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Diagnosis And Approaches To Treatment Of Patients Of All Ages With Simultaneous Presentation Of Ent And Cardiovascular Pathologies And Neonatal Conditions

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ABSTRACT

Modern medical practice increasingly encounters clinical cases where patients exhibit symptoms affecting multiple body systems simultaneously. A special risk group includes patients presenting complaints related to a combination of ENT (ear, nose, throat) pathologies, cardiovascular dysfunction, and neonatal conditions. These cases require not only high professional expertise from treating physicians but also coordinated efforts across multiple specialties—from neonatology to cardiothoracic surgery.

The presence of overlapping symptoms (e.g., dyspnea, cyanosis, reduced general tone, breathing disturbances) can complicate accurate diagnosis, especially when dealing with newborns or young children who are unable to clearly articulate their sensations. Moreover, interrelated pathologies may mask each other, increasing the risk of diagnostic errors and inappropriate therapy selection. This issue is relevant both for congenital developmental anomalies (such as nasopharyngeal hypoplasia combined with cardiac defects) and acquired conditions that complicate chronic disease progression.

This paper presents modern approaches to the comprehensive diagnosis of such conditions. Special attention is given to instrumental and laboratory diagnostic methods—from endoscopic evaluation of ENT pathologies to echocardiography and duplex vascular scanning. Functional testing methods (ECG, spirometry, pulse oximetry) and their interpretation across different age groups are also discussed.

The influence of congenital and acquired factors on the development of combined pathologies is analyzed, including genetic syndromes, intrauterine infections, immunodeficiency states, and environmental exposures. Clinical case examples are presented to demonstrate the effectiveness of a multidisciplinary approach in real-world settings.

In the treatment section, algorithms for selecting therapeutic strategies based on patient age, severity of condition, and prognosis are reviewed. Conservative treatment options, indications for surgical intervention, rehabilitation, and postoperative monitoring are described. Particular emphasis is placed on safety and minimizing risks when treating newborns and infants within the first year of life.

Keywords: *neonatology, ENT symptoms, cardiological problems, integrated diagnostics, interdisciplinary approach, comorbidity, vascular disorders, autoimmune diseases.*

1. INTRODUCTION

Modern medicine increasingly faces patients presenting with multiple complaints and manifestations involving various organs and systems. Particularly complex are cases where patients exhibit concurrent symptoms from the ENT organs (ears, throat, nose) and the cardiovascular system[1]. These conditions may arise from isolated pathologies of either organ or system, or from common etiological factors, including inflammatory processes, vascular disturbances, autoimmune mechanisms, or metabolic changes.

A distinct subgroup consists of newborns and infants within the first year of life, in whom combined pathology may present with nonspecific signs—such as cyanosis, respiratory distress, decreased activity, impaired sucking, and failure to gain weight. These symptoms may be associated not only with congenital heart defects but also with anatomical peculiarities of the upper airways or perinatal neurological pathology. In such cases, timely diagnosis and proper interpretation of the clinical picture become key factors for a favorable outcome.

ENT diseases such as chronic tonsillitis, sinusitis, otitis, or pharyngitis often manifest with nonspecific features that may obscure or exacerbate symptoms of cardiovascular issues—for example, hypertension, ischemic heart disease, or arrhythmias[2]. Conversely, cardiovascular diseases can trigger secondary changes in ENT organs, such as impaired microcirculation, mucosal edema, or reduced local immunity. This situation complicates diagnosis and necessitates integration of knowledge among specialists from different fields to identify the true cause of the patient's complaints.

The relevance of this issue lies in the fact that diagnostic errors or delayed treatment can lead to disease progression, complication development, and deterioration in the patient’s quality of life. Additionally, comorbid conditions significantly influence the choice of therapeutic strategy, since many medications used in cardiology or otorhinolaryngology may have contraindications or interact with each other.

2. MATERIALS AND METHODS

During the preparation of this article, several research methods were employed. A literature review was conducted, analyzing contemporary publications from domestic and international sources focusing on the relationship between ENT and cardiovascular diseases. Clinical guidelines, diagnostic and treatment standards, and interdisciplinary management recommendations for patients with multisystem complaints were reviewed. Pathogenetic mechanisms such as inflammation, atherosclerosis, metabolic disturbances, and autoimmune reactions were also analyzed.

During the comparative analysis, various diagnostic approaches to identifying the causes of combined ENT (ear, nose, throat) and cardiovascular symptoms were compared. The effectiveness of modern diagnostic methods (laboratory tests, instrumental examinations) was evaluated depending on the presumed nosology. In addition, clinical cases from practice were compared to identify common patterns and differences in disease progression.

Using clinical-pathogenetic analysis, the mechanisms of disease development were studied, including the impact of chronic inflammation in ENT organs on vascular wall and heart status, as well as the role of immune responses, cytokines, and other inflammatory mediators in the formation of comorbid conditions. Furthermore, risk factors indicating the dominance of one or another pathology (e.g., patient age, medical history, laboratory data) were analyzed. Principles of a multidisciplinary approach were applied to develop unified diagnostic and treatment algorithms, with due consideration given to the specifics of collaboration between specialists of different profiles during patient management.

3. RESULTS

The problem of comprehensive diagnostics for patients presenting simultaneous complaints related to ENT symptoms and cardiovascular disorders is highly relevant. Modern medicine faces an increasing frequency of patient visits where combined ENT and cardiovascular symptoms are observed[3]. These cases represent complex diagnostic challenges, since symptoms may be caused by either isolated pathologies of each organ or system, or by shared etiological factors. This creates the risk of misinterpreting the clinical picture, which can lead to delayed diagnosis of the underlying disease, disease progression, and the development of complications.

The relevance of this issue lies in the multiple interconnections between ENT organs and the cardiovascular system[4]. Chronic inflammatory processes in ENT organs, such as tonsillitis or sinusitis, can trigger systemic body reactions, including activation of the immune system and increased levels of pro-inflammatory cytokines. These changes can negatively affect the vascular wall and heart, contributing to the development of atherosclerosis, arterial hypertension, or other cardiovascular diseases.

Conversely, cardiovascular disorders such as ischemic heart disease or arrhythmias can cause secondary changes in ENT organs. For example, reduced blood supply to nasal and throat mucous membranes can lead to chronic inflammatory processes, tissue edema, and decreased local immunity[5]. Moreover, some medications used in the treatment of cardiovascular diseases may have side effects that worsen the condition of ENT organs.

An additional challenge is that clinical manifestations of ENT pathologies and cardiovascular problems often overlap. Furthermore, comorbid conditions significantly influence the choice of therapeutic strategy. Many drugs used in cardiology or otolaryngology may have contraindications or interact with each other, requiring special attention when prescribing treatment[6]. For example, the use of vasoconstrictive agents to relieve nasal congestion may adversely affect the cardiovascular system in patients with hypertension.

Thus, the issue of comprehensive diagnostics for patients with concurrent ENT symptoms and cardiovascular disorders is extremely urgent. It requires integration of knowledge among physicians of various specialties, implementation of modern examination methods, and development of standardized algorithms for managing these patients. Only a multidisciplinary approach will allow timely identification of the true cause of symptoms, optimization of treatment, and improvement in patients' quality of life.

Newborns and infants in the first months of life represent a special group of patients characterized by high organism vulnerability, immature adaptive mechanisms, and insufficient specificity of clinical symptoms. At this age, many diseases may manifest with general, nonspecific signs such as dyspnea, cyanosis, reduced general tone, breathing disturbances, episodes of apnea, refusal to suckle, lethargy, or irritability. These symptoms may stem from a wide range of causes -from congenital heart defects to anatomical peculiarities of ENT organs or consequences of perinatal nervous system injury.

It is especially difficult to identify the leading component of the pathological process when several systemic disorders coexist. For example, cyanosis and dyspnea may be caused by either a congenital heart defect with left-to-right shunt or upper airway obstruction (e.g., laryngomalacia, laryngeal stenosis, bilateral vocal cord paralysis), or a combination of these conditions. In such children, paradoxical improvement of the condition in the prone position is often observed, which may indicate upper airway obstruction. However, this important diagnostic sign may be missed without thorough anamnesis and dynamic observation of the child.

Another diagnostic difficulty is the inability of newborns to verbalize their complaints. Physicians are fully dependent on objective examination findings, parental observations, and instrumental diagnostic methods. The clinical picture may mimic more common neonatal conditions, such as neonatal respiratory distress syndrome (RDS), hypoxic-ischemic encephalopathy, infectious processes, or metabolic disorders.

Timely diagnosis is of critical importance because delays in identifying life-threatening conditions may lead to progressive hypoxia, development of complications involving the central nervous system, deterioration of neurological prognosis, and even fatal outcomes. This is particularly critical in cases of combined congenital malformations of ENT organs and the heart—such as Pierre Robin sequence, 22q11.2 deletion syndrome (DiGeorge syndrome), or Edwards syndrome - where multiple anomalies require a comprehensive approach and coordination between pediatricians, neonatologists, otolaryngologists, cardiologists, and geneticists.

Therefore, diagnosis in newborns presenting combined symptoms from ENT organs, cardiovascular system, and neonatal conditions requires not only a deep understanding of age-related physiological characteristics but also the use of modern diagnostic tools, including ultrasound of the heart and neck, endoscopic airway evaluation, brain MRI, genetic testing, and continuous clinical monitoring in hospital settings. Only such a systemic approach ensures timely care and improved prognosis for this category of patients.

Combined ENT and cardiovascular symptoms require special attention from physicians across multiple specialties[7]. Pathologies of hearing, nose, and throat organs may present as independent conditions or as manifestations of systemic diseases, including cardiovascular disorders. For example, chronic inflammatory processes in ENT organs, such as tonsillitis or sinusitis, may provoke systemic reactions by activating the immune system and increasing levels of pro-inflammatory mediators[8]. These changes may negatively affect vascular wall integrity and heart function, promoting the development of atherosclerosis, arterial hypertension, or other cardiovascular diseases.

It should be emphasized that there is an increasing proportion of cardiovascular lesions unrelated to rheumatism but occurring against a background of tonsillar origin. Metabolic disturbances in the myocardium predominate over inflammatory ones: so-called metabolic insufficiency of cardiomyocytes develops[9]. Myocardial contractile capacity changes according to energy-dynamic cardiac insufficiency (hypodynamic syndrome), the severity of which primarily depends on the clinical manifestations of cardiomyopathy. A.Yu. Ovchinnikova notes that decompensated chronic tonsillitis (CT) causes functional disorders of the cardiovascular system (tonsillogenic cardiomyopathy) in 86% of cases, placing these patients in a high-risk group for cardiovascular pathology. Clinically evident tonsillogenic cardiomyopathy develops in 61% of cases, while latent forms occur in 25%, detectable only through stress tests, predominantly ergospirometry, and manifested as reduced tolerance to physical exertion[10].

Primarily, associated cardiovascular diseases include acute rheumatic fever (ARF), chronic rheumatic heart disease (CRHD), functional cardiovascular changes, and systemic vasculitides. ARF is a post-infectious complication of CT, representing a systemic connective tissue disease predominantly affecting the cardiovascular system (carditis), joints (migratory arthritis), brain (chorea), and skin (erythema marginatum, rheumatic nodules). It develops after infection with Group A beta-hemolytic

streptococcus (GABHS) in individuals with hereditary predisposition. It typically occurs 2–4 weeks after an episode of acute or exacerbation of CT.

Currently, the most severe manifestation of ARF, determining the disease prognosis, is rheumatic carditis. Endocardial involvement is more common and may lead to valvular heart defects. Mitral valve involvement is frequent, and auscultation may reveal a blowing systolic murmur with chordal «click» at the fifth auscultation point with its epicenter over the apex of the heart[11]. With aortic valve involvement, a diastolic murmur is heard at the projection point of the aortic valve (second intercostal space on the right at the edge of the sternum) and at Botkin's point. However, the auscultatory picture is not always so clear-cut. In one-third of patients, mitral and aortic valve involvement is detected only via echocardiography (EchoCG). Myocardial damage due to streptococcal antibodies in CT is characterized by impaired cardiac conduction and the appearance of blocks—most commonly first-degree AV block, less frequently second-degree AV block, SA block, intra-atrial block, and bundle branch block. Additionally, signs of ARF may include previously undetected rhythm disturbances (extrasystoles, sinus tachycardia, sinus arrhythmia, migration of the pacemaker within the atria, etc.).

Common toxic-allergic manifestations include joint involvement in the form of polyarthritis or arthralgias[12]. The classical presentation of such conditions is migratory polyarthritis (more frequently affecting large and medium-sized joints), which resolves without residual organic changes–unlike arthritis associated with other diseases. Rheumatic heart disease (RHD) is a condition characterized by persistent damage to heart valves in the form of post-inflammatory marginal fibrosis of valve leaflets or established valvular pathology (insufficiency and/or stenosis), following prior acute rheumatic fever (ARF).

Systemic vasculitis represents a group of diseases united by primary destructive involvement of vessel walls of varying calibers and secondary involvement of organs and tissues in the pathological process[13]. The clinical presentation of systemic vasculitides in the initial phase shares common features caused by the development of a general inflammatory syndrome. These include elevated body temperature (febrile or subfebrile), pain in various locations (joints, muscles), anemia, leukocytosis, accelerated erythrocyte sedimentation rate (ESR), dysproteinemia, increased levels of immunoglobulin A, presence of C-reactive protein (CRP), circulating immune complexes, and cryoglobulins in the blood[14]. All these manifestations also serve as screening criteria that otolaryngologists should use to determine the clinical form of chronic tonsillitis (CT) and prescribe appropriate treatment.

Conversely, cardiological problems such as ischemic heart disease, arrhythmias, or heart failure may cause secondary changes in ENT organs. Circulatory disturbances can lead to reduced blood supply to nasal, pharyngeal, and auditory mucous membranes, resulting in tissue edema, chronic inflammation, and diminished local immunity[15]. Moreover, certain medications used for treating cardiovascular diseases may have adverse effects on ENT organs, exacerbating their condition.

Clinical manifestations of such combined pathologies often overlap, complicating differential diagnosis. For example, dizziness, tinnitus, or weakness may be related both to impaired circulation in the vertebrobasilar basin and to pathology of the middle ear or Eustachian tube[16]. This emphasizes the necessity of comprehensive patient evaluation, taking into account all possible causes of symptoms.

The interconnection between cardiovascular diseases and ENT pathologies is based on shared pathogenetic mechanisms, among which inflammatory processes, autoimmune reactions, and vascular disturbances play a key role[17]. Chronic inflammatory processes in ENT organs, such as tonsillitis, sinusitis, or otitis, may trigger systemic responses, activating the immune system and promoting the production of pro-inflammatory cytokines that affect vascular wall integrity, accelerate atherosclerosis, increase thrombosis risk, and elevate blood pressure.

Autoimmune reactions may also act as a link between cardiovascular and ENT pathologies[18]. For instance, chronic infections in the nasopharynx may lead to antibody formation that mistakenly attacks the body's own tissues, including cardiac or vascular cells. This may result in conditions such as rheumatism, myocarditis, or vasculitis, which negatively affect cardiovascular function.

Vascular disturbances occupy a special place in the relationship between heart disease and ENT pathologies. Insufficient blood supply to nasal, pharyngeal, and auditory mucosa may occur against a background of atherosclerosis, hypertension, or other cardiovascular issues, leading to weakened local immunity, delayed tissue regeneration, and intensified inflammatory processes in ENT organs[19]. In turn, ENT pathologies may influence vascular status—for example, through constant activation of the sympathetic nervous system or altered blood rheology due to chronic infection.

Modern instrumental and laboratory diagnostic methods play a crucial role in identifying primary pathology and establishing causal relationships between ENT diseases and cardiovascular issues[20]. These techniques not only clarify the nature of pathological changes but also help assess their interconnections, especially in multisymptomatic conditions.

Echocardiography helps evaluate cardiac status, detect structural changes (e.g., myocardial hypertrophy), contractile dysfunction, or heart valve defects potentially linked to systemic inflammatory processes[21]. Doppler ultrasound of head and neck vessels allows identification of flow disturbances in the vertebrobasilar basin, often causing dizziness, tinnitus, and hearing loss. Ultrasound imaging of soft neck and facial tissues is used to assess ENT organs, including tonsils, paranasal sinuses, and Eustachian tubes.

Radiography of the nose, paranasal sinuses, and chest organs helps identify inflammatory processes such as sinusitis, pneumonia, or pleurisy, which may share common etiological factors[22]. Computed tomography (CT) and magnetic resonance imaging (MRI) allow detailed examination of anatomical changes in ENT organs and the cardiovascular system, including foci of chronic infection or atherosclerotic vascular lesions.

Tonal audiometry and impedance testing are used to assess hearing function and detect sensorineural hearing loss potentially related to vascular disturbances[23]. Assessment of Eustachian tube function helps identify ventilation disorders of the middle ear, commonly encountered in combination with ENT and cardiovascular pathologies.

Electrocardiography (ECG) and 24-hour Holter monitoring enable detection of cardiac rhythm disturbances, myocardial ischemia, or other cardiologic pathologies linked to systemic inflammation or metabolic disturbances. Rhinoscopy, laryngoscopy, and otoscopy allow visualization of nasal, pharyngeal, and auditory mucosal status, helping identify foci of chronic infection or inflammation.

Measurement of leukocyte count, C-reactive protein (CRP), and other inflammatory markers helps identify the activity of inflammatory processes potentially related to either ENT or cardiovascular diseases. Lipid profile analysis (cholesterol, LDL, HDL) and glucose testing allows assessment of atherosclerosis risk and its impact on ENT organ perfusion[24].

Antibody level determination (e.g., to streptococcal antigens) helps identify chronic infections that may trigger autoimmune reactions such as rheumatism or vasculitis. Cytokine profiling enables assessment of pro-inflammatory activity and its influence on the cardiovascular system.

Bacteriological culture of nasal, throat, or ear discharge helps identify pathogens responsible for systemic complications, including cardiological issues. Thyroid hormone level testing is important, as thyroid dysfunction may simultaneously affect cardiac function and cause mucosal edema in ENT organs. In some cases, genetic testing may reveal predispositions to autoimmune or hereditary conditions that may link ENT symptoms with cardiovascular abnormalities.

Modern diagnostic methods allow not only the identification of primary pathology but also the establishment of causal links between ENT and cardiological conditions. For example, combining echocardiography, vascular Doppler, and cytokine analysis may help understand how chronic tonsillitis contributes to atherosclerosis development[25]. Use of CT or MRI together with microbiological investigations enables precise localization of infectious foci and assessment of their systemic effects.

Differential diagnostic approaches play a critical role in identifying common etiological factors linking ENT symptoms and cardiovascular disturbances. To exclude or confirm such factors as infectious agents, atherosclerosis, autoimmune mechanisms, and others, it is essential to carefully analyze clinical data, patient history, and results of additional tests.

One important aspect of differential diagnosis is identifying the role of infections in combined pathologies. Chronic infection foci in ENT organs, such as tonsillitis, sinusitis, or otitis, may provoke systemic reactions[26]. For example, streptococcal infection in the nasopharynx may lead to rheumatism or myocarditis. Important questions to address include:

1. Are there signs of chronic infection in ENT organs (e.g., enlarged tonsils, purulent nasal discharge)?
2. What is the dynamics of the inflammatory process in the patient (acute vs. chronic course)?
3. Is there evidence of previous infectious diseases that could have triggered systemic complications?
4. Do microbiological findings confirm the presence of pathogenic microorganisms in the throat, nasopharynx, or other ENT organs?

Atherosclerotic vascular changes may be a cause of both ENT symptoms (e.g., hearing loss due to impaired blood supply to the inner ear) and cardiological issues (ischemic heart disease, arterial hypertension). It is important to assess:

– the presence of risk factors for atherosclerosis in the patient (age, smoking, overweight, lipid metabolism disorders);

– whether there are clinical manifestations of vascular disturbances, such as dizziness, tinnitus, or intermittent claudication;

– whether ultrasound studies or CT/MRI confirm signs of atherosclerotic vessel involvement in the head, neck, or heart;

– the level of lipids in the blood (cholesterol, LDL, HDL) and other metabolic parameters[27].

Autoimmune reactions can link ENT pathologies and cardiovascular disturbances, for example in rheumatism or vasculitis. To identify autoimmune processes, it is important to consider:

– any history of diseases associated with autoimmune mechanisms (e.g., systemic lupus erythematosus, rheumatoid arthritis);

– whether the patient presents systemic symptoms such as fever, fatigue, joint pain, which may indicate immune system activation;

– whether inflammatory markers (C-reactive protein, erythrocyte sedimentation rate) and specific autoantibodies are elevated in the blood;

– whether there is a connection between chronic infections in ENT organs and the development of autoimmune complications (e.g., following tonsillitis).

In addition to infections, atherosclerosis, and autoimmune reactions, other common etiological factors must also be considered. For instance, diabetes mellitus can lead to vascular complications affecting both ENT organs and the heart. Blood glucose levels and other metabolic parameters should be evaluated. Thyroid dysfunction may simultaneously impact the cardiovascular system and cause mucosal edema in the nasal passages and throat. Testing thyroid hormone levels is therefore necessary[28].

Nervous system damage involving structures that innervate ENT organs and regulate cardiac function may be responsible for multisymptomatic conditions. Neurological disorders must be ruled out through detailed neurological examination.

Family history, past illnesses, duration and nature of complaints, and their relationship to external factors (stress, cold exposure, physical exertion) should all be taken into account. It is essential to determine which symptoms are dominant (ENT or cardiological) and how they relate to each other.

Comprehensive examination helps exclude or confirm suspected etiological factors. For example, vascular and cardiac ultrasound, blood tests, microbiological cultures, and other methods provide objective data. Collaboration among specialists (otolaryngologists, cardiologists, immunologists, neurologists) enables a multidimensional view of the problem and facilitates identification of the most probable cause of combined symptoms.

4. DISCUSSION

Timely identification of comorbid conditions plays a key role in medical practice, especially in patients presenting with a combination of ENT and cardiovascular symptoms. Comorbidity refers to the coexistence of two or more diseases in one individual, which may interact and amplify negative effects on the body. In the context of combined ENT and cardiovascular pathologies, timely diagnosis of comorbidities is particularly significant, as these diseases can substantially influence prognosis and quality of life[29].

Comorbid conditions often exacerbate the course of primary disease and increase the risk of complications. For example, untreated chronic tonsillitis may become a source of persistent infection, increasing the risk of autoimmune reactions such as rheumatism or myocarditis[30]. These complications significantly worsen health outcomes, as cardiac tissue damage may lead to serious functional impairments. Early detection and treatment of infection foci in ENT organs help prevent progression of cardiovascular problems.

Similarly, cardiological diseases such as atherosclerosis or hypertension may worsen the condition of ENT organs –e.g., by impairing mucosal blood supply or reducing local immunity. This may result in chronic inflammation and persistent disturbances, such as hearing loss or chronic pharyngitis.

Comorbidities significantly reduce the patient's quality of life, causing both physical discomfort and psychological distress. For example, a combination of dizziness, tinnitus, and dyspnea may limit physical activity, lead to social isolation, and contribute to anxiety or depression. Patients with such complaints often experience difficulties in daily life, which reduces work capacity and overall life satisfaction[31].

Moreover, multisymptomatic conditions may create a sense of uncertainty and anxiety in the patient, especially if the cause remains unclear. This emphasizes the importance of timely diagnosis of all pathologies and clear explanation of their interconnections to the patient.

The presence of comorbidities requires a personalized approach to treatment, since therapy for one condition may affect another. For example, use of vasoconstrictive drugs to relieve nasal congestion may be contraindicated in patients with hypertension, as this could trigger increased blood pressure. Similarly, certain medications used in cardiology (e.g., beta-blockers) may have side effects such as mucosal dryness, worsening ENT organ status[32].

Early detection of comorbidities allows physicians to develop safe and effective treatment strategies, minimizing risks of adverse effects and drug interactions. Early identification of comorbidities enables preventive measures aimed at halting disease progression. For example, when chronic tonsillitis and early signs of atherosclerosis are detected, recommendations may include lifestyle modifications (healthy diet, smoking cessation, regular exercise) and cholesterol-lowering medications, helping to prevent severe complications such as myocardial infarction or stroke.

Timely identification of comorbidities also reduces healthcare costs by preventing complications and hospitalizations. For example, early treatment of chronic tonsillitis may prevent the development of rheumatic disease, eliminating the need for long-term therapy and rehabilitation. Moreover, optimized treatment decreases the likelihood of repeated patient visits, making healthcare more economically efficient[33].

Thus, timely identification of comorbidities plays a decisive role in improving disease prognosis, enhancing patient quality of life, and optimizing treatment. This is especially critical in cases involving combinations of ENT and cardiovascular symptoms, where the interplay between pathologies may be complex and multifactorial. Only a comprehensive approach

considering all possible contributing factors can yield positive results and ensure long-term patient well-being.

To optimize the diagnostic process and improve treatment outcomes for patients with multisymptomatic conditions, a clear examination algorithm must be developed. Such an algorithm should aim to identify primary pathology, establish causal relationships between diseases, and rule out comorbidities (see Table 1).

Table 1 Algorithm for Comprehensive Patient Evaluation

Stage	Methods of Investigation
1. Medical History Collection	1. Clarification of symptoms (nasal congestion, sore throat, hearing loss, chest pain, dizziness, dyspnea). 2. Identification of risk factors (age, smoking, heredity). 3. Analysis of past illnesses and lifestyle.
2. Physical Examination	1. ENT organ inspection: tonsils, nasal and throat mucosa, ears. 2. Cardiac and vascular auscultation. 3. Assessment of general condition (skin color, edema, neurological status).
3. Laboratory Tests	1. Complete blood count (leukocytes, ESR). 2. Biochemical blood analysis (lipid profile, glucose, electrolytes). 3. Microbiological cultures (throat, nasopharynx, ear). 4. Immunological tests (anti-streptolysin-O, rheumatoid factor).
4. Instrumental Methods	ENT Examination: 1. Rhinoscopy, otoscopy, laryngoscopy. 2. Audiometry, impedance testing. 3. Neck soft tissue ultrasound. Cardiological Examination: 1. ECG, echocardiography. 2. Doppler ultrasound of head and neck vessels. 3. Ambulatory BP monitoring (ABPM), Holter monitoring. Additional Methods: 1. CT/MRI of ENT organs and vessels.
5. Data Analysis	1. Correlation of clinical, laboratory, and instrumental findings. 2. Determination of primary pathology and secondary changes.
6. Multidisciplinary Approach	Consultations with specialists: otolaryngologist, cardiologist, immunologist, neurologist. Joint discussion of examination results.

Medical history collection is the first and one of the most important stages of diagnosis, as it allows obtaining information about the nature of the patient's complaints, their duration, and progression. At this stage, the physician clarifies which symptoms are of primary concern to the patient: nasal congestion, sore throat, hearing loss, or cardiovascular disturbances such as chest pain, dizziness, or dyspnea. It is essential to determine how long these symptoms have persisted, whether their severity has increased, if there are any triggering factors (e.g., physical exertion, stress, cold exposure), or alleviating conditions (e.g., rest, medication). Additionally, risk factors for disease development must be identified, including the patient’s age, smoking, overweight, hereditary predisposition to atherosclerosis, hypertension, or autoimmune diseases. Particular attention is paid to past illnesses, injuries, surgeries, and allergic reactions. It is also important to assess the patient's lifestyle: level of physical activity, diet, and frequency of stressful situations. All these data help form a preliminary picture of possible causes of combined ENT symptoms and cardiovascular disorders.

Physical examination aims to identify objective signs of pathology. First, ENT organs are examined: the physician evaluates the condition of the tonsils, paying attention to their size, color, and presence of purulent coating; examines nasal mucosa for edema, hyperemia, or discharge; and checks the ears for inflammatory processes or reduced mobility of the tympanic membrane. During throat examination, signs of chronic pharyngitis or other inflammatory changes may be detected. Next, heart and vascular auscultation are performed to detect murmurs, rhythm disturbances, or changes in blood pressure. The general condition of the patient is assessed: skin color (pallor may indicate anemia or circulatory insufficiency), presence of edema (especially in the lower extremities), and neurological status. This stage provides important clinical data that may indicate primary pathology or comorbid conditions.

Laboratory tests aim to reveal hidden processes in the body that cannot always be determined through physical examination. A complete blood count helps assess the presence of inflammation based on elevated leukocyte levels and erythrocyte sedimentation rate (ESR). Biochemical blood analysis provides information about lipid profile (cholesterol, high- and low-density lipoproteins), glucose levels, electrolytes, and functional indicators of liver and kidney function. Microbiological testing includes taking cultures from the throat, nasopharynx, or ear to detect pathogenic microorganisms such as streptococci, staphylococci, or other infectious agents. Immunological tests are performed when autoimmune processes are suspected. These investigations allow identification of metabolic, inflammatory, and infectious causes of combined symptoms.

Instrumental diagnostic methods enable detailed evaluation of ENT organs, the cardiovascular system, and other organs. ENT examination includes rhinoscopy, otoscopy, and laryngoscopy to visualize nasal, throat, and ear mucous membranes. Audiometry and impedance testing are used to assess hearing function, especially important in cases of hearing loss or tinnitus complaints. Neck soft tissue ultrasound helps detect sinus pathology or enlarged lymph nodes. Cardiological assessment includes electrocardiography (ECG) to identify rhythm disturbances or signs of myocardial ischemia, echocardiography to evaluate cardiac structure and function, and Doppler ultrasound of head and neck vessels to detect flow disturbances. Additional tests may include 24-hour blood pressure monitoring (ABPM) and Holter ECG monitoring to detect hidden abnormalities. If necessary, computed tomography (CT) or magnetic resonance imaging (MRI) can be performed for detailed evaluation of ENT organs and vessels. These methods allow precise localization of pathological changes and establish their interrelationships.

During the data analysis phase, all collected information is compared: patient complaints, results of physical examination, laboratory and instrumental findings. The goal of this analysis is to determine which condition is primary and which is secondary. For example, if chronic tonsillitis and signs of atherosclerosis are detected, it is important to understand whether tonsillitis is the source of systemic inflammation exacerbating vascular disturbances, or whether atherosclerosis causes reduced blood supply to ENT organs. This stage requires deep understanding of pathogenetic mechanisms and interconnections between pathologies. The result of the analysis is the formulation of a provisional diagnosis and a plan for further action.

The interdisciplinary approach involves engaging specialists from various medical fields to jointly discuss the findings. Consultations by otolaryngologists, cardiologists, immunologists, and neurologists allow the problem to be viewed from different angles and facilitate the development of a personalized treatment plan. For instance, a cardiologist may recommend correction of blood pressure, while an ENT specialist focuses on treating chronic inflammation. Joint discussion helps avoid contradictions in drug prescriptions and ensures a comprehensive approach to patient management. This stage completes the diagnostic process and serves as the basis for continued patient care.

5. CONCLUSIONS

Combined manifestations of pathologies affecting ENT organs, the cardiovascular system, and neonatal conditions represent one of the complex challenges in modern clinical medicine. This issue is particularly relevant in newborns and infants during the first months of life, where symptoms such as dyspnea, cyanosis, reduced general tone, and breathing disturbances often have nonspecific characteristics and may stem from multiple causes – from congenital anomalies to systemic diseases. This significantly complicates early diagnosis and requires a high level of attentiveness and knowledge from physicians across multiple specialties.

Due to the inability of young children to verbalize their complaints, the clinical picture may be easily misinterpreted or masked by more common neonatal conditions such as respiratory distress syndrome or hypoxic-ischemic encephalopathy. The absence of clearly defined specific signs necessitates a comprehensive diagnostic approach, including careful medical history collection, physical examination, application of modern laboratory and instrumental diagnostic methods, and involvement of specialists ranging from neonatologists and cardiologists to otolaryngologists and geneticists.

Timely differential diagnosis is of particular importance when combined developmental defects are suspected, as delays in making the correct diagnosis may lead to progressive hypoxia, central nervous system damage, and other severe complications. The use of a multispecialty approach and coordination among all participants in the treatment process enables adequate assistance at the earliest stages and significantly improves patient outcomes.

Thus, effective resolution of combined pathology issues in patients of all ages, especially newborns, is only possible under the condition of establishing clear interaction algorithms between different medical specialties, implementing modern diagnostic and treatment technologies, and increasing physician awareness of potential manifestations of such conditions.

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