: A systematic review. Br.J.Dermatol. 2017, 177, 1272–1278.
22. Natarelli, N.; Gahoonia, N.; Sivamani, R.K. Bacteriophages and the microbiome in dermatology: The role of the phageome and a potential therapeutic strategy. Int. J. Mol. Sci. 2023, 24, 2695.
23. Khadka, V.D.; Key, F.M.; Romo-González, C.; Martínez-Gayosso, A.; Campos-Cabrera, B.L.; Gerónimo-Gallegos, A.; Lynn, T.C.; Durán-McKinster, C.; Coria-Jiménez, R.; Lieberman, T.D.; et al. The skin microbiome of patients with atopic dermatitis normalizes gradually during treatment. Front. Cell Infect. Microbiol. 2021, 11, 720674.
24. Nakatsuji, T.; Hata, T.R.; Tong, Y. et al. Development of a human skin commensal microbe for bacteriotherapy of atopic dermatitis and use in a phase 1 randomized clinical trial. Nat. Med. 2021, 27, 700–709.
25. Maura, D.; Elmekki, N.; Goddard, C.A. The ammonia oxidizing bacterium Nitrosomonas eutropha blocks T helper 2 cell polarization via the anti-inflammatory cytokine IL-10. Sci. Rep. 2021, 11, 14162.
26. Napolitano, M.; Fabbrocini, G.; Martora, F.; Picone, V.; Morelli, P.; Patruno, C. Role of Aryl Hydrocarbon Receptor Activation in Inflammatory Chronic Skin Diseases.Cells 2021,10,3559.
27. Belkaid Y, Hand TW. Role of the microbiota in immunity and inflammation. Cell. ElsevierB.V
28. Zachariassen LF, Krych L, Engkilde K, et al Sensitivity to oxazolone induced dermatitis is transferable with gut microbiota in mice. Sci Rep;
29. Mazmanian SK, Round JL, Kasper DL. A microbial symbiosis factor prevents intestinal inflammatory disease. Nature; 2008;453:620
30. Barr JJ, Auro R, Furlan M, et al Bacteriophage adhering to mucus provide a non host derived immunity. Proc Natl Acad Sci USA; 2013;110:10771–6.51.
31. Virgin HW. The virome in mammalian physiology and disease. Cell. Elsevier B.V.;2014;157:142–50.
32. Podlesny D, Fricke WF. Microbial Strain Engraftment, Persistence and Replacement after Fecal Microbiota Transplantation. https://doi.org/10.1101/2020.09.29.20203638
33. Podlesny D, Arze C, Dörner E, et al. Metagenomic strain detection with Same Str:dentification of a persisting core gut microbiota transferable by fecal transplantation. Microbiome; 2022;10(1):1-13.
34. Hildebrand F, Gossmann TI, Frioux C, et al Dispersal strategies shape persistence and evolution of human gut bacteria. Cell Host Microbe; 2021;29:1167–76.
35. Litvak Y, Bäumler AJ. The founder hypothesis: A basis for microbiota resistance, diversity intaxa carriage, and colonization resistance against pathogens. PLoS Pathog; 2019;15(2):14.
36. Fassarella M, Blaak EE, Penders J, et al. Gut microbiome stability and resilience: Elucidating the response to perturbations in order to modulate gut health. Gut. BMJ Publishing Group;2021:70:595–605.
37. McBurney MI, Davis C, Fraser CM, et al. Establishing What Constitutes a Healthy Human Gut Microbiome: State of the Science, Regulatory Considerations, and Future Directions. Journal of Nutrition. Oxford University Press; 2019;149:1882–95.
38. Watson AR, Füssel J, Veseli I, et al. Adaptive ecological processes and metabolic independence drive microbial colonization and resilience in the human gut. Available from: https://doi.org/10.1101/2021.03.02.433653

39. 39.Biesalski HK. Nutrition meets the microbiome: micronutrients and the microbiota. Ann N YAcad Sci. 2016;1372(1):53–64.
40. Fecal microbiota transplantation for the treatment of chronic inflammatory skin diseases. Science direct. Com. Received 15 April 2024, Revised 2 September 2024. Version of Record 12 September 2024.
41. Y. Belkaid, O.J. Harrison. Homeostatic immunity and the microbiota
42. C.A. Lozupone, et al. Diversity, stability and resilience of the human gut microbiota Structure, function and diversity of the healthy human microbiome
43. J.S. Bajaj, S.C. Ng, B. Schnabl. Promises of microbiome-based therapie
44. J. Mashiah, et al. Clinical efficacy of fecal microbial transplantation treatment in adults with moderate-to-severe atopic dermatitis
45. Silverberg JI, Gelfand JM, Margolis DJ, et al. Pain Is a Common and Burdensome Symptom of Atopic Dermatitis in United States Adults. J Allergy Clin Immunol Pract. 2019;7(8):2699-2706.e7.
46. Vakharia PP, Chopra R, Sacotte R, et al. Burden of skin pain in atopic dermatitis. Ann Allergy Asthma Immunol. 2017;119(6):548-552.e3.
47. Weidinger S, Beck LA, et al. Atopic dermatitis. Nat Rev Dis Primers. 2018;4(1):1.
48. Wollina U. Microbiome in atopic dermatitis. Vol. 10, Clinical, Cosmetic and Investigational Dermatology. Dove Medical Press Ltd.; 2017:51–6.
49. Grehan MJ, Borody TJ, Leis SM, et al. Durable Alteration of the Colonic Microbiota by the Administration of Donor Fecal Flora. J Clin Gastroenterol: 2010;44:551-561.
50. Cecile Verdier, Sylvain Denis, Cyrielle Gasc, et al. An Oral FMT Capsule as Efficient as an Enema for Microbiota Reconstruction Following Disruption by Antibiotics, as Assessed in an In Vitro Human Gut Model. Microorganism; 2021;9(2):1-19.
51. Wang JW, Kuo CH, Kuo FC, et al. Fecal microbiota transplantation: Review and update. Journal of the Formosan Medical Association. Elsevier B.V.; 2019;118:23–31.
52. Zhihao Qu, Peijun Tian, Bo Yang, et al. Fecal microbiota transplantation for diseases: Therapeutic potential, methodology, risk management in clinical practice. Elsevier. 2022;304.
53. Penders J, Thijs C, Van Den Brandt PA, et al. Gut microbiota composition and development of atopic manifestations in infancy: The KOALA birth cohort study. Gut; 2007;56(5):661–7.
54. Lee E, Lee SY, Kang MJ, et al. Clostridia in the gut and onset of atopic dermatitis via eosinophilic inflammation. Annals of Allergy, Asthma and Immunology; 2016;117(1):91-2.
55. Park DH, Kim JW, Park HJ, et al. Comparative analysis of the microbiome across the gut–skin axis in atopic dermatitis. International Journal of Molecular Sciences. MDPI; 2021;22(8):1-13.
56. Nowrouzian FL, Lina G, Hodille E, et al. Superantigens and adhesins of infant gut commensal Staphylococcus aureus strains and association with subsequent development of atopic eczema. British Journal of Dermatology; 2017;176(2):439– 45.
57. Moniaga CS, Tominaga M, Takamori K. An Altered Skin and Gut Microbiota Are Involved in the Modulation of Itch in Atopic Dermatitis. Cells; 2022;11(23).
58. Marrs T, Flohr C. The role of skin and gut microbiota in the development of atopic eczema. Vol. 175, British Journal of Dermatology. Blackwell Publishing Ltd; 2016:13–8.
59. Hamilton MJ, Weingarden AR, Unno T, et al. High-throughput DNA sequence analysis reveals stable engraftment of gut microbiota following transplantation of previously frozen fecal bacteria. Gut Microbes; 2013;4(2):125–35.
60. Ural K. Fecal microbiota transplantation capsule therapy via oral route for combatting atopic dermatitis in dogs. Ankara Universitesi Veteriner Fakultesi Dergisi; 2022;69(2):211–9.
61. Caroline F. Moeser. Trial of Fecal Microbial Transplantation for the Prevention of Canine Atopic Dermatitis. International Journal of Animal and Veterinary Sciences;2021;15(9):1–5.
62. Nutrition. Oxford University Press; 2019;149:1882–95.

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ATOPIC DERMATITIS IN THE ERA OF INNOVATIONS

(Reviewing and exploring modern research and literature on treatment of atopic dermatitis with microbial transplantation)

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SUMMARY

Atopic dermatitis is a chronic inflammatory skin disease with growing global prevalence, affecting both children and adults. It is characterized by immune system dysregulation, skin barrier dysfunction, and a complex interplay between genetic and environmental factors. Conventional treatments, such as topical corticosteroids, calcineurin inhibitors, and biologics, focus on symptom management but do not agree the underlying causes. This has led to an increasing interest in alternative approaches, including microbiome-targeted therapies. Fecal microbiota transplantation (FMT) has emerged as a novel therapeutic strategy for atopic dermatitis by restoring gut microbiota diversity and modulating immune responses through the gut-skin-axis. Recent studies suggest that dysbiosis plays a crucial role in atopic dermatitis pathogenesis, contributing to systemic inflammation and disease severity. FMT has shown potential in improving atopic dermatitis symptoms by rebalancing gut microbiota, enhancing regulatory immune pathways, and reducing inflammatory cytokine production. Clinical trials have demonstrated promising efficacy, but challenges remain regarding standardization, donor selection, and long-term safety.

This review explores the epidemiology of atopic dermatitis, the immunological mechanisms of FMT, and its potential as a cost-effective treatment. Given its affordability and potential long-term benefits, FMT could provide an accessible alternative to expensive biologic therapies. With further research and regulatory advancements, integrating FMT into dermatological practice could offer a transformative solution for atopic dermatitis management, improving patient outcomes and reducing the burden on healthcare systems.

Keywords: atopic dermatitis, innovations, literature review

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MICRO-RNA-S AS MEDIATORS IN DEVELOPMENT OF PSORIASIS

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Doi: https://doi.org/10.52340/jecm.2025.03.03

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მიკრო-რნმ - შუამავალი ფსორიაზის განვითარებაში

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რეზიუმე

ფსორიაზი წარმოადგენს ქრონიკულ ანთებად დაავადებას, რომელსაც საფუძვლად უდევს ეპიგენეტიკურ-იმუნოლოგიური მექანიზმების რთული ურთიერთქმედება. მიუხედავად იმისა, რომ ფსორიაზის ზოგიერთი იმუნოლოგიური მექანიზმი შესწავლილია, დაავადების მთავარი გამომწვევი და წარმმართველი ფაქტორი ჯერ-ჯერობით კვლავ უცნობი რჩება. არაკოდირებადი რნმ-ების აღმოჩენამ და გენის ექსპრესიის რეგულაციაში მათი როლის აღწერამ გამოავლინა მათი მნიშვნელობა სხვადასხვა დაავადების პათოგენეზში, მათ შორის, ფსორიაზის დროსაც. მოცემულ ნაშრომში განვიხილავთ ფსორიაზის შემთხვევაში მიკრო-რნმ-თა შეცვლილი ექსპრესიის როლს. ასევე, მიმოვიხილავთ არსებულ ინფორმაციას ფსორიაზის დროს კონკრეტული მიკრო-რნმ-ების მომატებული ან დაქვეითებული (miR-21, miR-31, miR-99a, miR-125b, miR-155, miR-203) დონის გავლენის შესახებ დაავადების სხვადასხვა ეტაპსა და პროცესზე. კონკრეტულად კი, მათ მნიშვნელობას ანთებისა და კერატინოციტების პროლიფერაციის გაძლიერებასა და კერატინოციტების დარღვეულ დიფერენცირებაში, რაც არის ფუნდამენტური პათოგენეზური ფაქტორები ფსორიაზის დროს. აღწერილია მოცირკულირე მიკრო-რნმ-თა დონის კორელაცია დაავადების სიმძიმესთან, რაც აქტუალურს ხდის პოტენციურ ბიომარკერებად მათი გამოყენების შესაძლებლობას.

Introduction: Psoriasis is a common, chronic, immune-mediated inflammatory disease with a complex and not fully understood pathogenesis. According to the latest global data (2019), psoriasis affects approximately 0.53% of the world's population, equating to roughly 5.3 cases per 1,000 people, with the highest prevalence among individuals aged 40–64 [23]. Psoriasis presents in multiple subtypes, broadly categorized into non-pustular and pustular forms. Non-pustular psoriasis includes chronic plaque psoriasis (psoriasis vulgaris - the most common type of psoriasis), guttate psoriasis, inverse (flexural) psoriasis, erythrodermic psoriasis, nail psoriasis and psoriatic arthritis (PsA). Pustular psoriasis can be further divided into localized (acrodermatitis continua of hallopeau and palmoplantar pustulosis/Barber type) and generalized forms (von Zumbusch psoriasis) [20].

While non-pustular psoriasis typically presents as sharply demarcated erythematous plaques or papules with silvery-white scales (with variations depending on the subtype), pustular psoriasis is characterized by sterile pustules with distinct distribution patterns. Although both groups share some histopathological features, such as epidermal hyperplasia (acanthosis), parakeratosis, neutrophil accumulation (much more prominent in pustular forms), dilated blood vessels in the dermal papillae, and Munro's microabscesses (more common in plaque psoriasis), they can exhibit key differences [15]. After describing the immunological changes in psoriasis, it became clear that the immunological basis also differs between these two types of disease. While specific immunological mechanisms of pustular psoriasis have been characterized, the current research on the role of microRNAs (miRNAs) in psoriasis derives predominantly from studies on plaque psoriasis. This paper will, therefore, focus on examining microRNAs (miRNAs) in this subtype.

Immunopathogenesis of psoriasis: Current evidence indicates that psoriasis is a multifactorial disease arising from a combination of genetic predisposition (e.g., HLA-Cw6, HLA-Cw1, HLA-Cw12, and others), immune dysfunction, and environmental triggers (e.g., injuries, infections, stress, smoking, and certain medications). While the exact mechanisms linking these factors to immune dysfunction in psoriasis are still under investigation, it is established that they collectively drive immune cell recruitment and activation [17].

The characteristic histopathological changes observed in psoriasis are excessive proliferation, aberrant differentiation of epidermal keratinocytes, along with immune cell infiltration. Although the precise role of each immune cell requires further investigation, well-known immune cells involved in psoriasis include keratinocytes, dendritic cells, T-lymphocytes, neutrophils, and mast cells [25].

To understand the dynamic interplay of these immune cells, Sabat et al. divided the disease process into three phases: a sensitization phase, a silent phase, and an effector phase [19].

In response to some stimuli (infection/medication/trauma), keratinocytes become activated/stressed and release cytokines. Simultaneously, they secrete antimicrobial peptides (AMPs) - a group of small molecules involved in the innate immune response against pathogens, including bacteria, viruses, fungi, and parasites. Composed of 12-50 amino acids, AMPs possess broad-spectrum antimicrobial activity. LL37 binds to DNA/RNA nucleic acids, forming complexes among these. Along with LL37, ADAMTS-like protein-5 has also been identified as a psoriatic auto-antigen that is selectively expressed by injured epidermal melanocytes [4,17,25].

During the sensitization phase, in which no clinical symptoms are visible, formation of keratinocyte-derived antimicrobial peptide-nucleic acid complexes and pro-inflammatory cytokines trigger two activation pathways: (1) Type I interferons (IFN-α/γ) production through Toll-like receptors (TLR9 and TLR7) stimulation on plasmacytoid DCs (pDCs), and (2) TNF-α and IL-6 secretion via activation and maturation of myeloid DCs (mDCs) into fully functional dendritic cells through secretion of IFN-γ, TNF-α, IL-1ß, and IL-6 by keratinocytes, macrophages and other innate immune cells. Mature dendritic cells migrate to lymph nodes, presenting antigens to naïve T-cells. Through the expression of co-stimulatory molecules on their surface (e.g., CD80/CD86) and secretion of various cytokines (e.g., IL-12 for Th1; IL-6, TGF-β, IL-1β, and IL-23 for Th17; IL-6 and TNF-α for Th22), they drive the differentiation of T-cells into mature Th1, Th17, and Th22 subsets [4,19].

Regardless of the specific T-helper cell subtypes a naïve T cell differentiates into, its activation leads to the formation of distinct memory populations. While differentiation, otherwise named polarization of T-cells, determines the T cell's cytokine profile, the formation of memory T-cells determines the T cell's long-term behavior. In this sense, naïve T cells can produce an effector T cell, an effector memory T cell, or a central memory T cell. Effector T cells are short-lived, rapidly produces cytokines, and die after the immune response ends. Effector memory T cells circulate in the blood or peripheral tissue and quickly reactivate upon reexposure to antigen. Central memory T cells mainly recirculate between blood and lymph nodes, exhibit a long lifespan, and retain strong proliferative capacity [1,19].

During the silent phase, activated T cells migrate to the skin, some of them converting into tissue-resident memory T cells. These cells persist long-term and create chronic inflammatory milieu in both lesional and perilesional sites of psoriasis that is susceptible to activation [1,13,19].

During the effector phase, migrated T-cells release distinct cytokines. Activated Th1 cells produce IFN-γ, TNF-α, and IL-2; Th17 cells secrete IL-17A, IL-17F, IL-22, and TNF-α; Th22 cells predominantly release IL-22 and TNF-α. These cytokines act on keratinocytes, stimulating them, which leads to

proliferation, altered differentiation, and cellular stress, further promoting additional cytokine release. The IL-23/IL-17A axis was identified as a key driver factor in the development of psoriasis [4,19].

Consequently, elevated levels of pro-inflammatory cytokines (IL-6, IL-23, and IL-1β) disrupt Treg differentiation and stability, shifting the immune balance toward pathogenic Th17 responses, thereby exacerbating inflammation and autoimmunity. This Th17/Treg imbalance creates a chronic, self-reinforcing inflammatory loop and facilitates psoriatic plaque formation [25].

Epigenetic changes in psoriasis: After exploring the roles of genetics and environmental factors in the development of psoriasis, researchers are now investigating their interplay, particularly how environmental influences modify immune-related gene function through epigenetic mechanisms. Well-known epigenetic modifications include DNA methylation/demethylation, histone modifications, and changes regulated by non-coding RNAs, specifically microRNAs [16]. This paper will focus on the role of different microRNAs in the development of the disease.

MicroRNAs (miRNAs) are small non-coding RNAs, approximately 22 nucleotides long, that regulate gene expression post-transcriptionally. More than 2,500 microRNAs have been identified in humans from the microRNA database 2019. They function by targeting messenger RNAs (mRNAs), modulating their translation efficiency and/or stability via RNA-induced silencing complex and, therefore, regulating various biological processes, including developmental timing, cell death, cell proliferation, haematopoiesis, and nervous system patterning [8].

Current research has identified around 250 dysregulated miRNAs in psoriasis that contribute to disease pathogenesis by regulating cell growth, modulating keratinocyte proliferation, their differentiation, immune responses, cytokine production, as well as the activation of different T cells and regulation of Th1/Th2 balance [6,14]. Circulating miRNAs in psoriasis may also serve as potential biomarkers based on the fact that their different levels showed correlations with PASI (Psoriasis Area Severity Index) scores, therefore, disease severity [2,11].

A standardized classification system for miRNAs has not yet been established, primarily due to an incomplete understanding of their diverse functions. The current categorization of miRNAs in psoriasis often focuses on their functional roles, such as miRNAs regulating keratinocyte proliferation, their differentiation or inflammatory processes. However, this classification faces limitations because many miRNAs exhibit overlapping roles; a single miRNA may regulate both keratinocyte proliferation and inflammatory pathways (e.g., miR-31 enhances both processes in psoriasis).

Given this complexity, dysregulated miRNAs in psoriasis are often classified pragmatically by their expression levels, such as upregulated miR-21 or downregulated miR-125b-5p.

One of the most extensively studied miRNAs in psoriasis is miR-21, the expression level of which is increased in psoriatic plaques, dermal T-cells, and blood samples. It plays a significant role in cell proliferation, differentiation, apoptosis, and migration. By binding to CASP8 (caspase-8) mRNA, miR-21 inhibits cell apoptosis, promoting keratinocyte hyperproliferation [7].

Furthermore, miR-21 suppresses SMAD7 (the 7th member of the SMAD family), resulting in an elevated level of TGF-β1 (transforming growth factor-β1), which induces differentiation of naïve T-cells into Th17 cells and production of IL-17 [12]. TGF-β1 can further stimulate miR-21 transcription, creating a self-amplifying loop [5].

Elevated miR-21 also contributes to inflammation by downregulating epidermal TIMP-3 (tissue inhibitor of matrix metalloproteinase-3), thereby enhancing TNF-α secretion by keratinocytes and promoting inflammation. Interestingly, TNF-α by itself increases miR-21 transcription by triggering STAT3 (signal transducer and activator of transcription 3) [26].

Another well-studied microRNA is miR-31, which is overexpressed in psoriatic lesions. It targets PPP6C (protein phosphatase 6) and FIH-1 (factor-inhibiting hypoxia-inducible factor 1). PPP6C is a negative cell cycle regulator, and by inhibiting this gene, miR-31 contributes to keratinocyte proliferation and epidermal hyperplasia. Along with that, high levels of miR-31 repress STK40 (serine/threonine kinase 40), a negative regulator of the NF-kB (nuclear factor-kB) signaling pathway, therefore activating keratinocyte hyperproliferation and release of pro-inflammatory cytokines, such as TNF-α, IL-1ß, IL-6, IL-8, IL-17, IL-23. The inflammatory cytokines themselves activate NF-kB signaling and induce miR-31. These cytokines also affect keratinocytes, leading to their activation [26,28].

The functional role of miR-31 appears complex, with evidence supporting its involvement in keratinocyte proliferation and differentiation. However, its effects appear context-dependent. On the one hand, miR-31 may promote keratinocyte differentiation by downregulating FIH-1, stabilizing HIF-1α (hypoxia-inducible factor), and modulating the Notch signaling pathway. On the other hand, miR-31 overexpression exacerbates psoriasis by activating the STAT3/p53 axis, thereby suppressing apoptosis and promoting disease progression [18,26].

Another miRNA involved in psoriasis pathogenesis is miR-155. MiR-155 level is significantly increased in psoriasis skin lesions and peripheral blood mononuclear cells (PBMCs). Increased expression of miR-155 in PBMCs appears to correlate with PASI and disease severity [3]. Overexpression of miR-155 inhibits PTEN (phosphatase and tension homolog), accumulating PIP3 (phosphatidylinositol-3,4,5-trisphosphate), which subsequently enhances AKT (protein kinase B) activity, resulting in suppressed apoptosis and increased keratinocyte proliferation [26]. MiR-155 was shown to potentially play a role in psoriasis development by increasing the inflammatory response via the NF-kB pathway [10]. MiR-155 targets CTLA4 (cytotoxic T lymphocyte-associated antigen 4), disrupting its immune-inhibitory function and promoting T-cell hyperactivation. This contributes to an inflammatory milieu favouring Th17 differentiation. Additionally, miR-155 drives Th17 cell polarization through direct suppression of SOCS1 (suppressor of cytokine signaling 1), a negative regulator of the JAK-STAT signaling pathway. By inhibiting SOCS1, miR-155 enhances STAT3 activation, further amplifying IL-17 production and exacerbating psoriatic inflammation [29].

Another keratinocyte-derived microRNA, miR-203, is significantly upregulated in psoriasis. Through inhibition of SOCS3, miR-203 activates STAT3 signaling - a key pathway regulating keratinocyte proliferation, differentiation, and inflammatory responses. Activation of STAT3 triggers overexpression of IL-6, TNF-ß, and EGFR (epidermal growth factor receptor), ultimately leading to apoptosis suppression, uncontrolled keratinocyte accumulation, and sustained inflammation [14].

Notably, miR-203 expression is further amplified by pro-inflammatory cytokines (IL-1α, IL-17A, IL-6, TNF-α), creating a loop that exacerbates psoriatic pathology. An additional mechanism of miR-203 is directly targeting tumor protein 63 (p63), a p53 family member essential for stem-cell maintenance. Repression of p63 by miR-203 contributes to aberrant keratinocyte proliferation [30].

Several other upregulated miRNAs in psoriasis show promising results as biomarkers for disease severity. Løvendorf et al. revealed that miR-223 and miR-143 could serve as potential systemic biomarkers in psoriasis because of their higher expression levels in PBMCs of psoriasis patients compared to healthy controls. Additionally, both miRNAs positively correlation with PASI scores, indicating their potential as disease severity markers [11]. Feng et al. studied miR-126 and concluded that upregulated miR-126 in lesional skin tissue promotes hyperproliferation of keratinocytes and inflammation in psoriasis correlating with increased disease risk and severity [2]. MiR-1266 could also be a potential biomarker, as its high serum levels were inversely correlated with psoriasis severity index (PASI) and BSA [21]. One study

discovered elevated levels of miR-19a in the hair roots of psoriatic patients and concluded that this microRNA could serve as a disease marker [6].

Several microRNAs that are downregulated in psoriasis have been described. One of the most downregulated microRNAs is miR-125b. It is expressed by resident cells (fibroblasts, keratinocytes, and melanocytes) and targets multiple genes involved in keratinocyte hyperproliferation and inflammation. MiR-125b suppresses FGFR2 (fibroblast growth factor receptor 2). Its downregulation in psoriasis leads to FGFR2 overexpression, driving keratinocyte proliferation [27]. Ferrarese et al. showed that miR-125b targets USP2 (ubiquitin-specific peptidase 2), a negative regulator of keratinocyte proliferation. Reduced miR-125b levels increase USP2, further promoting proliferation [24]. Zheng et al. identified AKT3 (an AKT isoform) as another miR-125b target. The inverse correlation between miR-125b and AKT3 in psoriasis activates the signaling pathway, enhancing keratinocyte proliferation [31].

MiR-99a is also downregulated in psoriasis. In healthy skin, miR-99a regulates the expression of IGF1R (insulin-like growth factor 1 receptor), inhibits keratinocyte proliferation, and promotes its differentiation. In psoriasis, loss of miR-99a leads to IGF1R overexpression, contributing to uncontrolled proliferation and epidermal hyperplasia [9]. Downregulation of miR-99a in psoriasis also results in FZD5/FZD8 overexpression, activating downstream factors β-catenin and cyclinD1, further accelerating keratinocyte proliferation [22].

Conclusion: Understanding the pathogenetic mechanisms of psoriasis is essential for developing targeted therapies that address the root causes of the disease rather than merely alleviating symptoms. Currently, there is lack of unified, objective biomarkers for monitoring, or predicting the recurrence of psoriasis. While the exact pathogenesis of psoriasis remains incompletely understood, emerging evidence suggests that epigenetic and immunological pathways do not operate in isolation but instead interact synergistically, forming a complex self-amplifying inflammatory network that drives disease progression.

MiRNAs have emerged as a key part of psoriasis, in which specific miRNAs have been shown to drive inflammation, promote keratinocyte hyperproliferation and abnormal differentiation. However, the precise mechanism of these miRNAs remains unclear, and no pathognomic miRNAs for psoriasis has yet been identified.

The complexity of disease is determined by several factors. First, different signaling cascades cooperate to alter keratinocyte behavior, sustain inflammation, and dysregulate immune responses. Second, a single miRNA can be regulated by multiple pathways, and one miRNA may influence several disease-relevant processes. Moreover, a single miRNA may exhibit divergent and even opposite functions within the same disease process. This network makes it challenging to identify a primary etiological trigger in psoriasis and highlights the importance of further investigation of the miRNAs spectrum.

References

1. Deng G, Zhang Y, Song J, et al. The role and therapeutic strategies for tissue-resident memory T cells, central memory T cells, and effector memory T cells in psoriasis. Immunology. 2024 Nov;173(3):470-480. doi: 10.1111/imm.13843. PMID: 39136109.
2. Feng S, Wang L, Liu W, et al. MiR-126 correlates with increased disease severity and promotes keratinocytes proliferation and inflammation while suppresses cells' apoptosis in psoriasis. J Clin Lab Anal. 2018 Nov;32(9):e22588. doi: 10.1002/jcla.22588. PMID: 29943471; PMCID: PMC6816918.
3. García-Rodríguez S, Arias-Santiago S, Blasco-Morente G, et al. Increased expression of microRNA-155 in peripheral blood mononuclear cells from psoriasis patients is related to disease activity. J Eur Acad Dermatol Venereol. 2017 Feb;31(2):312-322. doi: 10.1111/jdv.13861. PMID: 27535005.
4. Georgescu SR, Tampa M, et al. Advances in Understanding the Immunological Pathways in Psoriasis. Int J Mol Sci. 2019 Feb; 20(3):739. doi: 10.3390/ijms20030739. PMID: 30744173; PMCID: PMC6387410.

5. Henriet E, Abdallah F, Laurent Y, et al. Targeting TGF-β1/miR-21 Pathway in Keratinocytes Reveals Protective Effects of Silymarin on Imiquimod-Induced Psoriasis Mouse Model. JID Innov. 2022 Dec 16;3(3):100175. doi: 10.1016/j.xjidi.2022.100175. PMID: 36968096; PMCID: PMC10034514.
6. Hirao H, Jinnin M, Ichihara A, et al. Detection of hair root miR-19a as a novel diagnostic marker for psoriasis. Eur J Dermatol. 2013 Nov-Dec;23(6):807-11. doi: 10.1684/ejd.2013.2190. PMID: 24192448.
7. Jia HY., Zhang K., Lu WJ., et al. LncRNA MEG3 influences the proliferation and apoptosis of psoriasis epidermal cells by targeting miR-21/caspase-8. BMC Mol and Cell Biol 20, 46 (2019). https://doi.org/10.1186/s12860-019-0229-9.
8. Jiang X, Shi R, Ma R, et al. The role of microRNA in psoriasis: A review. Exp Dermatol. 2023 Oct;32(10):1598-1612. doi: 10.1111/exd.14871. PMID: 37382420.
9. Lerman G, Avivi C, Mardoukh C, et al. MiRNA expression in psoriatic skin: reciprocal regulation of hsa-miR-99a and IGF-1R. PLoS One. 2011;6(6):e20916. doi: 10.1371/journal.pone.0020916. PMID: 21687694; PMCID: PMC3110257.
10. Li J, Liu Y, Cao Y, et al. Inhibition of miR-155 Attenuates CD14+ Monocyte-Mediated Inflammatory Response and Oxidative Stress in Psoriasis Through TLR4/MyD88/NF-κB Signaling Pathway. Clin Cosmet Investig Dermatol. 2022 Feb 9;15:193-201. doi: 10.2147/CCID.S350711. PMID: 35173453; PMCID: PMC8841268.
11. Løvendorf MB, Zibert JR, Gyldenløve M, et al. MicroRNA-223 and miR-143 are important systemic biomarkers for disease activity in psoriasis. J Dermatol Sci. 2014 Aug;75(2):133-9. doi: 10.1016/j.jdermsci.2014.05.005. PMID: 24909097.
12. Mangan PR, Harrington LE, et al. Transforming growth factor-beta induces development of the T(H)17 lineage. Nature. 2006 May 11;441(7090):231-4. doi: 10.1038/nature04754. PMID: 16648837.
13. Matos TR, O'Malley JT, Lowry EL, et al. Clinically resolved psoriatic lesions contain psoriasis-specific IL-17-producing αβ T cell clones. J Clin Invest. 2017 Nov 1;127(11):4031-4041. doi: 10.1172/JCI93396. PMID: 28945199; PMCID: PMC5663366.
14. Mostafa SA, Mohammad MHS, Negm WA, et al. Circulating microRNA203 and its target genes 'role in psoriasis pathogenesis. Front. Med. 9:988962. doi: 10.3389/fmed.2022.988962.
15. Murphy M, Kerr P, Grant-Kels JM. The histopathologic spectrum of psoriasis. Clin Dermatol. 2007 Nov-Dec;25(6):524-8. doi: 10.1016/j.clindermatol.2007.08.005. PMID: 18021888.
16. Olejnik-Wojciechowska J, Boboryko D, Bratborska AW, et al. The Role of Epigenetic Factors in the Pathogenesis of Psoriasis. Int J Mol Sci. 2024 Mar 29;25(7):3831. doi: 10.3390/ijms25073831. PMID: 38612637; PMCID: PMC11011681.
17. Orzan OA, Tutunaru CV, Ianoși SL. Understanding the Intricate Pathophysiology of Psoriasis and Related Skin Disorders. Int J Mol Sci. 2025 Jan 17;26(2):749. doi: 10.3390/ijms26020749. PMID: 39859462; PMCID: PMC11766135.
18. Peng H, Kaplan N, Hamanaka RB, et al. microRNA-31/factor-inhibiting hypoxia-inducible factor 1 nexus regulates keratinocyte differentiation. Proc Natl Acad Sci U S A. 2012 Aug 28;109(35):14030-4. doi: 10.1073/pnas.1111292109. PMID: 22891326; PMCID: PMC3435188.
19. Sabat R, Philipp S, Höflich C, et al. Immunopathogenesis of psoriasis. Exp Dermatol. 2007 Oct;16(10):779-98. doi: 10.1111/j.1600-0625.2007.00629.x. PMID: 17845210.
20. Sarac G, Koca TT, Baglan T. A brief summary of clinical types of psoriasis. North Clin Istanb. 2016 Jun 14;3(1):79-82. doi: 10.14744/nci.2016.16023. PMID: 28058392; PMCID: PMC5175084.
21. Seifeldin NS, El Sayed SB, Asaad MK. Increased MicroRNA-1266 levels as a biomarker for disease activity in psoriasis vulgaris. Int J Dermatol. 2016 Nov;55(11):1242-1247. doi: 10.1111/ijd.13102. PMID: 27371164.
22. Shen H, Tian Y, Yao X, et al. MiR-99a inhibits keratinocyte proliferation by targeting Frizzled-5 (FZD5) / FZD8 through β-catenin signaling in psoriasis. Pharmazie. 2017 Aug 1;72(8):461-467. doi: 10.1691/ph.2017.7018. PMID: 29441905.
23. Wang, K., Zhao, Y. & Cao, X. Global burden and future trends in psoriasis epidemiology: insights from the global burden of disease study 2019 and predictions to 2030. Arch Dermatol Res 316, 114 (2024). https://doi.org/10.1007/s00403-024-02846-z.

24. Wei T, Folkersen L, et al. Ubiquitin-specific peptidase 2 as a potential link between microRNA-125b and psoriasis. Br J Dermatol. 2017 Mar;176(3):723-731. doi: 10.1111/bjd.14916. PMID: 27479112.
25. Wu M, Dai C, Zeng F. Cellular Mechanisms of Psoriasis Pathogenesis: A Systemic Review. Clin Cosmet Investig Dermatol. 2023 Sep 14;16:2503-2515. doi: 10.2147/CCID.S420850. PMID: 37727872; PMCID: PMC10506593.
26. Xiuli Y, Honglin W (2021) miRNAs Flowing Up and Down: The Concerto of Psoriasis. Front. Med. 8:646796. doi: 10.3389/fmed.2021.646796.
27. Xu N, Brodin P, Wei T, et al. MiR-125b, a microRNA downregulated in psoriasis, modulates keratinocyte proliferation by targeting FGFR2. J Invest Dermatol. 2011 Jul;131(7):1521-9. doi: 10.1038/jid.2011.55. PMID: 21412257.
28. Yan S, Xu Z, Lou F, et al. NF-κB-induced microRNA-31 promotes epidermal hyperplasia by repressing protein phosphatase 6 in psoriasis. Nat Commun. 2015 Jul 3;6:7652. doi: 10.1038/ncomms8652. PMID: 26138368; PMCID: PMC4506511.
29. Yao R, Ma YL, Liang W, et al. MicroRNA-155 modulates Treg and Th17 cells differentiation and Th17 cell function by targeting SOCS1. PLoS One. 2012;7(10): e46082. doi: 10.1371/journal.pone.0046082. PMID: 23091595; PMCID: PMC3473054.
30. Yi R, Poy MN, et al. A skin microRNA promotes differentiation by repressing 'stemness'. Nature. 2008 Mar 13;452(7184):225-9. doi: 10.1038/nature06642. PMID: 18311128; PMCID: PMC4346711.
31. Zheng Y, Cai B, Li X, Li D, Yin G. MiR-125b-5p and miR-181b-5p inhibit keratinocyte proliferation in skin by targeting Akt3. Eur J Pharmacol. 2019 Nov 5; 862:172659. doi: 10.1016/j.ejphar.2019.172659. PMID: 31518563.

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MICRO-RNA-S AS MEDIATORS IN DEVELOPMENT OF PSORIASIS

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SUMMARY

Psoriasis is a chronic inflammatory skin disease driven by complex epigenetic-immunological interactions. Although some immunological mechanisms have been characterized, the primary initiating factor of psoriasis remains elusive. The discovery of non-coding RNAs and their role as gene expression regulators has revealed their critical involvement in the pathogenesis of different diseases, including psoriasis.

This paper examines the contribution of specific dysregulated miRNAs to psoriatic inflammation, focusing on the most upregulated or downregulated (miR-21, miR-31, miR-99a, miR-125b, miR-155, miR-203) species. We discuss how these miRNAs form pathogenic feed-forward loops, that amplify inflammation and sustain keratinocyte dysfunction, which are fundamental factors in psoriasis, The intricate crosstalk between these miRNAs and Th17-associated cytokines (IL-17, IL-23) further complicates the disease network. Finally, we highlight miRNAs as potential biomarkers and therapeutic targets in psoriasis management.

Keywords: psoriasis, epigenetic, miRNAs, immunopathogenesis, biomarkers

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Doi: https://doi.org/10.52340/jecm.2025.03.04

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THE FREQUENCY OF OTOGENIC COMPLICATIONS AT THE MODERN STAGE OF MEDICINE (CASE REPORTS)

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SUMMARY

Acute otitis media (AOM) is one of the most common diseases in the world, especially in children. The incidence of the disease reaches about 80%. Mostly, inflammation of the middle ear is a concomitant condition of acute respiratory viral infection, which, at the same time, can cause many life-threatening complications. Complications of AOM are diverse and are classified as acute and chronic. Acute complications, which are classified as intratemporal and intracranial, are much more unpredictable and have severe consequences. The variety of complications is determined by the anatomical location of the structures of the middle ear. Their proximity to brain tissue, cranial nerves, brain sinuses, and neck muscles. The described cases are quite diverse. The only thing in common is that the AOM was at the forefront of the developing processes. Patients represent a wide age group from 5 to 64 years. One of the presented patients was middle-aged and practically healthy before the onset of OM. The oldest had controlled type II diabetes, and the child had clinical signs of hypertrophy of the nasopharyngeal tonsills and recurrent otitis media in the previous period of the disease. The analysis of the cases allows us to draw the following conclusions: (1) to increase the level of knowledge of specialists who first receive such patients and should give the right direction for further management. (2) to develop new antibacterial therapy regimens for acute otitis media, both in terms of combinations of antibiotic groups and dosage. (3) to provide timely, adequate treatment with assessment of results and drawing the right conclusions. Frequent monitoring, such as, a telephone call is enough especially during the first days. The specialist should consider the moment when myringotomy is indicated.

Keywords: acute otitis media, complications, acute mastoiditis, meningitis.

შესავალი. მწვავე შუა ოტიტი (მშო) მსოფლიოში ერთ-ერთი გავრცელებული დაავადებაა, განსაკუთრებით ბავშვებში. დაავადების სიხშირე დაახლოებით 80%-ს არწევს [5,10]. როგორც წესი, შუა ყურის ანთება მწვავე რესპირატორული ვირუსული ინფექციის თანმდევი მდგომარეობაა, რომელიც, ამავე დროს, ბევრი საშიში გართულების მიზეზი შეიძლება გახდეს. მშო-ს გართულებები მრავალფეროვანია და კლასიფიცირდება მწვავედ და ქრონიკულად.

ქრონიკულ გართულებებს მიეკუთვნება: მუდმივი სმენის დაქვეითება, დაფის აპკის პერფორაცია, ქრონიკული ჩირქოვანი შუა ოტიტი, ტიმპანოსკლეროზი. აღნიშნული დაავადებების მკურნალობა და მონიტორინგი შესაძლებელია. გაცილებით არაპროგნოზირებადი და მძიმე შედეგის მატარებელია მწვავე გართულებები, რომლებიც ინტრატემპორალურად და ინტრაკრანიულურად კლასიფიცირდება (ცხრილი 1).

ცხრილი 1. მწვავე შუა ოტიტის გართულებები

მწვავე შუა ოტიტის გართულებები	
ინტრატემპორალური	**ინტრაკრანიალური**
მასტოიდიტი (ბეცოლდის და ლუცის ფორმები) პეტროზიტი ლაბირინთიტი ზიგომატიციტი სახის ნერვის დამბლა	მენინგიტი ექსტრადურული აბსცესი სუბდურული ემპიემა კეროვანი ენცეფალიტი ტვინის აბსცესი ლატერალური სინუსის თრომბოზი ოტოგენური ჰიდროცეფალია

გართულებათა მრავალფეროვნებას შუა ყურის სტრუქტურების ანატომიური განლაგება განაპირობებს: მათი სიახლოვე ტვინის ქსოვილთან, ქალას ნერვებთან, ტვინის სინუსებთან, კისრის კუნთებთან. ინფექცია ძირითადად სამი გზით ვრცელდება:

1. კონტაქტური;
2. თრომბოფლებიტური;
3. ჰემატოგენური.

ინტრატემპორალური გართულებებიდან ყველაზე ხშირია მწვავე კოალესცენტური მასტოიდიტი (მკმ), რომელიც თავის მხრივ სხვა გართულებების მიზეზი შეიძლება იყოს. მკმ-ის გართულების სიხშირე 38%-ს უტოლდება [6,8].

მშო-ს გართულების განვითარების საყოველთაოდ მიღებული ხელშემწყობი ფაქტორებია:

1. არარაციონალური ანტიბიოტიკოთერაპია;
2. იმუნოდეფიციტური მდგომარეობა;
3. ინფექციის მაღალი ვირულენტობა.

ამავე დროს, რისკ ჯგუფში მოიაზრებიან შემდეგი პაციენტები:

1. 48 საათიანი ანტიბიოტიკოთერაპიის შემდეგ არანაირი დადებითი დინამიკა არ აღენიშნებათ.
2. 15 თვეზე უმცროსი ბავშვები.
3. როცა ანთებას ვირუსული ინფექცია ახლავს.
4. პაციენტები, რომლებსაც ამამნეზში მორეციდივე ოტიტები აქვთ.
5. მშო მოავადეები ზამთრის პერიოდში [9].

კიდევ ერთი საყოველთაოდ მიღებული თეზისია, რომ მშო-ს გართულებები უფრო ხშირია ბავშვებში (0.26%) [4], რაც განპირობებულია ევსტაქის მილის ანატომიით, უფრო ხშირი ავადობით. თუმცა აქვე უნდა აღინიშნოს, რომ ბოლო წლებში მოზრდილებში გართულებების სიხშირე მომატებულია და უფრო ცუდად ექვემდებარება ანტიბაქტერიულ თერაპიას, ქირურგიულ ჩარევას და სტაციონარში ხანგრძლივ მკურნალობას საჭიროებს. შემთხვევათა ნაწილში გამოსავალი პესიმისტურია.

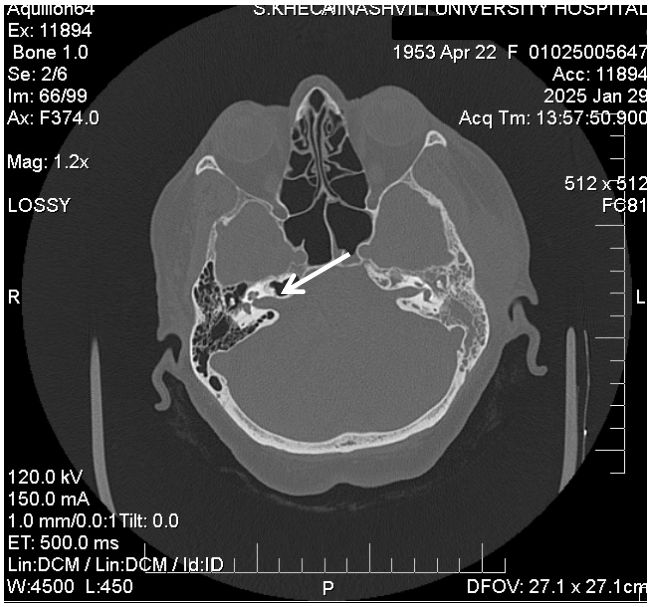
ამავე დროს, ბოლო წლების გამოცდილებამ გვიჩვენა, რომ მოზრდილთა პოპულაციაში პაციენტების დიდი ნაწილი გართულების ჩამოყალიბებამდე სომატურად ჯანმრთელები იყვნენ. მშო-მდე არც რომელიმე ქრონიკული დაავადების მატარებლები და არც მრვი-ით ხშირად მოავადენი იყვნენ. უმეტესობა მდგომარეობის დამძიმებამდე ადეკვატურ ანტიმიკრობულ მკურნალობას იღებდა.

მშო-ის გართულებებით მიმდინარე სამ შემთხვევას წარმოგიდგენთ, რაც საშუალებას მოგვცემს ვიმსჯელოთ მიზეზებზე, რომლებიც პროცესის დამძიმებას და შესაბამისად მკურნალობის და გამოსავლის გართულებას განაპირობებს.

კლინიკური შემთხვევების აღწერა.

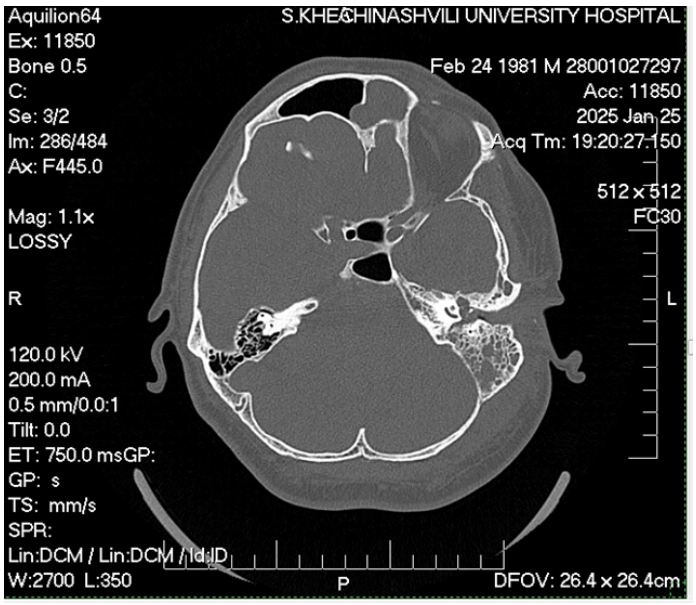
შემთხვევა 1. პაციენტი 5 წლის, კლინიკის გადაუდებელი მედიცინის განყოფილებაში შემოვიდა მაღალი ცხელებით (40°-მდე), სომნოლენტური, მარჯვენა ყურის ტკივილით, მარჯვენა თვალის გარე სიელმით. ანამნეზიდან საგულისხმოა, რომ დაახლოებით 1.5 თვის წინ მარჯვენა ყურის ტკივილის გამო ადეკვატური მკურნალობა არ ჩაუტარდა. ყურის წვეთების ხმარების შედეგად ტკივილი შეწყდა. ჩაითვალა, რომ ბავშვი გამოჯანმრთელდა. ანამნეზიდან ბოლომდე გასაგები არ არის უფრო შორეული ისტორია. ქალას ძვლების კტ კვლევით შემდეგი სურათი გამოვლინდა: მარჯვენა დაფის ღრუ, დვრილისებრი მორჩის უჯრედები და საფეთქლის პირამიდის ჰაეროვანი უჯრედები ამოვსებულია ანთებითი მუკოზური შიგთავსით. რეტროაურიკულარულად, ეპიდურულად ვლინდება 11 მმ სიგრძივი ზომის და 8 მმ სისქის, ხოლო დვრილისებრი მორჩის წინ, ეპიდურულად 13 მმ სიგრძივი და 6 მმ სისქის კონტრასტირებადი ბლანტსითხოვანი უბნები, რომლებიც ეპიდურულ აბსცესს შეესაბამება. ჩატარებული კვლევების საფუძველზე დაისვა შემდეგი დიაგნოზი: მწვავე მასტოიდიტი, პეტროზიტი, მენინგიტი, ეპიდურული აბსცესი.

შემთხვევა 2. პაციენტი 64 წლის, შემოვიდა კლინიკაში შემდეგი ჩივილებით: სმენის დაქვეითება, ტკივილი მარცხენა ყურის სახურის წინ მდებარე არეში, შეშუპება მოიცავდა არეს სახურიდან ყვრიმალის მორჩის მიმართულებით. კლინიკაში მოხვედრიდან რამდენიმე დღით ადრე ყურიდან ჩირქდენა დაეწყო, რამაც ტკივილის ინტენსივობა შეამცირა. პაციენტს პირველად ყურის ტკივილის და შესაბამისად შუა ყურის ანთების ეპიზოდი აღენიშნა 2 წლის წინ. ჩატარებული ანტიბიოტიკოთერაპიის შედეგად მწვავე ანთებითი ჩივილები ჩაცხრა, თუმცა სმენის დაქვეითება დარჩა. სმენის გარდა პაციენტი აღნიშნავდა პერიოდულად ყრუ, გარდამავალ ტკივილს ყურის არეში. მწვავე ანთებიდან რამდენიმე თვის შემდეგ გაკეთდა საფეთქლის ძვლის კტ კვლევა, რომელმაც მარცხენა დვრილისებრი მორჩის დაჩრდილვა აჩვენა. მკურნალმა ექიმმა ამ ფაქტს ყურადღება არ მიაქცია. კლინიკაში შემოსვლამდე 1 თვით ადრე პაციენტს შეუსივდა ყვრიმალის და სახურს შორის არე და ძლიერი ტკივილი დაეწყო. პაციენტი მივიდა ყბა-სახის ქირურგთან. ჩაუტარდა ექოსკოპია და ციტოლოგია. ორივე კვლევამ ჩირქის არსებობა აჩვენა. არსებული მონაცემების და კტ კვლევის საფუძველზე დაისვა ლუკს აბსცესის დიაგნოზი, რაც მასტოიდიტის ერთ-ერთი იშვიათი გართულებაა და საფეთქლის კუნთის ზედაპირზე ჩირქის დაგროვებას გულისხმობს (სურ.1).



სურ.1. მარცხნივ დაფის ღრუ, ანტრუმი, საფეთქლის პირამიდის და დვრილისებრი მორჩის უჯრედები სრულად დაჩრდილულია. დვრილისებრი მორჩის გარეთა ზედაპირის გასწვრივ რბილი ქსოვილები შეშუპებული.

შემთხვევა 3. პაციენტი შემოვიდა კლინიკაში გადაუდებელი თერაპიის განყოფილებაში შემდეგი ჩივილებით: მაღალი ცხელება (40-მდე), მარცხენა ყურის უკანა არეში შეშუპება, ჰიპერემია, პალპაციით ტკივილი, ყურის ნიჟარის მნიშვნელოვანი წინ წამოწევა, შეშუპება გრძელდებოდა დვრილისებრი მორჩის მწვერვალიდან მკერდლავიწ დვრილისებრი მორჩის გასწვრივ კისრის მიმართულებით. კისრის მარცხენა ნახევარი მთლიანად მნიშვნელოვნად შეშუპებული ლავიწამდე. კანი ჰიპერემიული, პალპაციით მტკივნეული, მკვრივი. პაციენტი თავს ვერ ამოძრავებდა, თავის იძულებითი მდებარეობა ჰქონდა. ამავე დროს პაციენტს ყლაპვა უჭირდა, ვინაიდან ხახის ლატერალური ზედაპირი იყო შეშუპებული, პალპაციით მტკივნეული. კტ კვლევით პროცესი მნიშვნელოვნად სცილდებოდა შუა ყურის ანატომიურ სტრუქტურებს (სურ.2). პაციენტს შესაბამისი მკურნალობა ჩაუტარდა შემდეგი დიაგნოზით: მწვავე მასტოიდიტის ბეცოლდის ფორმა, სუბპერიოსტალური აბსცესი, პარაფარინგული აბსცესი.



სურ.2. მარცხენა დაფის ღრუ, ანტრუმი, პირამიდის, დვრილისებრი მორჩის უჯრედები სრულად დაჩრდილულია. დვრილისებრი მორჩი რეტროაურიკულარულად დესტრუქციულია 14 მმ ზომის მონაკვეთზე. აღნიშნული უბნიდან ბლანტსითხოვანი მასა უპირატესად ვრცელდება დორსალურად და კაუდალურად 6 სმ ზომის სიგრძეზე, განივი ზომით 4 სმ. შედარებით მცირე განივი ზომის (განივი 2 სმ, სიგრძივი 4 სმ) მქონე ბლანტსითხოვანი მასა ვრცელდება წინ და მედიალურად პარაფარინგეალურად, სადგის-ინის კუნთის გასწვრივ.

განხილვა. წარმოდგენილი შემთხვევები საკმაოდ განსხვავებულია. საერთო არის მხოლოდ ის, რომ განვითარებული პროცესების სათავეში მშო იყო. პაციენტები ფართო ასაკობრივ ჯგუფებს 5-დან 64 წლამდე დიაპაზონში შეადგენენ. წარმოდგენილი პაციენტებიდან ერთი საშუალო ასაკის და პრაქტიკულად ჯანმრთელი იყო შუა ყურის ანთების დაწყებამდე. ყველაზე ასაკოვანს კონტროლირებული II ტიპის დიაბეტი ჰქონდა, ხოლო ბავშვს დაავადების წინა პერიოდში ცხვირ-ხახის ტონზილის ჰიპერტროფიის კლინიკური ნიშნები და მორეციდივე ოტიტი ჰქონდა.

ანტიბიოტიკებამდე ეპოქაში მასტოიდიტს სერიოზულ გართულებად თვლიდნენ, რომელსაც სიკვდილიანობის მაღალი პროცენტი სდევდა. წინა საუკუნის შუა წლებიდან, ანტიბიოტიკების პრაქტიკაში დანერგვის და მრავალრიცხოვანი ჯგუფების შექმნის შედეგად გართულებების სიხშირემ იკლო და იყო წლები, როცა მწვავე მასტოიდიტი ძნელად სანახავი იყო [11]. ეფექტური ანტიბიოტიკოთერაპიის დანერგვის მიუხედავად, ამჟამად, შუა ყურის ანთების ინტრაკრანიული გართულებების მაჩვენებელი 8%-ია და შემთხვევათა 5-26%-ში სიკვდილით მთავრდება. მშო-ს

შემთხვევაში ინტრაკრანიალური გართულებები სწრაფად ვითარდება, მიუხედავად იმისა, რომ შუა ყურის ანთება დროულად არის დიაგნოსტირებული და მკურნალობაც ადეკვატურია და შეესააბამება გაიდლაინს. ქრონიკული ჩირქოვანი შუა ოტიტის შემთხვევაში ხშირად არადიაგნოსტირებული და არანამკურნალევი შემთხვევებია, თუმცა გართულების ჩამოყალიბებისთვის წლები შეიძლება დასჭირდეს, მაგრამ დაავადების გამოსავალის მხრივ უფრო საშიშია [8]. 21-ე საუკუნეში, განსაკუთრებით კორონას პანდემიის შემდეგ, გახშირდა გართულებები და დამძიმდა მომდინარეობა.

მნიშვნელოვანია ჩავატაროთ შემთხვევათა ანალიზი, რათა გამოვააშკარავოთ შექმნილი მდგომარეობის მიზეზები, რაც პრევენციის საშუალებას მოგვცემს.

გართულებების ანალიზი გვიჩვენებს, რომ გართულებული ფორმების შემთხვევაში ანთებითი პროცესი საკმაოდ სწრაფად პროგრესირებს და ხშირად სუბიექტურად (ყურის ან ყურის უკანა არის ტკივილი, ცხელება, დაფის აპკის შეცვლილი სურათი) მკაფიოდ გამოხატული არ არის. მედიცინის განვითარების დღევანდელ საფეხურზე, როცა კომპიუტერული ტომოგრაფია, როგორც საფეთქლის ძვლის კვლევის მეთოდი ხელმისაწვდომი გახდა, შესაძლებელია დვრილისებრ მორჩში მიმდინარე და შესაბამისად ანთებითი პროცესის აღმოჩენა გამოხატული კლინიკის გარეშეც. უნდა გავითვალისწინოთ, რომ დვრილისებრი მორჩი ანატომიურად შუა ყურის ერთ-ერთი მოცულობით დიდი ნაწილია და ხშირად მისი ამომფენი ლორწოვანი გარსის ანთება მშო-ს თანმდევი ანთებითი პროცესია. ამ მდგომარეობას მწვავე მასტოიდიტი ოსტეიტით ეწოდება, რაც გულისხმობს, რომ ძვლოვანი სტრუქტურა ჯერ კიდევ შენარჩუნებულია. ეს პროცესი ხშირად მკაფიო სიმპტომატიკით არ ვლინდება (ყურის უკანა არეში ტკივილი, შეშუპება), თუმცა გართულების მიზეზი შეიძლება გახდეს. აღნიშნული ფორმის დიაგნოსტირება მხოლოდ რენტგენოლოგიური კვლევითაა შესაძლებელი. კლასიკური - კოალესცენტური მასტოიდიტი, რომელიც ოსტეიტით ანუ დვრილისებრ მორჩში ძვლოვანი სტრუქტურების რღვევით და აბსცედირებით მიმდინარეობს, უფრო ადვილი გამოსააშკარავებელია, ვინაიდან მწვავე სიმპტომატიკა ახასიათებს.

აღწერილ შემთხვევებში თვალში საცემია ინფექციის პროგრესირება მიუხედავად ადეკვატური ანტიბიოტიკოთერაპიისა, რაც ანტიბიოტიკების მიმართ რეზისტენტობის განვითარების გლობალური პრობლემის ერთ-ერთი გამოვლინებაა. როგორც ჩანს, ანტიბიოტიკების მიღების შედეგად, ერთის მხრივ, ინფექციის ერადიკაცია არ ხდება, მეორე მხრივ, მასტოიდიტის კლინიკური ნიშნები სიმძაფრეს კარგავს, რაც დიაგნოზის დასმას ართულებს [6,12]. ამ პროცესის ფონზე გახშირდა მასტოიდიტის ნაკლებად ცნობილი ფორმა - ფარული (ლატენტური) მასტოიდიტი (ფმ). ეს ფორმა პირველად 1935 წელს აღწერეს [13]. ფმ-ის დიაგნოსტირება რთულია, ვინაიდან მწვავე მასტოიდიტისთვის დამახასიათებელი კლასიკური ნიშნები, როგორიცაა ყურის უკანა არეში შეშუპება და გარეთა სასმენი მილის უკანა-ზედა კედლის ჩამოწევა, დამახასიათებელი არ არის [14,15]. ფმ თავისი ჩამოყალიბების გზაზე შემდეგ ეტაპებს გადის: მწვავე რესპირატორული ვირუსული ინფექცია - მწვავე შუა ოტიტი - ანტიბიოტიკოთერაპია - მდგომარეობის გაუმჯობესება ანუ ტკივილის და ჩირქდენის ალაგება. პაციენტს ჩივილები აღარ აქვს, მაგრამ სმენა დაქვეითებული რჩება. პერიოდულად შესაძლებელია უმნიშვნელო ტკივილები აწუხებდეს ყურის და ყურის უკანა არეში, რომელიც სპონტანურად ჩერდება. გადის რამდენიმე კვირა ან თვე. თითქოს უეცრად ინტრატემპორალური ან ინტრაკრანიალური გართულება ვითარდება. კტ კვლევით დვრილისებრი მორჩი დაჩრდილულია, დესტრუქციული პროცესია გამოხატული, ხოლო მასტოიდექტომიის დროს მნიშვნელოვანი ალტერაციულ-პროლიფერაციული ანთებითი პროცესია დვრილისებრი მორჩის ჰაეროვანი უჯრედების მნიშვნელოვან ნაწილში.

მშო და მასტოიდიტი შეიძლება იყოს ინფექციის წყარო მენინგიტის განვითარებისთვის, როცა კლინიკური ნიშნები მინიმალურადაა გამოხატული. ნორმალური ოტოსკოპიური სურათი არ გამორიცხავს ფარული მასტოიდიტის არსებობას [3].

მნიშვნელოვანი ფაქტორია სწორი და დროული დიაგნოსტიკა. შუა ყურის ღრუებიდან გარშემო ქსოვილებზე ინფექციის გადასვლის ალბათობის მაღალი რისკის შესახებ ცოდნა ყოველთვის არ არის საკმარისი. აქედან გამომდინარე, მაგალითად, ოტოგენური მენინგიტის ადრეული დიაგნოსტიკა კლინიკების ნაწილში გვიანდება, რადგან ობიექტურ მონაცემებს ვერ აკავშირებენ ყურთან. ამას ხშირად განაპირობებს ანამნეზის არასრულფასოვანი შეგროვება ან შუა ყურთან დაკავშირებული ჩივილების (მაგ. ტკივილი) იგნორირება. ოტოგენური მენინგიტი საკმაოდ მძიმე მიმდინარეობით ხასიათდება. ანტიბაქტერიულ და ინტენსიურ თერაპიასთან ერთად საჭიროებს ქირურგიულ ჩარევას მასტოიდექტომიის სახით. სწორად დასმული დიაგნოზი და დროული ადეკვატური მკურნალობა დაავადების გამოსავალს ამარტივებს და მკურნალობის ხანგრძლივობას, შესაბამისად ხარჯებს ამცირებს.

დასკვნები:

1. საჭიროა ავამაღლოთ იმ სპეციალისტების ცოდნის დონე, რომლებიც პირველად იღებენ ამ სახის პაციენტებს და უნდა მისცენ სწორი მიმართულება შემდგომი მენეჯმენტის მიმართულებით.
2. უნდა შემუშავდეს შუა ყურის მწვავე ანთების ანტიბიოტიკოთერაპიის ახალი სქემები, როგორც ანტიბიოტიკების ჯგუფების კომბინაციების, ასევე დოზირების მხრივ.
3. აუცილებელია მშო-ის დროული, ადეკვატური მკურნალობა შედეგების შეფასებით და სწორი დასკვნების გამოტანით. კერძოდ, პირველი დღეების განმავლობაში ხშირი მონიტორინგი, ზოგჯერ საკმარისია სატელეფონო. ექიმმა სწორედ უნდა განსაზღვროს მომენტი, როცა ნაჩვენებია მირინგოტომია. გამოჯანმრთელების შემდეგ პროცესის სრულ ალაგებაში დარწმუნება. მაგალითად, თუ მკურნალობის შემდეგ სმენა არ აღდგა, აუცილებელია როგორც აუდიომეტრია-ტიმპანომეტრია, ასევე დვრილისებრი მორჩის კტ კვლევა.

წარმოდგენილი ნაშრომი არის საწყისი ეტაპი. კვლევა ამ მიმართულებით უნდა გაგრძელდეს, რათა შემუშავდეს მწვავე შუა ოტიტის და მწვავე მასტოიდიტის პრევენციის და მკურნალობის სწორი მეთოდები.

გამოყენებული ლიტერატურა:

1. Asha'ari ZA, Shiyuti MI, Zihni M. Luc's abscess: a reminder of potential complication of otitis media. Brunei Int Med J 2012; 8: 261–264.
2. Ashikin Mohd Nordin, Ong Jun Jean, Juriza Ismail, Norazlin Kamal Nor, Wong Sau Wei, Noor Dina Hashim, Fahrin Zara Mohammad Nasseri, Adibah Abdul Ghafar, Erica Yee Hing, Nurdiyana Nasrudin, Asma Abdullah. Silient mastoiditis associated with pneumococcal meningitis. Malaysian Journal of Paediatrics and Child Health (MJPCH) | (Early online –December 2021) | Page 1 of 6
3. Cüneyt Kucur, İsa Özbay, Muhammet Fatih Topuz, Onur Erdoğan, Fatih Oğhan, Ali Güvey, Nadir Yıldırım. Complications of Acute Otitis Media: A Single Center Experience. Journal of Clinical and Experimental. 2017: 8 (4):12-17.
4. Debbie A Eaton; Chief Editor: Arlen D Meyers. Acute otitis media unresponsive to treatment., MBA Aug 14, 2023 https://emedicine.medscape.com/article/860323-overview#a3
5. Fireman P. Otitis media and eustachian tube dysfunction: connection to allergic rhinitis. J Allergy Clin Immunol. 1997 Feb;99(2):S787-97.
6. Garner EF, McKinnon BJ. Luc's abscess– a case report. Int J Pediatr Otorhinolaryngol Extra 2013; 8:e5–e7.

7. Laulajainen-Hongisto A., Jero J., Markkola A., Saat R., Antti A., Aarnisalo.J. Severe Acute Otitis Media and Acute Mastoiditis in Adults. J. International Advanced Otology 2016, 2620
8. Luc H. Sub-periosteal temporal abscess of otic origin without intra-osseous suppuration. Laryngoscope 1913; 23: 999–1,003.
9. Penido N., Chandrasenkar S., Borin A., Testa J. Complications of otitis media-a potencially lethal problem still present. Brazilian Jornal of otorhinolaryngology. 2016; 82(3): 253-262.
10. Ryan JT, Pena M, Zalzal GH, Preciado DA. Otogenic lateral sinus thrombosis in children: A review of 7 cases. Ear Nose Throat J. 2016; 95:108-12.
11. Schilder AG, Chonmaitree T, Cripps AW, Rosenfeld RM, Casselbrant ML, Haggard MP, Venekamp RP. Otitis media. Nat Rev Dis Primers. 2016 Sep 08; 2(1):16063.
12. Tzu-Chun Tsaia, Pang-Mien Yuc, Ren-Bin Tangb, Hsin-Kai Wangb, Ke-Chang Changa. Otorrhea as a Sign of Medical Treatment Failure in Acute Otitis Media: Two Cases with Silent Mastoiditis Complicated with Facial Palsy Pediatrics and Neonatology (2013) 54, 335-338.
13. Viswanatha B. Otitichydrocephalus: a report of 2 cases. EarNoseThroat J. 2010;89:E34-7.
14. Wolf G. Silent mastoiditis. JAMA.1935; 104(26): 2315-2319.
15. Wu JF, Jin Z, Yang JM, Liu YH, Duan ML. Extracranial and intracranial complications of otitis media: 22-year clinical experience and analysis. ActaOtolaryngol. 2012;132:261-5.
16. Zanoletti E, Cazzador D, Faccioli C, Sari M, Bovo R, Martini A. Intracranial venous sinus thrombosis as a complication of otitis media in children: Critical review of diagnosis and management. Int J Pediatr Otorhinolaryngol. 2015;79:2398-403.

ნინო შარაშენიძე [1], ნატო ნაკუდაშვილი [2], ირაკლი ხუნდაძე [1]

ოტოგენური გართულებების სიხშირე მედიცინის თანამედროვე ეტაპზე

(კლინიკური შემთხვევები)

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რეზიუმე

მწვავე შუა ოტიტი (მშო) მსოფლიოში ერთ-ერთი გავრცელებული დაავადებაა, განსაკუთრებით ბავშვებში. დაავადების სიხშირე დაახლოებით 80%-ს არწევს. როგორც წესი, შუა ყურის ანთება მწვავე რესპირატორული ვირუსული ინფექციის თანმდევი მდგომარეობაა, რომელიც, ამავე დროს, ბევრი საშიში გართულების მიზეზი შეიძლება გახდეს. აღწერილი შემთხვევები საკმაოდ მრავალფეროვანია. პაციენტები წარმოადგენენ ფართო ასაკობრივ ჯგუფს 5-დან 64 წლამდე. ერთ-ერთი წარმოდგენილი პაციენტი იყო საშუალო ასაკის და პრაქტიკულად ჯანმრთელი მშო-ის დაწყებამდე. ყველაზე ხანდაზმულს ჰქონდა II ტიპის დიაბეტის კონტროლირებადი, ხოლო ბავშვს დაავადების წინა პერიოდში აღენიშნებოდა ცხვირ-ხახის ტონზილების ჰიპერტროფიის და მორეციდივე შუა ოტიტის კლინიკური ნიშნები. შემთხვევების ანალიზი საშუალებას გვაძლევს გამოვიტანოთ შემდეგი დასკვნები: (1) უნდა გავზარდოთ სპეციალისტების ცოდნის დონე, რომლებიც პირველად იღებენ ასეთ პაციენტებს და უნდა მისცენ სწორი მიმართულება შემდგომი მართვისთვის. (2) საჭიროა ახალი ანტიბაქტერიული თერაპიის სქემების შემუშავება მწვავე შუა ოტიტის დროს, როგორც ანტიბიოტიკების ჯგუფების კომბინაციებისა და დოზირების თვალსაზრისით. (3) ექიმმა უნდა უზრუნველყოს დროული, ადეკვატური მკურნალობა შედეგების შეფასებით და სწორი დასკვნების გამოტანით. კერძოდ, პირველი დღეების განმავლობაში ხშირი მონიტორინგი, ზოგჯერ საკმარისია სატელეფონო. ექიმმა სწორედ უნდა განსაზღვროს მომენტი, როცა ნაჩვენებია მირინგოტომია.

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LEAD DISTRIBUTION IN PATIENTS WITH ALLERGIC DISEASES – A SEVEN-YEAR EPIDERMIOLOGICAL STUDY

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Doi: https://doi.org/10.52340/jecm.2025.03.05

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ტყვიის განაწილება ალერგიული დაავადებების მქონე პაციენტებში - შვიდწლიანი ეპიდერმიოლოგიური კვლევა

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რეზიუმე

მიზანი: შეფასდეს ტყვიის, როგორც გარემოს ტოქსიკური აგენტის და ალერგიული დაავადებების კლინიკური გამოვლინებების პოტენციური ასოციაცია.

მეთოდები: მრავალწლიანი ჯვარედინი ტყვიის და იმუნოლოგიური პარამეტრები შეფასდა 418 ალერგიულ პაციენტში და 92 ჯანმრთელ კონტროლში. ბიოქიმიური და იმუნოლოგიური ანალიზები ჩატარდა თანამედროვე ლაბორატორიული ტექნიკის გამოყენებით (ICP-MS, ELISA, იმუნოფლუორესცენცია), ხოლო სტატისტიკური ანალიზი STATA–ს გამოყენებით. IgE, ჰისტამინის და ანტი-IgE, ისევე როგორც ეოზინოფილების რაოდენობა, მნიშვნელოვნად იყო მომატებული ალერგიულ ჯგუფში ($P<0.05$).

დასკვნა: ტყვიის მომატებული დონე შეიძლება კავშირში იყოს ალერგიულ პროცესთან, განსაკუთრებით პედიატრიულ პაციენტებში, რაც ხაზს უსვამს გარემოს ჯანმრთელობის დაცვის მნიშვნელობას.

Introduction. The complex epidemiological landscape of allergic diseases and the growing significance of associated environmental factors have become the focus of active research in the fields of medicine and public health over the past decades. One such factor is lead — a heavy metal widely present in the environment, known for its toxic effects on various organs and systems.

Despite existing studies that examine lead levels in different biological substrates and its relationship to the formation of immunological inflammatory responses, there is still no definitive conclusion regarding the exact dose and mechanisms by which lead is involved in the pathogenesis of allergic diseases [1,3,5,7,10,11,13].

It is evident that lead accumulation in the human body is a globally widespread phenomenon, as confirmed by both international and local epidemiological data. At the same time, the prevalence of allergic diseases is also steadily increasing [12].

Against this background, the aim of the present study was to investigate lead concentrations in patients with allergic diseases (asthma, atopic dermatitis/eczema, allergic rhinitis, food allergy, urticaria) and to evaluate its potential association with clinical manifestations of the disease.

Objectives and Methods. The aim of this study was to assess lead concentrations in the bodies of patients with allergic diseases. To achieve this goal, a multi-indicator study was conducted over a period of 7 years. Venous blood samples were collected from 418 patients with allergic diseases (Group G1), aged between 2 and 69 years. This group included 186 children, 152 young adults, and 80 patients over the age of 40; 249 were female and 169 were male. Patients were selected randomly and enrolled in the study based on prior informed consent. All of them had presented to Clinic " XXI saukune" for various medical reasons. Additionally, a control group (Group G2) was included in the study, consisting of 92 healthy individuals - 31 children and 61 young adults; among them, 50 were female and 42 were male. The demographic characteristics of the groups involved in the study are presented in the following tables.

Table 1. Distribution of Allergic Diseases in Group G1

Allergy Disease	Total (n)	Children (n)	Adults (n)
Asthma	41	24	17
Atopic Dermatitis	115	54	61
Allergic Rhinitis	52	4	48
Food Allergy	53	21	32
Urticaria (total)	211	83	128
-Acute Urticaria	134	-	-
-Chronic Urticaria	77	-	-

Table 2. Demographic Characteristics of Study Participants

Groups	Total (n)	Children (2-15y)	Young Adults (18-39y)	Old Adults (>40y)	Females	Males
G1 (Allergic patients)	418	186	152	80	249	169
G2 (Healthy controls)	92	31	61	0	50	42

Blood samples were collected for measurement of lead concentrations via inductively coupled plasma mass spectrometry (ICP-MS). Immunological assessments included total IgE, histamine, anti-IgE levels (via ELISA and immunofluorescence), and eosinophil count (via microscopy). All participants provided informed consent, and ethical approval was obtained from the institutional review board. Statistical analyses were conducted using STATA version 18, with significance defined at $p < 0.05$.

Results. The analysis revealed significantly higher blood lead concentrations in the allergic patient group (G1) compared to the healthy control group (G2). Elevated blood lead levels (>10 μg/dL) were detected in 302 out of 418 allergic patients (72%) and in 31 out of 92 participants in the control group (33%).

Table 3. Frequency of Elevated Blood Lead Levels in Study Groups

Groups	Total Participants (n)	Lead Elevated Level (>10 μg/dL)	Percentage (%)
G1 (Allergic patients)	418	302	72%
G2 (Healthy controls)	92	31	33%

This significant difference suggests a possible association between allergic diseases and elevated lead levels. Among allergic patients (Group G1), the prevalence of high blood lead levels (BLL >10 μg/dL) varied by disease type and age group. A detailed breakdown is presented below:

Table 4. Prevalence of Elevated Blood Lead Levels (BLL >10 μg/dL) Among Allergic Patients by Disease Type and Age Group

Allergic Disease	Patients (n)	Children (n)	Lead Elevated Leven (BLL) in Children (n/%)	Adults (n)	Lead Elevated Level (BLL) in Adults (n/%)
Asthma	41	24	19 (79%)	17	12 (71%)
Atopic Dermatitis	115	54	31 (57%)	61	32 (52%)
Allergic Rhinitis	52	4	2 (50%)	48	18 (38%)
Food Allergy	53	21	17 (81%)	32	27 (84%)
Urticaria	211	83	63 (76%)	128	78 (61%)

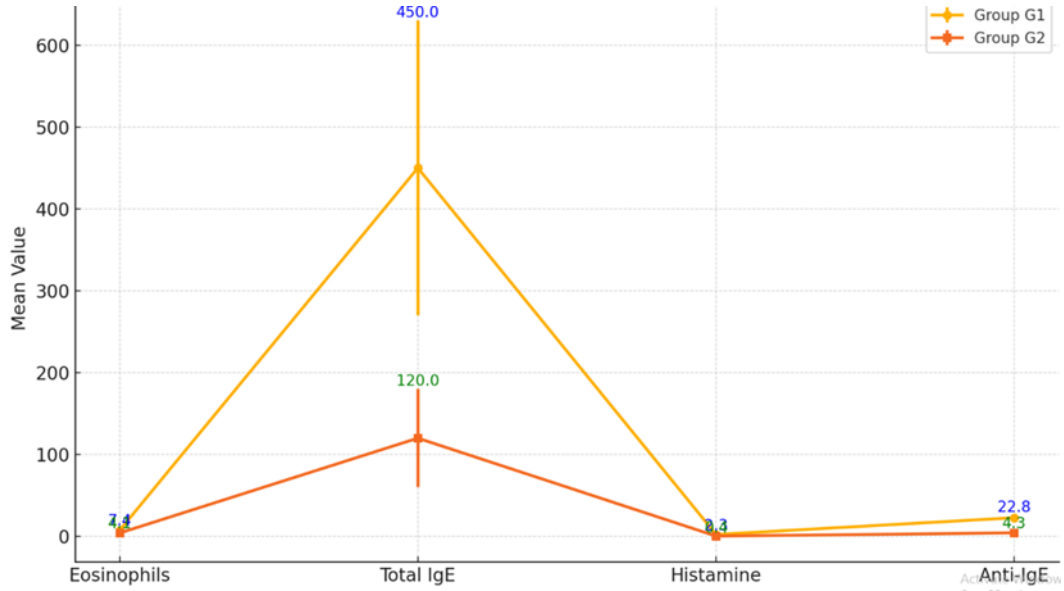
According to Table 4, all subgroups of children with allergic diseases showed high levels of lead in the blood, ranging from 70% to 81%. Among adults, elevated lead levels were observed in patients with asthma, urticaria, and food allergies (61%–71%). The most frequent cases of elevated lead levels were recorded in patients with food allergies (81%) and asthma (79%), whereas the lowest prevalence was found in adults with allergic dermatitis (52%) and allergic rhinitis (38%).

The distribution of immunological parameters also revealed interesting differences between the studied groups. Specifically, the average eosinophil count in Group G1 was 7.4 ± 2.1, compared to 4.1 ± 1.5 in Group G2 ($p < 0.001$), indicating a statistically significant difference. Total IgE concentration in Group G1 was 450 ± 180 IU/mL, while in Group G2 it was 120 ± 60 IU/mL ($p < 0.01$). Histamine levels also differed significantly between the groups (G1: 2.3 ± 1.1, G2: 0.4 ± 0.1, $p = 0.03$). The level of anti-IgE was significantly higher in Group G1 (22.8 ± 2.7) compared to Group G2 (4.3 ± 1.3, $p = 0.05$).

Table 5. Comparison of Immunological Parameters Between Groups G1 and G2

Parameters	G1 Mean ± SD	G2 Mean ± SD	P - value
Eosinophils (x106/L)	7.4 ± 2.1	4.1 ± 1.5	p<0.001
Total IgE (IU/mL)	450 ± 180	120 ± 60	p<0.01
Histamine (ng/mL)	2.3 ± 1.1	0.4 ± 0.1	p=0.03
Anti-IgE (KU/I)	22.8 ± 2.7	4.3 ± 1.3	p=0.05

The above-mentioned correlations of immunological markers are clearly illustrated in Diagram 1.



Interpretation and Analysis. The data indicate a high prevalence of elevated blood lead levels (BLL >10 µg/dL) among allergic patients, particularly within the pediatric age group. In children, high lead levels were observed across all types of allergic diseases and exceeded those found in adults.

The highest BLL was recorded in: Children with food allergies (81%) and asthma (79%); Elevated levels were also observed in children with urticaria (76%) and atopic dermatitis (70%). In adults, elevated lead levels were also significant, though generally lower. Specifically: The highest levels were found in adults with asthma (71%) and urticaria (61%); The lowest prevalence was observed in cases of atopic dermatitis (52%) and allergic rhinitis (38%). Notably: Patients with urticaria showed the highest average levels of both IgE and anti-IgE; Elevated eosinophil levels were observed in cases of urticaria and atopic dermatitis.

This trend may suggest a possible link between lead exposure and allergic sensitization or disease severity, particularly among younger individuals. The disproportionately high lead levels in children may be explained by both physiological and behavioral factors - including increased intestinal absorption of lead and greater exposure to environmental risks during early developmental stages.

The findings underscore the need for further research to identify environmental and lifestyle factors contributing to lead exposure in allergic individuals, with special attention to early-life exposure. Furthermore, the data highlight an important public health imperative - the development and implementation of screening and preventive measures for vulnerable populations.

Discussion. The results of this study confirm the high prevalence of elevated blood lead levels (BLL >10 μg/dL) among patients with allergic diseases, particularly within the pediatric population. This association was especially pronounced in children with food allergies (81%) and asthma (79%), suggesting that individuals with allergic conditions at a young age may be more susceptible to lead accumulation.

The age-dependent differences in lead levels are likely explained by both physiological and behavioral factors. Children absorb lead more efficiently through the gastrointestinal tract compared to adults and are also at higher risk of exposure to lead-containing environmental sources - such as contaminated soil, dust, or household items. Such exposure, especially during critical stages of immune system development, may contribute to heightened allergic sensitization or the exacerbation of existing conditions.

The study clearly demonstrated that the increase in lead burden is particularly significant in allergic children. These findings are consistent with international research that has identified children as more vulnerable to lead toxicity [4]. Lead is known to promote a Th2-skewed immune response, which is one of the mechanisms underlying enhanced allergic inflammation [6].

In adults, elevated BLL may reflect chronic, long-term environmental exposure or the lasting effects of early-life lead burden. Lead exposure may also operate at the cellular level, contributing to oxidative stress, disruption of epithelial barrier function, and cytokine imbalance.

From a pathophysiological standpoint, lead has been shown to impact the immune system by promoting Th2-type immune responses, which are closely associated with allergic inflammation [2]. Elevated lead levels may also induce oxidative stress, damage epithelial barriers, and modulate cytokine profiles, thereby intensifying allergic reactions [6].

These findings align with previous studies linking heavy metal exposure to increased levels of IgE, histamine, and eosinophilia in allergic patients.

In our study, elevated lead levels were also detected in adults - most notably in cases of asthma (71%) and urticaria (61%) - though overall levels were lower than those observed in children. These differences may reflect cumulative or occupational exposure, chronic environmental influences, or long-term effects of early-life lead exposure.

Lead can cause epigenetic changes (e.g., DNA methylation, histone modification) that affect the expression of genes involved in allergic responses [8]. Therefore, the varying levels of lead burden across different types of allergic diseases may indicate that certain conditions are more sensitive to environmental toxins. For example, elevated lead levels observed in both acute and chronic urticaria may suggest a role for lead in non-IgE-mediated hypersensitivity or mast cell activation.

Given that lead is widely present in urban environments and may exacerbate or even trigger allergic diseases, our findings underscore the importance of environmental health monitoring. Targeted lead screening among high-risk allergic patients - especially children - should become an integral part of clinical and public health strategies.

References:

1. Chung, Y., et al. (2019). Lead Exposure and Its Association with Allergic Sensitization in Adults: A Cross-Sectional Study. Environmental Research, 172, 10–15.
2. Heo, Y., Lee, W. T., & Lawrence, D. A. (2007). Differential effects of lead and cAMP on the Th1/Th2 immune balance. International Journal of Immunopharmacology, 7(6), 811-818.
3. Kim, S. Y., et al. (2020). The Impact of Lead Exposure on Atopic Dermatitis: Evidence from a National Survey. Journal of Allergy and Clinical Immunology, 145(2), AB12.
4. Lanphear BP, et al. Low-level environmental lead exposure and children's intellectual function: an international pooled analysis. Environmental Health Perspectives, 2005.
5. Liu, X., et al. (2017). Blood Lead Levels and Asthma in Children: A Meta-Analysis. Science of the Total Environment, 601–602, 599–605.
6. Mishra KP. Lead exposure and its impact on immune system: A review. Toxicology In Vitro, 2009.
7. Smith, R. L., Thompson, K. M., & Williams, P. C. (2020). Lead exposure and immune dysregulation: Emerging links to allergy and asthma. Environmental Health Perspectives, 128(4), 47001. https://doi.org/10.1289/EHP6001
8. Senut, M. C., Cingolani, P., Sen, A., Kruger, A., Shaik, A., Hirsch, H., & Suhr, S. T. (2012). Epigenetics of early-life lead exposure and effects on brain development. Epigenomics, 4(6), 665-674.
9. Patrick, L. (2006). Lead toxicity, a review of the literature. Alternative Medicine Review, 11(1), 2-22.
10. Zhang, Y., et al. (2018). Association between blood lead levels and allergic sensitization in children: A population-based study. Ped Allergy and Immun, 29(6), 624–631. https://doi.org/10.1111/pai.12954
11. Wang, C., et al. (2016). Association Between Blood Lead Levels and Allergic Rhinitis in a Pediatric Population. International Journal of Pediatric Otorhinolaryngology, 85, 166–170.
12. World Health Organization. (2022). Global report on trends in prevalence of allergic diseases 2000–2020. Geneva: WHO. Retrieved from https://www.who.int/publications/allergy-report-2022
13. Yang, S. N., et al. (2018). Lead Exposure and Its Association with Eosinophilic Airway Inflammation in Children. Pediatric Pulmonology, 53(9), 1230–1235.

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LEAD DISTRIBUTION IN PATIENTS WITH ALLERGIC DISEASES – A SEVEN-YEAR EPIDERMIOLOGICAL STUDY

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SUMMARY

Objective: To evaluate the potential association between lead, as an environmental toxic agent, and the clinical manifestations of allergic diseases.

Methods: As part of a multi-year cross-sectional study, lead levels and immunological parameters were assessed in 418 allergic patients and 92 healthy controls. Biochemical and immunological analyses were performed using modern laboratory techniques (ICP-MS, ELISA, immunofluorescence), and statistical analysis was conducted using STATA 18.

Results: Lead concentration was significantly higher in the allergic patient group (BLL >10 μg/dL observed in 72%), especially among children. Levels of IgE, histamine, and anti-IgE, as well as eosinophil counts, were significantly elevated in the allergic group ($p < 0.05$).

Conclusion: Elevated lead levels may be associated with the allergic sensitization process, particularly in pediatric patients, highlighting the need for environmental health protection.

Keywords: Lead, allergy, environmental toxicology, immunological markers, body burden, BLL, children, asthma, urticaria, food allergy

აბსტრაქტები

1. LUKA MACHITADZE

MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN (MIS-C) FOLLOWING COVID-19

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Multisystem Inflammatory Syndrome in Children (MIS-C) is a rare but potentially life-threatening hyperinflammatory condition that develops after SARS-CoV-2 infection. Although its exact etiology remains unclear, MIS-C is associated with a dysregulated immune response, leading to a cytokine storm, endothelial cell damage, and multisystem organ involvement. Unfortunately, specific and updated data on cases of Multisystem Inflammatory Syndrome in Children (MIS-C) are not publicly available in Georgia and its neighboring countries - Armenia, Azerbaijan, Turkey, and Russia. However, global prevalence rates are as follows: its occurrence is estimated to be between 1:3,000 and 1:5,000 among children infected with SARS-CoV-2 (based on data from 2020-2022 (CDC)).

Clinically, MIS-C is characterized by prolonged fever, cardiovascular, gastrointestinal, neurological, and dermatological manifestations. Diagnosis relies on clinical evaluation, laboratory tests (CRP, D-dimer, IL-6, troponin), and imaging studies (echocardiography, chest radiography). The early stage of managing the foreign syndrome began in 2020, when nothing was known except that it resembled Kawasaki disease and septic shock. In the beginning, treatment involved aspirin, and later, steroids and intravenous immunoglobulin. The period of 2021 led to the standardization of treatment, with new findings on the syndrome prompting the use of anticoagulants and IL-6/1 inhibitors alongside traditional methods, which allowed us to transition to the modern stage (2022-2024). Randomized studies (NAPRTCS, RECOVERY) show that IVIG + corticosteroids is the most effective treatment. Anti-cytokine therapy is used in resistant cases, as well as thrombosis prevention and inotropic support as needed.

MIS-C cases are increasing globally, particularly in children aged 5-15 years. Despite ongoing research, many aspects remain uncertain, including the identification of diagnostic biomarkers (COVID-associated markers, cardio-specific, immune-dysregulatory, hematological-endothelial) and long-term outcomes. Special importance is given to syndrome-specific markers: the high levels of CXCL9 and IL-17A raise specific suspicion for MIS-C syndrome. Additionally, the presence of extremely high levels of NT-proBNP is noteworthy for differentiating between this syndrome and Kawasaki disease. Laboratory results are supported by a history of COVID infection, immunoglobulin positivity, and thrombocytopenia, which are also distinguishing features from Kawasaki disease. Future studies should focus on large-scale cohorts to improve diagnosis and develop personalized treatment strategies.

This syndrome continues to pose a significant challenge in pediatric patients, requiring continuous monitoring and scientific advancement. Preventing MIS-C is closely linked to COVID-19 prevention, with vaccination and adherence to public health recommendations playing a crucial role.

2. N. NAKUDASHVILI [1], L. RATIANI [1], M. TSABADZE [1], Z. NAKUDASHVILI [3], I. KEKELIDZE [2], M. KOBAKHIDZE [2], T. SANIKIDZE [4], SH. TSIKLAURI [5], M. LOMAIA [6]

FEATURES OF VASOMOTOR RHINITIS (VMR)

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Vasomotor (non-allergic) rhinitis (VMR) is a chronic inflammatory process of the nasal mucosa, which causes sneezing, nasal congestion, runny nose and postnasal drip. Unlike allergic rhinitis, its etiology is not fully established, although it is likely that various environmental factors directly or reflexively affect the nasal mucosa, leading to the development of symptoms.

The aim of our study was to investigate the characteristics of vasomotor rhinitis in patients who had not had COVID-19 infection and in patients who had COVID-19 infection. Data were collected from patients with vasomotor rhinitis (VMR), who were divided into two groups: Group I - data was collected from

patients diagnosed with vasomotor rhinitis (VMR), who had COVID-19 more than 6 months ago and Group II - without COVID-19.

Methods: All patients underwent the instrumental (anterior and posterior rhinoscopy, endoscopy, rhinomanometry) examination, the cytological (eosinophils, neutrophils, and leukocytes count), and biochemical investigations of nasal smear (the content of nitric oxide (NO)) and blood serum total antioxidant activity.

Results: No statistically significant differences were observed in the initial objective and subjective indicators between Groups I and II. However, cytological analysis of nasal smears revealed a higher presence of eosinophils, lymphocytes, and an increased number of neutrophils, along with a lower concentration of nitric oxide (NO) in patients from Group I compared to those in Group II. Additionally, the total antioxidant activity (TAA) in the blood serum of VMR patients was lower than in healthy controls, with a more pronounced reduction observed in Group I.

Conclusions: In patients with VMR who had a history of COVID-19 infection, oxidative stress intensity and nasal NO depletion were significantly elevated. These changes contributed to impaired protective mechanisms, persistent eosinophilic inflammation, and increased airway hyperresponsiveness.

3. ANA MAGHRADZE, IVANE CHKHAIDZE, NANI KAVLASHVILI

POST-COVID COMPLICATIONS AND LONG-COVID IN CHILDREN

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Many children suffer from lingering symptoms after COVID-19, known as long COVID syndrome (LCS), otherwise called Post COVID-19 Condition (PCC). Despite extensive research, the prevalence of symptoms, its impact on quality of life, and underlying mechanisms still need to be fully understood. As neutrophilic granulocytes play an essential role in COVID-19, and their prolonged disruption was found to cause immunological diseases, we hypothesized their ongoing disturbed functionality in LCS. Long COVID is a condition characterized by long-term, multi-system, often severe health problems persisting or appearing after the typical recovery period of COVID-19. Although studies into long COVID are under way, as of April 2025 there is no consensus on the definition of the term. LCS in children was defined by the WHO as PASC occurring within 3 months of acute coronavirus disease 2019 (COVID-19), lasting at least 2 months, and limiting daily activities. Pediatric PASC mostly manifest after mild courses of COVID-19 and in the majority of cases remit after few months. However, symptoms can last for more than 1 year and may result in significant disability. What is Known: • Post-acute sequelae of coronavirus 2019 (COVID-19) (PASC) - also termed Long COVID - in children and adolescents can lead to activity limitation and reduced quality of life. • PASC belongs to a large group of similar post-acute infection syndromes (PAIS). In research studies, more than 200 symptoms have been linked to long COVID. Symptoms may stay the same over time, get worse, or go away and come back.

Common symptoms of long COVID include: Extreme tiredness, especially after activity; Problems with memory, often called brain fog; A feeling of being lightheaded or dizzy; Problems with taste or smell. Other symptoms of long COVID include: Sleep problems; Shortness of breath; Cough; Headache; Fast or irregular heartbeat, chest pain; Digestion problems, such as loose stools, constipation or bloating. Long COVID encompasses a heterogeneous collection of symptoms and conditions after SARS-CoV-2. These symptoms may reflect persistent symptoms from acute COVID-19 infection, such as cough, shortness of breath, headaches, fatigue, chronic pain, and loss of taste and smell. They may further reflect exacerbation of underlying conditions, such as persistent cough in children with asthma, diabetic ketoacidosis in children with diabetes, exacerbation of mental health and neurodevelopmental conditions.

Prevalence: A study in Malaysia reported that 21.1% or approximately 1 in 5 COVID-19 survivors reported persistent ill health>3 months post-COVID infection. A study in India reported that 9.4% of people had long-term symptoms after COVID-19. Two studies in Saudi Arabia reported approximately 49% and 51.2% overall Long-COVID prevalence, respectively. Two studies in Turkey reported approximately 27.1% and 47.5% prevalence, respectively. A study in Japan reported 56.14% prevalence, while a study in

Mexico reported high prevalence of 68% at approximately 90 days post-COVID infection. In Canada, 28.5% prevalence of persistent post-COVID-19 symptoms 90 days after infection was reported.
Treatment: In general, current clinical practice adopted a symptom-based approach in managing long COVID. Although there are currently no broadly effective treatments for long COVID, treatments for certain components have been effective for subsets of populations.

4. NINO KARANADZE, GIGI GORGADZE, TINATIN KILASONIA, NINO JANKARASHVILI

BACTERIOPHAGE THERAPY FOR ANTIBIOTIC-ALLERGIC AND ANTIBIOTIC-RESISTANT OCULAR INFECTIONS: A RETROSPECTIVE STUDY

Tbilisi State Medical University; LIONS Eye Diabetic Clinic; Georgia

Introduction. The increasing number of patients who are allergic to antibiotics and the global rise of antibiotic resistance have significantly challenged the treatment of infections, particularly in ophthalmology. Antibiotic allergic reactions, typically mediated by immunoglobulin E (IgE), which triggers an inflammatory response, often cause adverse effects ranging from mild rashes to life-threatening anaphylaxis, which can complicate the treatment of infections. Additionally, antibiotic resistance, caused by several reasons including the modification of antibiotic targets, the production of enzymes that degrade antibiotics (such as β-lactamases), alterations in cell membrane permeability, and the active expulsion of drugs via efflux pumps, has emerged as a critical global health concern.
In ophthalmology, the impact of these issues is profound. Patients who experience adverse reactions to antibiotics or whose infections are caused by resistant bacteria face limited treatment options. In response to this growing challenge, from the year 2000, the Department of Eye Diseases of Tbilisi State Medical University successes in using Pyo-Bacteriophage to treat various eye diseases such as chronic and acute blepharitis, infectious-allergic conjunctivitis and keratitis and chronic and acute dacryocystitis in antibiotic-allergic and antibiotic-resistant patients or in the patients who have negative antibiotic treatment results in the past. Advantages of the Bacteriophage therapy compared to antibiotic therapy, such as specificity, adaptability, lower risk of side effects or allergic reactions, naturally occurrence potential and biodegradability, and reduced risk of antibiotic resistance should be taken into account.
Purpose. The study aimed to collect and analyze the data of the cases where Pyo-Bacteriophage was implemented for treatment and the treatment results.
Methods. Pyo-bacteriophage leads to specific lysis of Staphylococcus, Streptococcus, E.coli, Pseudomonas Aeruginosa and Proteus. Pyo-bacteriophage, produced in The George Eliava Institute of Bacteriophage, Microbiology and Virology was prescribed for instillation, application and nasolacrimal duct irrigation. The data was collected from the patients' medical histories and follow-up results.
Results. A total of 79 patients, who underwent the mentioned treatment were found, of which 30 had chronic dacriocystitis, 27-Infectious-allergic conjunctivitis and 22-Blepharitis. In most of the cases (61/79) the positive outcome with relief of patient complaints and full recovery was achieved.
Conclusion. Considering the diversity of patients and the complications that could occur if antibiotic therapy, which was ineffective, did not have an alternative in the form of bacteriophage, the high effectiveness and clinical significance of pyo-bacteriophage therapy as a treatment method is confirmed. Also, its other advantages mentioned above should be taken into account.

5. R. JAVAKHADZE, N. KHATIASHVILI, KH. CHIGOGIDZE, KH. SHUBLADZE, O. GHVABERIDZE, T. TODUA

THE ESTIMATION OF INFLUENCE OF COVID-19 ON THE MEDICAL WORKERS HEALTH, INCLUDING WOMEN

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The new coronavirus infection (COVID-19) caused by the SARS-COV-2 virus first appeared in China at the end of 2019, spread very quickly throughout the world during the first three months and took on the

character of a pandemic. The spread of the corona virus disease during the pandemic claimed millions of lives, including medical personnel.

The works published by WHO, ILO, EU discuss the harmful working conditions of employees in the healthcare system, which became extreme during infections and the COVID-19 pandemic. Opinions on recognizing COVID-19 as an occupational disease or accident are summarized. There is data in the literature that discusses the experience of several EU countries. As a result of the conducted studies, the main risk factors, health disorders and preventive measures were identified. Expertise issues on recognizing the viral infection COVID-19 as an occupational disease among employees in the healthcare system were discussed. The long-term consequences that develop after the acute period of COVID-19 disease are noteworthy, which are expressed in various diseases, such as: post-infectious asthenia with vegetative dysfunction, interstitial changes in the lungs (granulation or fibrosis), pulmonary hypertension, thromboembolic pulmonary hypertension, emotional burnout syndrome.

The work is interesting, which provides an assessment of the impact of COVID-19 on women health working in the medical sphere in Georgia. The pandemic has significantly affected their working conditions, also their physical and psychological risks have increased. 70% of healthcare workers worldwide are women, and they have been on the front lines of the fight against COVID-19. The number of women employed in the healthcare sector in Georgia exceeds the number of employed men, and is 62%.

The aim of the study was to identify the necessary changes for women in employment during the COVID-19 pandemic by fulfilling specific research objectives. The study revealed that COVID-19 has had a significant impact on women working in the health sector, especially on their paid and unpaid work, economic situation and social responsibilities. COVID-19 is affecting men and women differently. According to UN Women's rapid gender assessment of the COVID-19 situation, the differential impacts of the pandemic on women and men include livelihoods, vulnerability and the distribution of unpaid domestic work. Following the research, relevant recommendations and conclusions were issued.

6. TEKLA KUBLASHVILI, TAMARI TABATADZE, NINO KHELADZE

THE INFLUENCE OF ENVIRONMENTAL FACTORS ON PRECOCIOUS PUBERTY: A CASE REPORT

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Precocious puberty is defined as the appearance of secondary sexual characteristics before the age of 8 in girls and before the age of 9 in boys. In recent years, research has increasingly identified a link between precocious puberty and environmental factors, particularly chemicals (Endocrine Disrupting Chemicals – EDCs) that negatively affect the normal functioning of the endocrine system.

In this report, we discuss the case of a 6-year-old girl diagnosed with idiopathic precocious puberty. The patient's medical history, including frequent and abundant consumption of food stored in plastic containers and processed foods (such as fast food, sweets, and foods rich in trans fats), clearly indicated significant exposure to EDCs. The patient's complaints included breast enlargement, accelerated growth rate, and mood swings over the past 6 months. The patient's mother experienced menarche at the age of 13, and her daughter had a similar development at the age of 12.5. To clarify the diagnosis, the patient's height (above the 97th percentile), weight (appropriate for age), and degree of sexual maturation were assessed. Using the Tanner scale, breast development was at stage 3, pubic hair at stage 2, and axillary hair at stage 1. Bone age, determined by X-ray examination of the left wrist and hand, was found to be 2 years ahead of the chronological age. Laboratory studies revealed elevated levels of luteinizing hormone (LH), slightly elevated follicle-stimulating hormone (FSH), and high estradiol (E2 - 65 pg/ml). To exclude hypothyroidism, thyroid function was assessed, with normal levels of thyrotropin (TSH) and free thyroxine (FT4). To rule out congenital adrenal hyperplasia and/or adrenal tumors, adrenal hormones were evaluated. The results of 17-OHP (17hydroxyprogesterone) and DHEA-S (dehydroepiandrosteronesulfate) were within the normal range for the patient's age. Prolactin levels were also normal. To exclude the possibility of a germ cell tumor, human chorionic gonadotropin (hCG) and alpha-fetoprotein (AFP) levels were evaluated, and both were within the normal range. Instrumental

studies included pelvic ultrasound (which showed that the size of the uterus and ovaries was increased, consistent with pubertal development) and magnetic resonance imaging (MRI) of the brain, which ruled out hypothalamic-pituitary tumors. Based on the studies performed, the patient was diagnosed with idiopathic central precocious puberty (ICPP). She was treated with Leuprorelin Acetate 11.25 mg injections (GnRH agonist therapy) once every 3 months. Growth rate, bone age, and hormonal balance were regularly monitored. The parents were advised on proper nutrition for the child, which included removing processed meat products from the diet, reducing the intake of high-fat dairy products, sugar, and refined carbohydrates.

Thus, modern research clearly indicates the significant influence of environmental factors, especially EDCs, on precocious puberty. The case discussed here further confirms that not only genetic factors but also the environment in which we live play a major role in the onset of precocious puberty. It is important to inform parents about the potential influence of environmental factors (such as healthy nutrition and reducing exposure to EDCs). These results underscore the need for regulatory policies to limit EDC exposure and further research to elucidate the causal mechanisms.

7. BEKA JALABADZE

HOST-PATHOGEN INTERACTIONS IN MYCOBACTERIUM TUBERCULOSIS: BACTERIAL EVASION AND IMMUNE DEFENSE

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Mycobacterium tuberculosis (MTB), a large, no motile, rod-shaped bacterium is a causative agent of disease tuberculosis. It has evolved to persistently evade eradication by the immune system, making it one of the leading causes of infectious mortality worldwide. Notably, MTB has developed the ability to replicate within phagocytic cells, mainly macrophages - cells that are typically responsible for eliminating pathogens.

The complex host-pathogen interactions that enable MTB to survive within macrophages and contribute to the establishment of latency are critical for its long-term persistence. In recent years, significant scientific findings have been made in understanding of how MTB manipulates host immune responses. Research has uncovered how the pathogen alters the maturation of phagosomes, interferes with autophagy, inhibits macrophage activation, and intervenes with cytokine responses to suppress inflammation and promote the formation of a latent infection. MTB relies on several mechanisms to evade immune elimination and persist within the host. It has a lipid-rich, atypical cell wall, the waxy envelope, serves as a layer of protection against degradative enzymes and low pH, making it resistant to processes such as autophagy and phagocytosis. In addition, the bacterium produces effector proteins, such as ESAT-6, CFP-10, SapM, and PknG, which interfere with host cell functions, preventing phagolysosomal fusion. Furthermore, MTB reshapes the intracellular environment, forming a stable niche in which it replicates. This also contributes to the formation of granulomas.

The interactions between MTB and the host immune system are explored to highlight key immune evasion mechanisms, to improve understanding of MTB pathogenesis.

8. BELA KURASHVILI, MARINA TSIMAKURIDZE, MAIA TSIMAKURIDZE, NINO KHACHAPURIDZE, DALI ZURASHVILI, ETERI MAISURADZE

THE ROLE OF NUTRITION IN THE TREATMENT AND PREVENTION OF CORONAVIRUS INFECTION

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During the spread of coronavirus infection, the nature of nutrition and dietary regimens are changing. Especially during the pandemic, when fresh products are less available in settings of isolation and quarantine. A balanced diet is of particular importance to strengthen the immune system. To strengthen immunity, a person must receive all the necessary nutrients: proteins, fats, carbohydrates, vitamins (A,

D, E, B6, B12), and mineral elements (Zn, Se). The use of low-calorie, detoxifying dietary products rich in these substances contributes to the favorable course and prognosis of infectious diseases.
In the composition of food products, it is important to reduce the use of sugar and sugar-containing products, since carbohydrates increase the permeability of the blood vessel walls, which, in turn, aggravates the course of the disease. To increase the body's immunity, zinc is necessary, which is part of more than 300 enzymes. Accordingly, it is important to include cereals, chicken, and seafood, which are characterized by a high zinc content, in the diet. It is important to use unrefined oil-containing vitamins A and D (especially flaxseed oil, which is rich in polyunsaturated fatty acids).
The use of vegetable and animal products promotes detoxification and activation of antibody production. For perfect nutrition, it is necessary to include fats and surfactants in the diet (consisting of 90% fat, 10% protein and carbohydrates), which helps to absorb oxygen and prevent hypoxia.
In the case of any infection, and especially coronavirus infections, it is important to have a balanced and rational diet and maintain an optimal nutrition regimen.

9. TINATIN JOJUA, KETEVAN PETRIASHVILI, PEPO JANGAVADZE

THE SWEET DANGER: HOW SUGAR DRIVES INFLAMMATORY DISEASES

Tbilisi State Medical University

Over the past 30 years, the excessive consumption of dietary sugars, including glucose, fructose, and high-fructose corn syrup (HFCS), has significantly increased the prevalence of obesity, type 2 diabetes, cardiovascular disease, and metabolic syndrome. In addition, excessive sugar intake causes systemic inflammation, which is a significant factor in developing chronic inflammatory diseases.
This study aimed to evaluate the impact of dietary sugars on the development of inflammatory processes and their role in the development of chronic inflammatory conditions, such as rheumatoid arthritis (RA), multiple sclerosis (MS), psoriasis, and inflammatory bowel disease (IBD).
Methods: In an experimental-observational study, scientists used mice on a high-sugar diet. These mice showed increased inflammatory markers, changes in the microbiome, and increased inflammation by T cells. The study also included 100 humans. Their dietary profile and levels of inflammatory markers, including IL-6, TNF-α, and CRP, were analyzed. Data were collected through blood tests and monitoring of patients' dietary habits.
The results of the study show that excessive sugar consumption causes a significant increase in the levels of inflammatory markers in adipose and other tissues, a decrease in the number of T and B lymphocytes, enhances the differentiation of Th17 cells through TGF-β and IL-6, activates macrophages, and affects the intestinal microbiome. All of these increase the risk of chronic inflammatory diseases.
The study also revealed that natural anti-inflammatory agents, such as curcumin, epicatechin, and astaxanthin, suppress sugar-induced inflammation by modulating NF-κB, MAPK, and other inflammatory cascades.
In conclusion, the study highlights the important role of excessive sugar intake in the development of inflammatory diseases and recommends the use of dietary interventions and natural anti-inflammatory agents. These data require further studies to substantiate the effectiveness of dietary interventions further.

10. IRAKLI ZAKROSHVILI

POST-COVID SMALL FIBER NEUROPATHY, IMPLICATIONS OF INNATE IMMUNITY AND CHALLENGES ON IVIG THERAPY

Tbilisi State Medical University

Small fiber neuropathy (SFN) involves damage to small unmyelinated C fibers and thinly myelinated Aδ fibers, which are responsible for pain, temperature, and autonomic functions.
The immunopathophysiology suggests that in many cases, SFN is immune-mediated. Autoantibodies (like

anti-FGFR3 or anti-TS-HDS) and immune cells can attack small nerve fibers directly or cause inflammation in the dorsal root ganglia.
It's associated with autoimmune diseases (e.g., lupus, Sjögren's, sarcoidosis), and sometimes post-infectious or vaccine-triggered. Immune dysregulation leads to nerve fiber degeneration and dysfunction. Small fiber neuropathy (SFN) is commonly observed in patients after long COVID, presenting with painful paresthesias, dysautonomia, and postural orthostatic tachycardia syndrome. The use of intravenous immunoglobulin (IVIg) therapy in post-COVID SFN cases has been considered, despite the lack of specific autoimmunity markers. A retrospective study involving nine post-COVID SFN patients with whole wide spectrum of symptoms reported symptom resolution or improvement following IVIg treatment, even up to 17 months after acute COVID-19 infection. These findings are based on retrospective data, therefore there is a need to highlight which step of SFN immunopathology is IVIg targeting and how efficacy is assessed. New evidence suggests that in SFN associated with type 1 diabetes, innate immune cells such as activated macrophages, Langerhans cells, dendritic cells, and natural killer cells contribute to clinical symptoms by releasing proinflammatory cytokines and peptidergic proteins that sensitize nociceptors on intradermal nerve fibers. Innate immunity is likely the main culprit not only in post-COVID SFN, but also in other „apparently autoimmune" SFN. Understanding the immunopathogenesis of SFN is crucial for both neurologists who have no data to justify using IVIg and for patients who are worried, that a possibly effective therapy is denied.

11. KONSTANTINE TSAGAREISHVILI, ALEXANDER TSAGAREISHVILI

SCABIES: A NEGLECTED DISEASE

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BACKGROUND: Although scabies in Georgia is under epidemiological control (as a reportable disease), it remains a growing challenge for public health. This is attributed to several factors, including the economic conditions of specific population groups, limited access to treatment, quality of medications, non-compliance with treatment regimens, and a lack of awareness about the dermatosis among primary care physicians.
MATERIALS AND METHODS: The aim of this study was to assess the total number of registered scabies cases across Georgia, including the city of Kutaisi and our clinic, from 2020 to 2023. In addition, the outpatient records of 119 patients from our clinic were analyzed for the period 2020-2024 using a specially designed questionnaire to investigate the epidemiological characteristics of scabies. Diagnosis was based on clinical examination, patient history data, microscopy of skin scrapings, and dermoscopic examination.
RESULTS: According to analysis of the annual data of scabies cases from the LEPL National Center for Disease Control and Public Health, shows that new scabies cases increased by 1.8 times in Georgia, 1.5 times in Kutaisi, and 1.7 times in our clinic during the period 2020–2023. Outpatient records of 119 patients (53% female and 47% male) from our clinic were reviewed between 2020 and 2024 to study the epidemiological features of scabies. The majority of the patients (43.7%, or 52 patients) were in the 0–14 age group, with 51.9% (27 patients) out of them being under school age (0–6 years old).
Following is the number of patients in other age groups: 15-19 years old 7.56% (9 Patients), 20-24 years old 7.56% (9 patients), 25-29 years old 5.04% (6 patients), 30-39 years old 10.92% (13 patients), 40-49 years old 15.14% (18 patients), 50> years old 10.08% (12 patients). The main part of the patients had classic clinical manifestation of scabies. Mite burrows were identified in the 0-14 years old patients, 32.69% (17 patients), often excoriated, and secondarily infected.
Only one patient had clinical manifestation of crusted scabies, which was universal process on the skin with hyperemia, the hyperkeratotic areas, crusts, deep fissures, including face, eyebrows, pinna, neck and limbs.
According to data from our clinic, the main focus of scabies transmission to healthy individuals were families, kindergartens, schools, and organized activity groups such as dance and sports teams. Assessment showed that 1/3 of family members were infected. In 40% of these cases, the source of infection within

the household was children aged 0–14 years, in 64.70% of cases (77 patients), the duration of disease ranged from 3 weeks to 3 months.
Among sexually active men aged 20-29 years (8 patients), the majority (88.89%) acquired scabies from sexual partners. The assessments revealed the high stigma related to scabies, as the patients were ashamed the diagnosis considering the disease associated to the low hygiene standards, 90% of the interviewed adults.
The main reasons for late scabies cases (lasting one month or more) included: incorrect diagnosis, even in case of correct diagnosis, failure of treatment of all close contacts, particularly in larger families (with four or more members), kindergarten, school, organized activity groups such as dance and sports teams, it also included improper usage of medications, substandard drug quality, the inability to conduct repeated treatment when necessary due to financial constraints.
CONCLUSIONS: As far as the scabies stays the common disease for the resource limited countries, it is important to have deeper and wider epidemiological study in Georgia and conduct the relevant measures to reduce the cases in the Country.

12. LIA LOMIDZE [1,3], EKA EKALADZE [2,3], NANA KVARATSKHELIA [1], VENERA DAVITULIANI [1,2], IRINE KEKELIDZE [2]

POSTNASAL DRIP AS CAUSE OF CHRONIC COUGH

[1]ENT National Center, [2]TSMU, [3]KWIU

Background: Postnasal Drip Syndrome (PNDS) is a leading cause of chronic cough, often associated with rhinosinusitis, cough variant asthma, and gastroesophageal reflux disease. PNDS is a clinical diagnosis of exclusion, lacking definitive diagnostic tests or objective findings.
Objective: This study aimed to investigate the prevalence of chronic cough associated with PNDS following the COVID-19 pandemic and evaluate the effectiveness of conventional treatment methods.
Methods: A cohort of patients presenting with chronic cough was assessed for PNDS. Conventional treatment efficacy was analyzed, and cases unresponsive to standard therapy were further evaluated through complex treatment approaches.
Results: Our findings indicate a significant increase in chronic cough cases post-COVID-19.
Conclusion: The prevalence of PNDS-related chronic cough has risen post-pandemic. Standard treatment approaches may be insufficient in certain cases, necessitating a more comprehensive treatment strategy. Further research is needed to optimize management protocols for PNDS- induced chronic cough.

13. IRMA MANJAVIDZE, DALI CHITAISHVILI, PIRDARA NOZADZE, LIA OTIASHVILI, NANA JIKIDZE

EVALUATING THE EFFECTIVENESS OF SIMULATION-BASED LEARNING FOR RESPIRATORY PROCEDURES IN UNDERGRADUATE MEDICAL EDUCATION

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Background. Simulation-based learning (SBL) is gaining popularity in medical education. However, its use in teaching respiratory procedures, such as managing asthma, COPD, and pulmonary fibrosis, has not been extensively explored. These procedures are crucial for diagnosing, monitoring, and treating respiratory diseases, foundational to effective clinical decision-making and patient care. This study aims to assess how second-year medical students perceive the effectiveness of SBL in learning respiratory procedures.
Methods. The respiratory procedures topic was incorporated into the "Clinical Skills" syllabus for second-year medical students. This topic covered essential skills that must be acquired by graduation, as defined by the National Sectoral Benchmarks in Medical Education. The skills included in the syllabus were peak flowmetry, spirometry, oxygen therapy, oropharyngeal, nasopharyngeal, orotracheal, and nasotracheal suctioning, inhalation therapy, and postural drainage. Upon completing the course, students were asked

to complete an anonymous survey to assess their satisfaction with the new topic, the effectiveness of simulation-based learning (SBL), and the impact on their clinical confidence.
All second-year students enrolled in the fall semester of the 2024-2025 academic year were eligible (n=228). A total of 124 students returned the survey, yielding a 54% response rate. The survey included 5-point Likert-scale questions assessing overall satisfaction, the effectiveness of simulation, the usefulness of SBL in understanding respiratory procedures, and students' confidence in performing these procedures. Binary questions evaluated students' perceived preparedness to handle respiratory conditions in clinical settings.
Results. A total of 124 students responded to the survey. Regarding overall satisfaction, 74.2% rated it as "satisfied" (4), and 16.1% rated it as "very satisfied" (5). The effectiveness of SBL in teaching respiratory procedures was rated positively, with 71.8% rating it as "effective" (4) and 12.1% as "very effective" (5). The majority (76.6%) felt that SBL significantly improved their understanding of respiratory procedures. Confidence in performing procedures increased post-module, with 71.8% feeling "confident" (4) after completing the course. Regarding clinical preparedness, 76.6% felt more prepared to handle respiratory conditions. Some students raised concerns about insufficient time for skill labs and limited access to equipment.
Conclusion. Simulation-based learning in respiratory procedures was well-received, with students reporting improved understanding, confidence, and preparedness. Addressing resource limitations will further enhance the effectiveness of SBL in medical education.

14. G. KIRTADZE [1], G. MKHEIDZE [2], N. NAKUDASHVILI [1,2], M. TSABADZE [1,2], I. KEKELIDZE [3], Z. NAKUDASHVILI [4], M. KEVANISHVILI [1]

DIAGNOSIS, MANAGEMENT AND SURGICAL APPROACHES OF NASAL SEPTAL PERFORATION

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Nasal septal perforation (NSP) is a defect in the nasal septum that may result from trauma, previous surgery, infection, inflammatory diseases, or substance abuse. Patients with NSP often present with symptoms such as nasal crusting, whistling, epistaxis, nasal obstruction, and varying degrees of discomfort. Diagnosis is primarily clinical, with anterior rhinoscopy and nasal endoscopy playing crucial roles in evaluating the size, location, and impact of the perforation. Imaging may be required in cases of suspected underlying pathology.
Management strategies depend on symptom severity and perforation size. Asymptomatic or small perforations can often be managed conservatively with nasal hydration, saline irrigation, and emollients. Larger or symptomatic perforations may necessitate surgical repair, which remains challenging due to high failure rates and difficulty in achieving stable tissue coverage. Various surgical techniques have been developed, including local mucosal flap advancement, interpositional grafts (such as acellular dermis, cartilage, or fascia), and free tissue transfer. The choice of technique is influenced by perforation size, mucosal mobility, and surgeon expertise. Recent advancements, including the use of biomaterials, tissue engineering, and endoscopic approaches, have shown promise in improving surgical outcomes.
Despite surgical innovations, achieving complete closure with long-term success remains difficult, with recurrence rates varying. A meticulous surgical approach, adequate tissue mobilization, and postoperative care are crucial for optimizing outcomes. Preventative measures, such as avoiding nasal trauma and treating underlying conditions, are essential in reducing NSP occurrence. Future research into regenerative medicine and novel biomaterials may further improve the success rates of NSP repair. This review discusses the etiology, diagnosis, and current surgical techniques available for managing nasal septal perforations, highlighting traditional, emerging and our own approaches to optimize patient outcomes.

15. TAMAR BURJANADZE, MAIA MATOSHVILI, NINO ADAMIA, MANANA KOBAKHIDZE, MARIAM TUTASHVILI

AQUAGENIC URTICARIA: PATHOPHYSIOLOGY, DIAGNOSIS AND MANAGEMENT

TSMU, M. Iashvili Children's Central Hospital

Aquagenic Urticaria (AU) is a rare dermatological disorder characterized by the development of pruritic wheals and erythema upon exposure to water, irrespective of its temperature or source. While the exact pathophysiology remains uncertain, several hypotheses suggest a role for water-soluble antigens triggering mast cell degranulation or abnormal sweat gland response. The condition primarily affects young individuals and can significantly impact quality of life. Diagnosis is confirmed through water challenge test, and treatment options include antihistamines, barrier protection, and in severe cases, omalizumab or phototherapy. This thesis aims to provide a comprehensive review of AU, including its epidemiology, pathophysiology, clinical presentation, diagnostic criteria, and current management strategies, while also highlighting areas for future research.

Introduction. Aquagenic urticaria is a unique condition presenting challenges in dermatology and allergy medicine. Its impact on daily life is substantial, as water exposure triggers distressing symptoms. Despite its rarity, increasing awareness in necessary to improve diagnosis and treatment.

Pathophysiology and Clinical Presentation. AU manifests as pruritic wheals and erythema within minutes of water exposure, resolving shortly after drying – in the period of 30 minutes and 2 hours. While AU can happen in adults and children of any gender, it is more common in females during or after puberty. Proposed mechanisms include histamine release from mast cells and hypersensitivity to water-soluble antigens. Differential diagnoses include cholinergic urticaria and aquagenic pruritus.

Diagnosis and Management. Diagnosis relies on clinical history and water challenge tests. This test involves applying a cloth dampened with room temperature water to the skin for about 20 minutes. If the patient develops hives, the diagnosis is confirmed. Standard treatments involve non-sedating antihistamines, while barrier methods such as topical oils can reduce symptoms. Severe cases may require omalizumab or phototherapy. Psychological support is also essential for affected individuals.

Conclusion. Though rare, AU significantly affects quality of life. Advancing research into its pathophysiology and treatment options is crucial for improving patient care and long-term management.

16. MAIA MAGLAPERIDZE

OPTIMIZING THE DIAGNOSIS AND TREATMENT OF PSORIASIS ASSOCIATED WITH STREPTOCOCCAL INFECTION

Russian Peoples' Friendship University

Introduction: Psoriasis (Ps) is one of the most common chronic dermatoses, affecting 3 to 7% of the global population, according to various authors. Being a genetically determined immunopathological disease, psoriasis is characterized by hyperproliferation of epidermal cells, impaired differentiation of keratinocytes, and immune system dysfunction with the formation of immune-dependent cytokines and mediators.

The Aim of the Study: Investigation of new links in the etiopathogenesis of psoriasis associated with streptococcal infection by assessing the expanded spectrum of microbiota in key biotopes (skin, throat, intestines) and development of a complex treatment plan considering the identified factors.

Methods of the Study. All patients in the main group and the control group underwent a comprehensive clinical and laboratory examination, including: Collection of family history/anamnesis and disease history; Physical examination: To determine the severity of the pathological lesion, a standardized method for assessing PASI (Psoriasis Area and Severity Index) was used. Clinical and biochemical blood tests; CMSM (Chromato-Mass Spectrometry of Microbial Markers) of blood, skin, and throat swabs. The method is highly sensitive and rapid (requiring only 3 hours for a complete analysis cycle). Blood analysis—ASLO (anti-streptolysin O) and ANCA (antineutrophil cytoplasmic antibodies).

Examinations - 1 Stage Results: Analysis of the laboratory results revealed the following: 28% of patients (n=7) showed a slight increase in ASLO levels (more than 200); 28.5% (n=8) revealed Strep. viridans or Strep. aureus cultured in 10, 4-5 degrees; and ANA level was negative in all patients (100% of cases). Thus, the clinical significance of such indicators as ASLO, ANA, and levels of Strep. viridans or Strep. aureus at psoriasis (Ps) is extremely low. This prompted us to use more sensitive research methods to investigate the role of *Strep. pyogenes* in the pathogenesis of Ps and its identification.

Conclusion. Using the chromatographic mass spectrometry method of microbial markers (CMSM), a disruption of micro biocenosis was revealed in patients with Ps, characterized by an increase in the concentration of 6 opportunistic pathogenic microorganisms ($p<0.05$): coccal microflora (Streptococcus spp., Staphylococcus aureus); microorganisms of the Clostridia group (intestinal flora: Clostridium perfringens, Clostridium propionicum). Microorganisms causing purulent skin lesions (Propionibacterium acnes); fungi of the Candida genus; increase in endotoxin levels ($p<0.05$); and a normal concentration of lactobacilli.

17. NINO TORADZE, TINATINI MIGINEISHVILI, ANA PETRIASHVILI, NINO ADAMIA, GVANTSA JAJANIDZE

DERMATOMYOSITIS IN CHILDREN: CASE REPORT

Tbilisi State Medical University, M. Iashvili Children's Central Hospital

General overview. Juvenile dermatomyositis is a rare inflammatory, autoimmune disease, characterized by progressive weakness of the proximal skeletal muscles, which can lead to complete immobility. In addition to the weakness of the proximal muscles, the disease is characterized by periorbital swelling, purplish-lilac erythema, and a heliotrope rash on the cheeks. Symmetrical Gottron's papules appear on the extensor surfaces of joints, especially on the proximal interphalangeal joints. The differential diagnosis of dermatomyositis should include post-viral myalgia, polymyositis, rheumatoid polymyalgia, systemic lupus erythematosus, and systemic scleroderma. In order to diagnose this condition, we use the Childhood Myositis Assessment Scale (CMAS). The primary treatment includes glucocorticoids, with prednisone being the most commonly used. Our case highlights the importance of thorough patient examination and appropriate management.

Case Discussion. A 3-year-old girl was admitted to the M. Iashvili Central Pediatric Hospital, who, according to her parents, had experienced changes in her walking pattern, weakness, and increased restriction of movement for one month. Additionally, periorbital swelling and difficulty swallowing were noted. Prior to hospitalization, the parents consulted a neurologist, who excluded neurological pathology. For further investigation, they sought care in the emergency department of M. Iashvili's Central Pediatric Hospital. Upon admission, the patient's general condition was concerning. The child had restricted movement, periorbital purplish-lilac erythema, a heliotrope rash on the face, Gottron's papules on the interphalangeal joints of the hands, a change in voice tone, and difficulty swallowing. The mucosa of the oral cavity was clean, with moderate hyperemia of the posterior pharyngeal wall. Peripheral pulse was of average fullness and tension, capillary refill time was > 2 seconds, and skin turgor was decreased. On auscultation, breath sounds were equally distributed on both sides. The abdomen was soft, non-tender on palpation, and the patient had normal urination and defecation. The patient was evaluated using the Childhood Myositis Assessment Scale (CMAS), and a diagnosis of juvenile dermatomyositis was made. The patient underwent electromyography. Laboratory tests showed elevated creatine kinase levels (2000 U/L), an increase in antinuclear antibodies (1:1280), and liver function tests suggesting juvenile dermatomyositis. The patient was treated with pulse methylprednisolone therapy. Despite positive results in paraclinical tests, significant clinical improvement was not observed during the first week. On the 9th day of hospitalization, the patient's condition began to improve, and paraclinical tests showed positive dynamics. Due to this, the patient was discharged on the 21st day after admission.

Discussion: Our case demonstrates that dermatomyositis in children is a rare and remains a significant challenge for physicians. It requires careful anamnesis, rapid differential diagnosis, appropriate management, and active monitoring during treatment.

18. LASHA TCHELIDZE, NINO ADAMIA, IA PANTSULAIA, PIRDARA NOZADZE

EOSINOPHILIC ESOPHAGITIS: ALLERGIC OR GASTROINTESTINAL DISEASE?

Tbilisi State Medical University, Department of Medical Biology and Parasitology; M. Iashvili Central Children's Hospital, Department of Pediatrics

Eosinophilic esophagitis is a chronic inflammatory Th2 cell-type immune-mediated disease characterized by the presence of more than 15 eosinophils in esophageal biopsy material using a high-power field (HPF). It is recognized as the most common cause of dysphagia in the population. Its prevalence is on average one patient per 2500 population, although the disease is characterized by a high prevalence in Caucasians and/or males. This is associated with the presence of single nucleotide polymorphisms (SNPs) in pseudoautosomal regions of sex chromosomes. The exact statistical data on eosinophilic esophagitis in many countries of the world, including Georgia, are unknown. This is associated with incorrect or delayed diagnosis. Modern diagnostic principles include the assessment of the disease by a gastroenterologist based on endoscopic findings using the EREFS classification (total score - 8), which includes five main signs: the presence of edema, rings, exudate, fissures and strictures in the esophageal tube. Eosinophilic esophagitis requires appropriate differential diagnosis with diseases such as gastroesophageal reflux disease (GERD), celiac disease, various intestinal malformations, food allergies, and diseases with other functional disorders of the esophagus. The code of the etiopathogenesis of eosinophilic esophagitis is supplemented by the existence of eosinophilic gastrointestinal diseases (Non-EoE-EGIDs), between which there are significant differences in immunopathophysiology, clinical and paraclinical manifestations. Based on a systematic review of the literature, we discussed the main aspects of eosinophilic esophagitis and eosinophilic gastrointestinal diseases and presented the differences between them in the form of diagrams and tables. Based on the systematic analysis, we also determined that the main treatment options include the elimination of food allergens, the use of proton pump inhibitors (PPIs), and tropical corticosteroids. Studies are underway on the future use of monoclonal antibodies, in particular anti-IL-5 and anti-IL-13 antibodies. 60% of patients with eosinophilic esophagitis have a history of allergic diseases such as asthma, rhinitis, atopic dermatitis, and food allergies. Therefore, the disease can be considered an important link between gastroenterology and allergology, requiring an interdisciplinary approach, timely diagnosis, and treatment.

19. VAKHTANG BERIDZE [1,2], TAMAR BAKHTADZE [1,2], SOPHIO BERIDZE [2], MIRANDA SHERVASHIDZE [1,2], MEGI KHABAZI [1,2]

RESPIRATORY SYMPTOMS IN URBAN AND RURAL CHILDREN IN THE ADJARA REGION (GEORGIA)

[1]Shota Rustaveli State University, Batumi, Georgia; [2]Maternity and Child Health Center, Batumi, Georgia

Background: A population-based survey showed 65% of children with asthma remain undiagnosed. Because of the unknown frequency of asthma and other common allergic diseases in children living in Georgia we conducted a population-based respiratory health survey. The objective of the study was to estimate the prevalence of Respiratory symptoms in urban and rural children of the Adjara Region (Western Georgia) and to examine their familial and environmental correlates.

Methods: The cross-sectional study included 3238 urban and 2081 rural children aged 5-17 years. Physician-diagnosed respiratory diseases and symptoms were ascertained using the ISAAC questionnaire completed by the parents. Both family and environmental factors were examined for their association with respiratory health outcomes including asthma and spastic bronchitis. Descriptive statistics and multiple logistic regression analysis were used to test associations.

Results: The overall prevalence of asthma was larger in rural children than in urban children (2.8% vs. 1.8%, respectively; p=0.01). Spastic bronchitis occurred with similar frequency in urban (7.8%) and rural children (6.5%). Compared with urban children, rural subjects had dry cough at night (13.1 vs 8.2%, p<0.001) and attacks of dyspnea (4.7 vs 2.4%, p<0.001) more often. The prevalence of other symptoms did not differ significantly between urban and rural subjects. Results of multivariate analyses showed that

both asthma and spastic bronchitis were associated ($p<0.05$) with parental history of asthma, dampness in the house, and poor financial standing of the family. In addition, asthma was related to coal/wood-based heating whereas spastic bronchitis was associated with passive smoking and lower parental education.
Conclusions: The findings show a low prevalence of ever-diagnosed asthma in the examined population. Nosological tradition and similar correlates of asthma and spastic bronchitis suggest that some cases of asthma might be included in the diagnostic category of spastic bronchitis.

20. MARIAM GIORGASHVILI, DATA KEKUTIA, NINO ADAMIA

THE IMMUNOLOGICAL IMPLICATIONS OF GUILLAIN-BARRE SYNDROME FOLLOWING UPPER RESPIRATORY INFECTIONS IN PEDIATRIC PATIENTS

Tbilisi State Medical University, M. Iashvili Children's Central Hospital

Introduction. Guillain-Barré Syndrome (GBS) is a rare, immune-mediated disorder causing rapid-onset muscle weakness and areflexia, often following infections. It affects 1-2 per 100,000 children annually, with upper respiratory infections as a common trigger. This case highlights a five-year-old girl who developed GBS post-infection, stressing the importance of early diagnosis.
Case Presentation. A previously healthy five-year-old developed fever, sore throat, and cough, followed a week later by progressive limb weakness. Examination revealed muscle weakness, areflexia, and sensory disturbances. Nerve conduction studies confirmed GBS, and cerebrospinal fluid (CSF) analysis showed elevated protein with normal cell counts (albuminocytologic dissociation).
Pathophysiology & Clinical Implications. GBS arises from an immune response attacking peripheral nerves, likely due to molecular mimicry. Prompt recognition is vital, as early treatment with intravenous immunoglobulin (IVIG) improves recovery. A multidisciplinary approach minimizes complications and long-term effects.
Conclusion. Understanding GBS triggers is crucial for prevention and treatment. Future research should identify pathogens associated with pediatric GBS and explore targeted therapies. Increased awareness among healthcare providers enables timely intervention and better patient outcomes.

21. LASHA TCHELIDZE, TINATINI MIGINEISHVILI, NINO ADAMIA, DAVIT MAKHATADZE

IMMUNOPATHOPHYSIOLOGY OF CROHN'S DISEASE AND MODERN HORIZONS OF DIAGNOSTICS

Tbilisi State Medical University, Department of Molecular Biology of the Cell and Parasitology, M.Iashvili Children's Central Hospital

Introduction. Crohn's disease is a chronic autoimmune inflammatory granulomatous disease that affects the entire digestive tract, especially the terminal part of the ileum and the large intestine. Its etiology is multifactorial and includes both genetic and immunological, as well as environmental factors. The disease can develop at any age. There is an almost equal prevalence rate in both sexes. Physical examination can identify patients who have complications such as strictures, fistulas, abscesses, or other extraintestinal manifestations. The Pediatric Crohn's Disease Severity Index (PCDAI), the Montreal Classification, and the Lemann Index, adopted in 2021, are important diagnostic criteria for this disease.
Methods. Up to 15 cases of Crohn's disease have been recorded at the M. Iashvili Children's Central Clinic over the past twenty years. The aim of the study was to analyze 5 clinical cases registered in the recent past, determine gender and ethnic preferences, assess patients using the Pediatric Crohn's Disease Severity Index, Montreal Classification, and Lemann Index, and identify prognostic criteria.
Results. Based on the analysis of the medical histories of five patients, we found that the disease was more common in males (4:1). Two patients had mild to moderate Crohn's disease (PCDAI score range - 10 - 37.5), and their assessment according to the Montreal Classification was A1L2 and A2L2. The Lemann Index, which shows the degree of damage to the digestive tract in Crohn's disease, was not determined due to the absence of surgical intervention. Three patients had a relatively severe form of Crohn's disease

(PCDAI score range ->40), we confirmed the presence of fistula in two of them, and stricture in one of them by the Montreal classification. The Lemann index was approximately in the middle of the internationally recognized range - 0.2-12.6. Extraintestinal clinical manifestations such as anemia and arthritis were detected in the latter patients.

Conclusions. Our study showed that Crohn's disease is actively progressing in the pediatric age. Various extraintestinal clinical manifestations accompanied the disease in the patients we studied who required surgical intervention. A high score of pediatric Crohn's disease severity, assessment of patients by the Montreal classification (various ALB variants), and a high Lemann index indicate a relatively severe course of the disease and require careful treatment. The main line of treatment in patients with mild disease was prednisolone, and in patients with severe disease was infliximab.

22. TINATINI MIGINEISHVILI, LASHA TCHELIDZE, NINO ADAMIA, NINO KHELADZE

AUTOIMMUNE THYROID DYSFUNCTIONS IN CHILDREN WITH DOWN SYNDROME

Tbilisi State Medical University, M. Iashvili Children's Central Hospital

Introduction. Down syndrome is the most common genetic condition caused by 21st chromosome trisomy. Among the associated diseases of Down syndrome, thyroid gland autoimmune pathologies are noteworthy, which manifest as both hypothyroidism and hyperthyroidism. Their clinical manifestation depends on the timing of disease development, the level of damage, and the degree of thyroid hormone deficiency or excess. Due to the variety of accompanying clinical symptoms and low specificity, diagnosing thyroid pathologies in children with Down syndrome is based on clinical presentation, anamnesis, laboratory, and instrumental data.

Methods. We retrospectively studied the medical history of 4 patients. The aim of the study was to assess the thyroid function based on the clinical presentation, anamnesis, laboratory data (TSH, FT4, anti-TPO, anti-TTG, total-IgG), and instrumental data (thyroid ultrasound) of children with Down syndrome.

Results. Based on the analysis of 4 patients' medical histories, we found that thyroid pathology was present in 1 patient in the form of hyperthyroidism and 2 patients in the form of hypothyroidism. In 1 patient, congenital hypothyroidism progressed to thyrotoxicosis. In patients with hypothyroidism, the following clinical symptoms were observed: loss of appetite, meteorism, constipation, and insomnia. In patients with hyperthyroidism, the following clinical symptoms were observed: enlarged thyroid gland, Graves' ophthalmopathy, difficulty breathing, drooling, dental caries, anxiety, irritability, and sleep disturbances.

Conclusions. Our study shows that thyroid gland pathologies are common among the associated diseases of Down syndrome. Timely, accurate, and regular medical monitoring of thyroid function plays a crucial role in the growth and intellectual development of children with Down syndrome.

23. SALOME MAGHLAKELIDZE, KETEVAN GOTSADZE, NERIMAN TSINTSADZE, EKA LILUASHVILI, MURAD TSINTSADZE, PIRDARA NOZADZE, ANKA KOBAKHIDZE

MANAGEMENT OF ODONTOGENIC SINUSITIS – A MULTIDISCIPLINARY APPROACH

Evergreen Clinic; Tbilisi State Medical University, Georgia

Odontogenic sinusitis, a form of maxillary sinus inflammation originating from dental infections or procedures, presents a unique diagnostic and therapeutic challenge due to its overlapping manifestations with rhinogenic sinusitis. This condition demands a collaborative approach involving dental professionals, otolaryngologists, and radiologists for accurate diagnosis and effective management. This review highlights the etiology, clinical presentation, and diagnostic strategies essential for differentiating odontogenic sinusitis from other sinus pathologies. Emphasis is placed on the importance of imaging modalities such as cone-beam computed tomography (CBCT). Treatment protocols are discussed in the context of both dental and sinus pathology, integrating surgical and non-surgical interventions. The multidisciplinary approach ensures comprehensive care, minimizes recurrence, and enhances patient

outcomes. This paper underscores the critical need for interprofessional collaboration in addressing the complex nature of odontogenic sinusitis.

24. IRINE NAKHUTSRISHVILI, KHATIA KHACHIDZE, KETEVAN GOTSADZE, SOPHIO JAPIASHVILI, TINATIN KHOZREVANIDZE, MARIAM TUTASHVILI

INFECTIOUS MONONUCLEOSIS AND ITS MANIFESTATION IN OTOLARYNGOLOGICAL PRACTICE

American Hospital and Reiman Clinic, TSMU, Tbilisi, Georgia

Infectious mononucleosis is a viral infectious disease, most commonly caused by the Epstein-Barr virus (EBV). The disease is widely prevalent in pediatric and early adolescent populations and is characterized by a variety of clinical manifestations, among which otolaryngological symptoms are particularly frequent. Pharyngotonsillitis caused by EBV is often the initial clinical manifestation of infectious mononucleosis and presents a significant challenge in terms of differential diagnosis.

Diagnosis is based on the assessment of clinical signs, along with laboratory tests - atypical lymphocytosis in the blood, EBV serological tests (VCA-IgM, VCA-IgG, EBNA), and, if necessary, PCR diagnostics. The therapeutic approach is primarily symptomatic and includes antipyretic, anti-inflammatory, and immunomodulatory treatment. Antibiotic therapy is considered only in cases of complicated disease progression or superinfection.

Timely recognition and management of infectious mononucleosis in otolaryngological practice is crucial, both to avoid inappropriate therapy and to ensure the patient's rapid recovery. Pharyngotonsillar inflammation, cervical lymphadenopathy, and hypertrophy of the nasopharyngeal mucosa often appear in the early stages of the disease, requiring differentiation from other serious conditions, including nasopharyngeal carcinoma.

Of particular concern is the fact that EBV is considered one of the etiological factors in the development of nasopharyngeal carcinoma, which necessitates even greater attention to timely diagnosis and monitoring of the virus. This paper reviews the clinical manifestations of infectious mononucleosis, its diagnostic features, and its potential association with malignant neoplasms of the nasopharynx. The role of the otolaryngologist is emphasized in both early diagnosis and the prevention of potential complications.

25. SOPHO JAVAKHADZE, KETEVAN GOTSADZE, KHATIA KHACHIDZE

LANGERHANS CELL HISTIOCYTOSIS IN OTORHINOLARYNGOLOGY

Japaridze-Kevanishvili Clinic; Curatio; Reiman's Clinic; TSMU, Department of Otolaryngology, American Hospital, Tbilisi, Georgia

Langerhans cell histiocytosis (LCH) is a rare disease that begins in LCH cells. LCH cells are a type of dendritic cell that normally helps the body fight infection. Sometimes mutations develop in genes that control how dendritic cells function. These include mutations of the *BRAF*, *MAP2K1*, *RAS*, and *ARAF* genes. These mutations may cause too many LCH cells to grow and build up in certain parts of the body: like skin, lymph nodes, lungs, liver and bone marrow, they also can form granulomas in upper and lower limbs. Risk factors of LCH can be exposing to virus like Epstein-Barr. Also having a parent who was exposed to certain solvents; Having a parent who was exposed to metal, granite, or wood dust in the workplace, having a family history of cancer or LCH, having a personal history or family history of thyroid disease, having infections as a newborn, smoking, not being vaccinated as a child. One of the most exposed organs to LCH are bones of the skull. This led to all damage and destruction of temporal and especially mastoid bones. For diagnosis we need to perform clinical-laboratory and instrumental tests (pet ct). Also very important is morphology. Treatment of LCH is surgery, radiation therapy, bone marrow transplant, chemotherapy.

26. NANA KAPANADZE

JOB'S SYNDROME (HYPER-IGE SYNDROME)

Tbilisi State Medical University

Job's syndrome or hyper-immunoglobulin E syndrome (HIES) is a rare, heterogeneous complex of primary immunodeficiency disorders. It is characterized by triad of extremely high serum immunoglobulin E (IgE) levels, recurrent cutaneous infections like chronic eczematous dermatitis, skin abscesses and recurrent pulmonary infections. These patients have characteristic facial appearance and many oral manifestations. Eosinophilia, retention of deciduous teeth and skeletal abnormalities are other important clinical features of this syndrome. Early diagnosis and treatment prevent progressive pulmonary sequelae and increase survival. About 200 cases of Job's syndrome has been reported worldwide. Familial HIES is of two types depending on the type of gene involved; autosomal-dominant Job's syndrome (AD-HIES), which develops due to mutation in human signal transducer and activator of transcription 3 gene (STAT3) and autosomal recessive Job's syndrome caused by DOCK8 gene mutation, but most cases are sporadic.

27. A. KOBAKHIDZE, A. MERKULAVA

CHRONIC RHINOSINUSITIS: GLOBAL TRENDS EPOS-20

"Belarusian State Medical University" Minsk, Republic of Belarus

Objective: Chronic rhinosinusitis (CRS) is a prevalent inflammatory condition of the paranasal sinuses, significantly impacting quality of life and healthcare systems worldwide. The EPOS-2020 guidelines provide updated insights into its epidemiology, pathophysiology, and management. This review highlights global trends in CRS as per EPOS-2020, focusing on diagnostic criteria, emerging phenotypes (e.g., CRS with/without nasal polyps), and evidence-based treatment strategies.

CRS affects ~5–12% of the global population, with variations across regions due to environmental and genetic factors. Endotype-driven classification now guides personalized therapy, including biologics for severe cases. The document highlights the heterogeneity of the disease: - CRSwNP (with CRS polyps): predominantly Th2-mediated inflammation, with the participation of IL-5, IL-13 and IgE. - CRSsNP (without CRS polyps): Th1/Th17-response and the role of biofilms. Particular attention is paid to microbiome imbalance and epithelial barrier dysfunction. EPOS-2020 recommends: Clinical criteria (symptoms lasting more than 12 weeks: nasal congestion, discharge, pain/pressure); Endoscopic examination to identify polyps; CT scan according to the Lund-Mackay system only before surgical intervention.

Therapeutic approaches: 1. Conservative treatment: Intranasal corticosteroids (first-line therapy). Antibiotics (macrolides in doses to reduce inflammation). 2. Surgical: FESS* (Functional Endoscopic Sinus Surgery) in case of failure of medical treatment. 3. Biological therapy: Anti-IL-4/IL-13 (dupilumab) and anti-IgE (omalizumab) for severe CRSwNP.

Conclusions. EPOS-2020 reinforces the shift toward precision medicine in CRS, addressing unmet needs through novel biomarkers and targeted therapies. Global collaboration is essential to optimize diagnostic and therapeutic frameworks. EPOS-2020 emphasizes a personalized approach based on endotyping and multidisciplinary collaboration. Despite progress, challenges remain, such as the identification of diagnostic biomarkers and the availability of biologics.

28. MIRANDA SHERVASHIDZE, ANA CHIKHRADZE, TAMAR BAKHTADZE, KHATIA DOLIDZE, TAMAR SHERVASHIDZE

OBESITY-RELATED HYPERTENSION IN ATHLETE CHILDREN

Batumi Shota Rustaveli State University, M. Iashvili Batumi Maternal and Child Central Hospital

In recent years there has been a dramatic increase in the prevalence of overweight in children and adolescents. Obesity is often associated with hypertension, which is an important cardiovascular risk

factor. Obesity during childhood is clearly not a benign condition. The higher the body mass index (BMI), the greater the likelihood of adverse cardiovascular risk factors. Overweight in childhood carries up to a 10 times higher risk of being overweight in adulthood. Obesity during childhood and adolescence is one of the strongest predictors of adult hypertension.
Outcomes related to childhood obesity include hypertension, type 2 diabetes mellitus, dyslipidemia, left ventricular hypertrophy, nonalcoholic steatohepatitis, obstructive sleep apnea, and orthopedic problems as well as social and psychological problems.
Our Aim was examining the trends in childhood blood pressure and the relationship between excess body weight and the development of hypertension and provide relevant recommendations.
Methods and Results: we performed an echocardiographic assessment of the cardiovascular system and also conducted 12-lead ECG monitoring and calculated their BMI. in 305 athletes aged 8 to 17 years, A group of 63 children was selected from these - including 42 rugby players and 19 judokas. Most participants did not have any symptoms or complaints of cardiac disease. Our study revealed that 24 (38%) participants had elevated blood pressure across three separate visits (white-coat hypertension was included). 21 (33%) participants had a BMI in the 90th percentile, and 10 (15%) had a BMI in the 95th percentile. 24 (36%) participants had a BMI in the 75th percentile.
Conclusion: Our study led to the identification of elevated blood pressure in rugby players and judokas and highlighted that it is more common in overweight and obese children. All overweight and obese children were subsequently referred to a pediatric endocrinologist.

29. DAVID BAKHTURIDZE, TAMAR MAGHLAKELIDZE, TEMUR CHIBURDANIDZE

MAXILLARY EXPANSION IN CASE OF SKELETAL ASYMMETRIES

Kote Mardaleishvili Clinic, Tbilisi, Georgia

Maxillo-facial skeletal asymmetry refers to the quite common multifactorial pathological process, that can be manifested not only in functional (chewing, speaking, breathing), but in esthetic disturbances. Undeveloped maxilla (narrowing in axial space) separately or in combination with other pathological processes, can be seen as one of the reasons for skeletal asymmetries.
Depending on the patient age, stage of skeletal development and the degree of skeletal deformation, treatment varies from the orthodontic-prosthodontic methods to the surgical expansion. Among the surgical methods, MARPE is biologically the most controlled version with adolescents and adults. It increases the control over the result and decreases the necessity of orthognathic surgery.
Based on experience, maxillary surgical expansion improves the functional disturbances and esthetic problems in a short period. Expansion of upper airways is also an important fact among the results. It improves breathing and can be considered as a treatment or prophylactic method of the frequent pathology – sleep apnea.

30. NESRETIN FATIH TURGUT

WHAT IS SIALENDOSCOPY?

Samsun Education and Research Medical University, Samsun Medikana Hospital, Turkey

Sialendoscopy is a modern and minimally invasive method used to visualize and treat the salivary gland ducts.
When is it Used? - Salivary gland stones; Ductal strictures; Recurrent salivary gland infections; Sjögren's syndrome; Salivary gland problems due to radioactive iodine therapy.
How is it Performed? - Using a thin endoscope, the duct of the salivary gland is accessed through the mouth. If necessary, stones are removed, strictures are dilated, or the duct is flushed. The procedure is usually performed under local anesthesia and does not require hospitalization.
What are the Advantages? - No surgical incision required; Fast recovery; Direct treatment option; Reduction in recurrent infections and dry mouth.
Remember: Sialendoscopy allows early diagnosis and effective treatment of many salivary gland diseases.

31. NINO OZBETELASHVILI, KETEVAN PETRIASHVILI, IA FANTSULAIA, NINO ADAMIA, PIRDARA NOZADZE, NINO TOTADZE, IRMA UBIRIA, DALI SHOVNADZE

NANOPARTICLES AND RESPIRATORY IMMUNOTHERAPY

Tbilisi State Medical University, M. Iashvili Children's Central Hospital, Department of Pediatrics

Nanoparticles and their application in the immunotherapy of respiratory diseases represent a major advancement in medical science. In recent years, nanotechnology has opened new possibilities for treating asthma, allergies, and other respiratory conditions. Due to their specific size, shape, and surface morphology, nanoparticles enable the targeted delivery of active substances, significantly enhancing the effectiveness of medications while reducing the risk of side effects. This study explores the mechanisms by which nanoparticles suppress allergic reactions, improve asthma treatment, and modulate the immune system. Of particular interest is their proper integration into clinical practice, which enhances drug efficacy and allows for a more personalized treatment approach.

The study **aims** to evaluate the potential of these technologies and analyze the outcomes of combining immunotherapy with nanoparticles.

Study Objectives: Investigate the use of nanoparticles in treating allergic asthma and other respiratory diseases. Assess the potential of inhalation vaccines, focusing on their efficacy and impact on the immune response.

Results: The study found that nanoparticles play a crucial role in the treatment of allergic asthma and other respiratory diseases. Nanotechnology enables the precise delivery of medications, reducing side effects and improving therapeutic outcomes. The size and surface morphology of nanoparticles are particularly important, as they enhance immune responses and accelerate the exchange of therapeutic compounds within the body.

Additionally, clinical trials of inhalation vaccines indicate their effectiveness in strengthening the immune response, representing a significant advancement in the treatment of allergic and asthmatic conditions. The high efficacy of inhaled vaccines, coupled with minimal side effects, offers a safer and more efficient treatment strategy. As a result, the study suggests that the combined use of nanoparticles and inhalation vaccines presents a promising and safe approach for the future treatment of respiratory diseases.

ავტორთა საყურადღებოდ!

1. ორიგინალური სტატია უნდა წარმოადგინოთ ერთ ეგზემპლარად, დაბეჭდილი 1,5 ინტერვალით, შრიფტის ზომა - 12 პუნქტი; ქართული, რუსული და ინგლისური ტექსტი აკრეფილი უნდა იყოს შრიფტით Sylfaen, ფორმატში Microsoft Word.
2. სტატიის მოცულობა არ უნდა იყოს 5 გვერდზე ნაკლები და უნდა შეიცავდეს ციტირებული ლიტერატურის სიას, ცხრილებს და გრაფიკებს.
3. პირველ გვერდზე მიუთითეთ: 1) ავტორის (ავტორების) სახელი და გვარი სრულად; 2) სტატიის სათაური; 3) კათედრა, ლაბორატორია ან ორგანიზაცია, ქალაქი, ქვეყანა.
4. სტატიას უნდა დაერთოს რეზიუმე ინგლისურ და ქართულ ენებზე, თითოეული მოცულობით არა უმეტეს 0,5 გვერდისა.
5. ტექსტში ბიბლიოგრაფიული მითითებები აღნიშნეთ ნომრით, კვადრატულ ფრჩხილებში, ლიტერატურის ნუსხის შესაბამისად. მიუთითეთ ნაშრომის სახელწოდება, გამომცემლობა, წელი, ტომი, ნომერი და გამოშვება, გვერდების აღნიშნვით.
6. სტატიას ბოლოში ერთვის პირველი ავტორის ხელმოწერა, სამეცნიერო ხარისხი და წოდება, მისამართი და ტელეფონის ნომერი.
7. ჟურნალის სარედაქციო კოლეგია იტოვებს უფლებას შეასწოროს და შეამოკლოს ჟურნალში გამოსაქვეყნებელი სტატია რეცენზენტის შენიშვნების გათვალისწინებით.
8. ჟურნალის სარედაქციო კოლეგია პასუხს არ აგებს გამოქვეყნებული მასალის შინაარსზე.
9. ხელნაწერები, რომლებიც არ შეესაბამება აღნიშნულ წესებს, უბრუნდება ავტორს განხილვის გარეშე.

INFORMATION FOR AUTHORS

1. A single copy of an original article should be typed 1.5-spaced, font size 12, on sheets of paper with standard margins. It's desirable to submit an article typed in Microsoft Word.
2. The articles submitted should not be less than 5 typed pages, including list of references, tables and figures.
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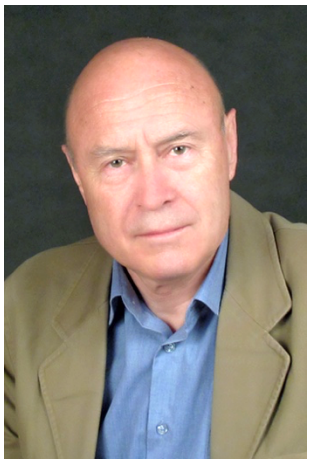
მთავარი რედაქტორების გვერდი
Page of Editors-in-chief

ნინო ჯავახიშვილი - მთავარი რედაქტორი 1999-2012 წლებში
გამოჩენილი ქართველი მეცნიერი და საზოგადო მოღვაწე. დიდი ანატომი. საქართველოში კლინიკური მორფოლოგიის ფუძემდებელი. თბილისის სახელმწიფო სამედიცინო ინსტიტუტის კურსდამთავრებული (1935). მედიცინის მეცნიერებათა კანდიდატი (1941). მედიცინის მეცნიერებათა დოქტორი (1949), პროფესორი (1953), საქართველოს მეცნიერებათა დამსახურებული მოღვაწე (1965), საქართველოს მეცნიერებათა აკადემიის აკადემიკოსი (1979). საქართველოს მეცნიერებათა აკადემიის ექსპერიმენტული მორფოლოგიის ინსტიტუტის დირექტორი (1959-2006), საპატიო დირექტორი (2006-2012). ჯილდოები: ღირსების ორდენი, ლენინის ორდენი, შრომის წითელი დროშის ორდენი, ხალხთა მეგობრობის ორდენი, საპატიო ნიშნის ორდენი. 300-მდე სამეცნიერო ნაშრომის, 9 მონოგრაფიის ავტორი.

Nino Javakhishvili - Editor-in-Chief in 1999-2012
Prominent Georgian scientist and public figure. Great anatomy. Founder of clinical morphology in Georgia. Graduate of Tbilisi State Medical Institute (1935). Candidate of Medical Sciences (1941). Doctor of Medical Sciences (1949), Professor (1953), Honored Worker of Science of Georgia (1965), Academician of the Georgian Academy of Sciences (1979). Director of the Institute of Experimental Morphology of the Georgian Academy of Sciences (1959-2006), Honorary Director (2006-2012). Awards: Order of Honor, Order of Lenin, Order of the Red Banner of Labor, Order of Friendship of Peoples, Order of Merit. Author of about 300 scientific works, 9 monographs.



ბორის კორსანტია - მთავარი რედაქტორი 2013-2020 წლებში
გამოჩენილი ქართველი მეცნიერი, იმუნოლოგი. საქართველოში ვირუსოლოგიის ერთ-ერთი ფუძემდებელი. ვიტებსკის სახელმწიფო სამედიცინო ინსტიტუტის კურსდამთავრებული (1964). ლენინგრადის ექსპერიმენტული მედიცინის ინსტიტუტის ასპირანტი (1964-1967), მედიცინის მეცნიერებათა კანდიდატი (1967), ლენინგრადის სსრკ ჯანდაცვის სამინისტროს გრიპის ინსტიტუტის დოქტორანტი (1972-1975), მედიცინის მეცნიერებათა დოქტორი (1975), პროფესორი (1980), მედიცინის და ბიოლოგიურ მეცნიერებათა აკადემიის აკადემიკოსი. საქართველოს ექიმთა პოსტდიპლომური განათლების ასოციაციის დამფუძნებელი, ვიცე-პრეზიდენტი, კონფერენციების სამეცნიერო დირექტორი.
290 სამეცნიერო ნაშრომის და 5 მონოგრაფიის ავტორი.

Boris Korsantia - Editor-in-Chief in 2013-2020
Prominent Immunologist, one of the founders of Virology in Georgia.
Graduate of Vitebsk State Medical Institute (1964). Postgraduate student at the Leningrad Institute of Experimental Medicine (1964-1967), Candidate of Medical Sciences (1967), PhD student at the Leningrad Institute of Influenza of the Ministry of Health of the USSR (1972-1975), Doctor of Medical Sciences (1975), Professor (1980), Academician of Academy of Medicine and Biology. Founder, Vice President and Scientific Director of the Georgian Postgraduate Medical Association. Author of 290 scientific works and 5 monographs.

ნატო კორსანტია - მთავარი რედაქტორი 2021 წლიდან
ექიმი დერმატოვენეროლოგი. თბილისის სახელმწიფო სამედიცინო უნივერსიტეტის, კანისა და ვენერიულ სნეულებათა დეპარტამენტის ასოცირებული პროფესორი. თბილისის სახელმწიფო სამედიცინო უნივერსიტეტის კურსდამთავრებული (2001). საქართველოს მეცნიერებათა აკადემიის ბიოტექნოლოგიის ინსტიტუტის ასპირანტი იმუნოლოგიასა და ალერგოლოგიაში (2001-2003), თსსუ დერმატო-ვენეროლოგიის რეზიდენტი (2002-2005).
მედიცინის მეცნიერებათა კანდიდატი (2003).
50-ზე მეტი სამეცნიერო ნაშრომის ავტორი.

Nato Korsantia - Editor-in-Chief since 2021
Doctor Dermatovenerologist. Associate Professor, Department of Dermato-venereology, Tbilisi State Medical University.
Graduate of Tbilisi State Medical University (2001). Postgraduate student in Immunology and Allergology at the Institute of Biotechnology of the Georgian Academy of Sciences, Resident of TSMU Dermato-Venereology (2002-2005).
Candidate of Medical Sciences (2003).
Author of more than 50 scientific works.