

The role of timely diagnosis and treatment of ENT pathologies in maintaining the physical health of patients

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Abstract. The presented work analyzes the need for specialized diagnostic procedures in order to identify the presence of certain ENT pathologies in the patient, since their untimely detection and, as a result, treatment directly affect the physical health of a person as a whole. It is noted that a decrease in patients' attention to their health, as well as an untimely appeal to a specialized specialist for advice, can lead to the development of serious complications and even surgical intervention. The authors investigate in detail the features of common ENT diseases, possible symptoms, as well as complications that arise in the case of a chronic course of such diseases. At the same time, considerable emphasis is placed on the importance of the prevention of ENT diseases, among these measures are proper nutrition, a healthy lifestyle, regular medical examinations and following recommendations for the care of ENT organs. The paper emphasizes that timely diagnosis and treatment of ENT pathologies should be identified as key factors that ensure the necessary level of physical health of patients, for this reason, it is necessary to consult a specialist at the first symptoms of the disease. Investigating the methods of diagnosis of ENT diseases, the authors of the work also pay attention to the consideration of methods of treatment of ENT diseases, especially noting conservative therapy, since at the early stages of the development of the disease it allows to restore the patient's health without resorting to surgical intervention. Based on the results of consideration of the problem, it should be concluded that timely referral to a specialist, diagnosis and treatment of ENT diseases are necessary conditions for maintaining and improving the physical health of patients and their quality of life.

1 Introduction

The health of the ENT organs plays an important role in the overall physical and psychological well-being of a person. Diseases of the ENT organs, such as the throat, nose and ears, can lead to serious complications if you do not consult a specialist in time. The

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symptoms of these diseases can have a negative impact on the quality of life, causing painful sensations, making it difficult to breathe, disrupting sleep and nutrition [1].

Timely diagnosis and treatment of ENT pathologies are key factors for maintaining the physical health of patients. Moreover, the prevention of ENT diseases is of the same importance as the correct treatment. A healthy lifestyle, regular medical examinations, as well as knowledge of the correct methods of care for ENT organs help prevent many diseases and improve the quality of life.

According to statistics, ENT diseases are one of the most common reasons for contacting doctors. They can occur at any age, but most often affect children and the elderly [2]. Some of the most common ENT diseases include sinusitis, sinusitis, pharyngitis, laryngitis, tonsillitis, adenoiditis, otitis, etc.

Despite the fact that many ENT diseases can be treated with conservative methods, such as the use of medications, physiotherapy and other methods, surgical intervention may sometimes be required. In some cases, untimely access to a doctor and improper treatment of the diseases in question can lead to serious complications, such as hearing loss, respiratory and swallowing disorders, as well as infectious and inflammatory processes that can lead to the development of other diseases.

2 Materials and methods

In the process of writing the study, articles and monographs of various researchers in the field of otolaryngology were analyzed, the data obtained were summarized through the use of comparative and analytical research methods.

3 Results

ENT diseases are a group of diseases related to the respiratory and hearing organs, such as the nose, throat, ears and parotid glands. They can have various etiologies, including infectious, allergic, traumatic and tumor. The most common diseases of this group and their characteristics are presented in Table 1.

Table 1. The most common otolaryngological pathologies and their characteristics

Otolaryngological pathologies	Otolaryngological pathologies Characteristics and symptoms
Acute and chronic rhinitis	Acute and chronic rhinitis is an inflammatory disease of the nasal mucosa. Symptoms include runny nose, nasal congestion, coughing, itching and sneezing. Acute rhinitis is most often caused by viruses, and chronic rhinitis can be associated with allergies, prolonged use of nasal drops and other factors.
Genyantritis	Genyantritis is an inflammation of the paranasal (maxillary) sinus. Symptoms include pain in the eye sockets, nasal discharge, headache and fever.
Sinusitis	Sinusitis is an inflammation of the mucous membrane of the sinuses (sinuses) of the head. Symptoms include nasal congestion, headache, soreness in the sinuses, impaired sense of smell and general weakness.
Pharyngitis	Pharyngitis is an inflammation of the posterior pharyngeal wall and soft palate. Symptoms include sore and irritated throat, impaired voice, cough and fever.

Laryngitis	Laryngitis is an inflammation of the vocal cords and the mucous membrane of the larynx. Symptoms include hoarseness, difficulty breathing and swallowing, and soreness in the larynx.
Tonsillitis	Tonsillitis is an inflammation of the tonsils, which are located in the back of the pharynx. Symptoms include sore throat, difficulty swallowing, fever, and enlarged lymph nodes in the neck.
Adenoiditis	Adenoiditis is an inflammation of the palatine tonsils (adenoids). Symptoms include difficulty breathing, snoring, sleep disturbances, nasal congestion and fever.
Otitis media	Otitis media is an inflammation of the middle ear. Symptoms include ear pain, hearing impairment, dizziness and fever.

The considered group of diseases and complications resulting from their development can have a significant impact on the quality of life of patients, affecting their ability to work, communicate and do everyday things, therefore it is important to diagnose and treat otolaryngological pathologies in a timely manner in order to prevent possible complications and ensure good physical and mental health of patients. If the diseases in question are not treated in a timely manner or treatment is not effective enough, then they can progress into a chronic form and cause serious complications. Some of the possible complications of chronic otolaryngological pathologies include:

- development of obstructive sleep apnea. Respiratory failure during sleep, which occurs due to diseases of the upper respiratory tract, such as a chronic runny nose or adenoids. Obstructive sleep apnea can lead to a decrease in sleep quality, an increased risk of cardiovascular diseases and other complications.;
- development of acute respiratory infections. Chronic otolaryngological pathologies can weaken the immune system and make a person more susceptible to upper respiratory tract infections;
- development of sinusitis. Inflammation of the mucous membrane of the sinuses, which can become chronic and lead to headaches, nasal congestion and other symptoms;
- the development of hearing impairment. Some of the diseases in this group, such as chronic sinusitis or chronic runny nose, can lead to hearing impairment due to nasal congestion or impaired functions of the auditory tube;
- development of complications in recurrent infections. Constant recurrence of infections can lead to the development of complications such as otitis media, laryngitis and others;
- development of chronic laryngitis. Inflammation of the vocal cords and the mucous membrane of the larynx, which can lead to voice disorders and other health problems;
- development of chronic bronchitis. Inflammation of the bronchi, which can lead to coughing, difficulty breathing and other breathing problems [3].

Timely diagnosis of otolaryngological pathologies plays an important role in maintaining the physical health of patients. In particular, patients who seek medical help at the first symptoms of ear, throat or nose diseases have a high chance of avoiding complications in the future, while maintaining their overall health. It is also important here to reduce the financial burden on the patient, since the cost of treatment for complications of a particular disease will be much higher. Accordingly, the advantages of early diagnosis of otolaryngological diseases are great.

Diagnosis of otolaryngological pathologies includes various methods, depending on the nature of the disease. It is noted in the literature that the examination of a specialist is the first and main method of diagnosis. By conducting an examination of the patient, the doctor in conversation with him can also identify certain symptoms of the disease, the duration of their course, which is very important when prescribing therapy [4].

The next necessary diagnostic method is an endoscopic examination, which allows the otolaryngologist to obtain a detailed image of the organs and identify pathological changes that are invisible during a normal examination. Endoscopic examination is a safe procedure, but may be accompanied by the risk of complications, such as infection, bleeding or tissue injury [5].

X-ray examination has also been widely used in the diagnosis of this group of diseases. Pointing out the advantages of this type of diagnosis, experts note that the X-ray image is two-dimensional, does not allow you to get a detailed idea of the structure of a particular organ under study and may be limited in detecting certain pathologies, such as tumors or soft tissues.

A more accurate picture of the development of the disease, in contrast to an X-ray examination, can be given by computed tomography, which provides the possibility of creating a three-dimensional model of the internal structures of organs, which allows you to examine their structure in more detail and identify the presence of pathologies. However, there are some limitations in the use of computed tomography as a diagnostic method for determining certain types of pathologies, such as tumors or soft tissues [6].

Magnetic resonance imaging is another method of diagnosing otolaryngological pathologies. This method is based on the use of a magnetic field and radio waves to create images of internal structures of organs. It is also used to detect various diseases, such as tumors, infections, inflammations, anomalies and others [7].

Laboratory tests are widely used in the diagnosis of otolaryngological pathologies. They allow you to determine the presence and degree of inflammatory processes, infections, allergic reactions and other pathological changes. A clinical blood test helps to assess the general condition of the patient's body, determine the presence of inflammatory processes, anemia, infections and other changes. Bacteriological analysis of sputum makes it possible to determine the type and sensitivity to antibiotics of the causative agent of infection, and through allergological tests it is possible to determine the presence of allergic reactions and identify allergens that cause these reactions, and immunological tests help to assess the patient's immune system and identify the presence of autoimmune diseases. All these studies in combination with other diagnostic methods make it possible to achieve a more accurate and complete diagnostic result [8].

Traditional methods of diagnosis of otolaryngological pathologies have a number of disadvantages that can complicate or limit the accuracy of diagnosis and treatment. In particular, some methods, such as X-ray examination, do not allow to get a complete picture of the disease, since they are limited in the field of research. Individual diagnostic methods do not allow to determine the details of the disease, such as the condition of the mucous membrane or the degree of inflammation. It should also be noted the high cost of individual diagnostic methods, which is why they are not always available to patients. Some diagnostic methods, such as bacteriological analysis, require time to conduct and additional costs for laboratory equipment and reagents. In this regard, the emergence of modern methods and diagnostic technologies can significantly improve the accuracy of diagnosis and treatment of ENT diseases.

4 Discussion

At the present stage, specialists offer a number of innovative methods for diagnosing otolaryngological pathologies, which allow obtaining more accurate and detailed information about the patient's condition. One of these methods is fibrolaryngoscopy. The use of this method allows you to examine the larynx and trachea using a thin flexible endoscope. Unlike traditional laryngoscopy, this type of diagnosis does not require the use of general anesthesia and makes it possible to carry out an examination both in a hospital and on an outpatient basis

[9]. The procedure is performed using an anesthetic spray that anesthetizes the nasopharynx, and then a flexible endoscope is inserted through the patient's nose or mouth and allows you to assess the condition of the upper respiratory tract. During the procedure, the doctor may also take biopsy or mucus samples for further analysis. The diagnostic method in question is a safe procedure and can be carried out both in a polyclinic and in a hospital. It is widely used in otolaryngology to assess the condition of the upper respiratory tract, as well as to clarify diagnoses, plan treatment and monitor the effectiveness of therapy [10].

Another method – optical coherence tomography – is based on the use of laser light and optical devices and allows you to obtain a three-dimensional image of the tissues of the pharynx, nose and ears. Through the use of this diagnostic method, specialists have the opportunity to detect diseases at the earliest stages and carry out differential diagnostics.

Multi-mode photonic endoscopy is also a fairly effective method. Through the use of this diagnostic technology, it is possible to obtain multi-channel images of the surface tissues of ENT organs using several spectral channels. This method is most effective in the diagnosis of tumors, ulcers and other pathologies. Unlike traditional fibrolaryngoscopy, this method provides a more detailed image of the mucous membrane and allows you to visualize not only its surface, but also deep structures. This allows you to identify pathologies that may go unnoticed with other diagnostic methods. A feature of the method is the possibility of using several camera modes, which allows you to obtain images at different depths of light penetration and with different contrast characteristics. Depending on the mode, multimode photonic endoscopy can be used to diagnose various pathologies, including tumors, infections, inflammatory processes and injuries [11].

The method can also be used to perform a biopsy and take tissue samples for further analysis. This allows you to get a more accurate diagnosis and choose the most effective treatment method.

However, multimode photonic endoscopy is a fairly new diagnostic method, and its use is limited due to the high cost of equipment and complexity of the procedure. In addition, at the moment there are no generally accepted standards for the use of multimode photonic endoscopy and interpretation of the data obtained.

Through the use of another diagnostic method, electrocochleography, it is possible to record the vibrations of the eardrum during sound irritation. Its task is to register the activity of the cochlea and auditory nerve caused by an acoustic stimulus. The special value of the method is that it allows you to identify pathologies characteristic of vestibular hydrops. There are two methods of electrocochleography: transtympanic and extratympanic.

The transtympanic method is performed under a microscope under local anesthesia. The only indication of the method is a high degree of hearing loss. The active electrode through the puncture of the eardrum is fixed on the inner (promontory) wall of the labyrinth near the round window of the cochlea.

The extratympanic method is noninvasive. The eardrum is not involved in this study (intact), therefore, the technical solution of the method is based on the location of the active electrode in the ear canal. Next, a binding electrode is installed on the earlobe or mastoid process, and a grounding electrode is installed at the level of the seventh cervical vertebra. During the procedure, sound signals are transmitted to the patient's examined ear through headphones or special earplugs. The sound signals in this method are clicks and multi-frequency tonal messages [12].

Magnetic resonance angiography is also successfully used today, where a magnetic field and radio waves are used to create a three-dimensional image of blood vessels. Using this method of diagnosis, specialists are able to detect vascular disorders, such as aneurysms and obstruction. It is also possible to obtain more detailed information about the condition of blood vessels than other diagnostic methods, such as ultrasound and X-ray angiography, since magnetic resonance angiography does not require the use of X-rays or the introduction of

contrast agents into the circulatory system, which increases the level of patient safety [13]. However, the diagnostic method under consideration may not be sufficiently accurate in assessing certain types of blood diseases, such as small vessels and blood vessels in high-density tissues, for example in the lungs. Also, this type of examination is not carried out for patients with implanted medical devices, such as pacemakers or artificial joints, due to the possibility of their interaction with a magnetic field.

The next method is functional rhinometry, it is used to assess the function of the nose by measuring the speed and volume of air flow through the nasal passages. Using this method, allergic rhinitis and other nasal breathing disorders can be diagnosed [14].

Using such a type of diagnosis as confocal endomicroscopy, specialists, through the use of a laser beam to create images of microscopic structures on the surface of the mucous membrane of the nose and larynx, can diagnose cancer or other diseases of the mucous membrane of organs with high accuracy. During the procedure, the patient is injected with an endoscope with a confocal microscope into the oral or nasal cavity. The optical system scans the tissues and then uses computer technology to process them to create detailed three-dimensional images. This method allows you to determine the characteristics of tissues, such as their structure and condition, which can be useful in the diagnosis of various diseases, such as throat cancer, laryngeal diseases and others. The advantages of the diagnostic procedure under consideration include high accuracy and reliability of diagnosis, as well as the ability to obtain results quickly and painlessly [15]. Disadvantages of the method include the high cost and the requirement of a highly qualified doctor to perform the procedure.

Another innovative diagnostic method is the assessment of the balance of oxygenation and denitrogenation, it allows you to assess the functional state of the lateral walls of the nose and pharyngolaryngeal zone, as well as to determine the balance between oxygenation and denitrogenation in them. This type of diagnosis is based on the use of special equipment that allows you to feed a mixture of gases with a given ratio of oxygen and nitrogen into the nasal cavity and measure the concentration of these gases in the exhaled air. Assessment of the balance of oxygenation and denitrogenation is carried out by analyzing changes in the concentration of oxygen and nitrogen in the exhaled air at various points of the nasal cavity and pharyngolaryngeal zone. Experts note the painlessness and safety of this type of diagnosis, which is very important for elderly patients. As indicated by experts, this method allows to assess the condition of the mucous membrane of the nose and throat, as well as to identify violations of the balance of oxygenation and denitrogenation.

Thus, it can be concluded that innovations in the diagnostic field make it possible to carry out accurate and highly effective detection of a number of diseases at an early stage. The approaches to carrying out diagnostic procedures, which were presented above, surpass the traditional ones in terms of the accuracy of determining pathology and provide an opportunity to visualize even minor changes in organs and tissues. According to experts, it is thanks to the latest technological approaches in diagnostics that it becomes possible to make the most accurate diagnosis and, as a result, prescribe effective treatment.

New approaches to diagnosis, which have emerged due to advances in medicine, allow us to identify, along with other diseases, otolaryngological pathologies in the early stages. Accordingly, patients who have undergone a thorough diagnostic examination can start treatment in a timely manner and maintain their physical health as a whole [16].

However, it should be borne in mind that the most advanced developments in the field of diagnostics have a number of certain disadvantages, such as the high cost of procedures or the availability of the necessary training of a diagnostician [17]. But, despite this, it is difficult to overestimate their contribution to the development of modern otolaryngology, since the opportunities provided by new diagnostic developments are able to preserve the health of a large number of patients and increase the average life expectancy of people.

5 Conclusions

Today, along with other diseases, pathologies in the otolaryngological field are a fairly common phenomenon. Like other diseases, they can acquire a chronic form and negatively affect the health of the patient as a whole. The task of modern medicine is to diagnose these diseases in a timely, accurate and high-quality manner in order to prescribe appropriate treatment to patients. The importance of timely and accurate diagnosis of this group of diseases also lies in the fact that they significantly reduce the quality of life of patients and negatively affect their physical health in general.

To date, a number of methods and approaches to the organization of diagnostic procedures have been proposed in medical diagnostic practice, allowing to identify otolaryngological abnormalities at the earliest stage. Innovations in this field play a special role, as they allow performing diagnostic procedures most accurately. At the same time, despite the high efficiency, some innovative diagnostic methods can be expensive or require special equipment, which limits their availability to a wide range of patients. To achieve the best results in the diagnosis and treatment of ENT diseases, it is necessary to use an integrated approach that combines traditional and innovative methods of diagnosis and treatment, as well as an individual approach to each patient.

References

1. T. Barghouthi, F. Glynn, R.B. Speaker, M. Walsh, *Telemed J E Health*. **18(2)**, 150-152 (2012)
2. L. Biagio, W. Swanepoel, A. Adeyemo, J.W. Hal, B. Telemed, *J E Health*. **19(4)**, 252-258 (2013)
3. J. Brant, K. Leahy, N. Mirza, *World J Otorhinolaryngol Head Neck Surg* **4(2)**,135-139 (2018)
4. L.J. Caffery, M. Farjian, A.C. Smith *J Telemed Telecare* **22(8)**, 504-512 (2018)
5. G. de Greve, P.W. Hellings, W.J. Fokkens, B. Pugin, B. Steelant, S.F. Seys. *Clin Transl Allergy* **7**, 22 (2017)
6. R.H. Eikelboom, M.N. Mbaio, H.L. Coates, M.D. Atlas, M.A. Gallop, *Int J Pediatr Otorhinolaryngol* **69(6)**, 739-744 (2016)
7. M. Fieux, S. Duret, N.Bawazeer, L. Denoix, S. Zaouche, S. Tringali, *Eur Ann Otorhinolaryngol Head Neck Dis*. **137(4)**, 257-261 (2020)
8. F.G. Garritano, D. Goldenberg, *Otolaryngol Clin North Am*. **44(6)**, 1259-1274 (2011)
9. P.W. Hellings, W.J. Fokkens, C. Bachert, C. Akdis, T. Bieber, I. Agache et al. EUFOREA-ARIA-EPOS-AIRWAYS ICP statement. *Allergy* **72**, 1297-305 (2017)
10. P.J. Hofstetter, J. Kokesh, A.S. Ferguson, L.J. Hood, *Telemed J E Health*. **16(5)**, 551-556 (2010)
11. S. Kohlert, P.Murphy, D. Tse, C. Liddy, A. Afkham, E. Keely. *eConsultations. Laryngoscope* **128(2)**, 350-355 (2018)
12. R. Latifi, R.S. Weinstein, J.M. Porter et al. *Scand J Surg*. **96(4)**, 281-9 (2007)
13. T. Lundberg, G. Westman, S. Hellstrom, H. Sandstrom, *Int J Pediatr Otorhinolaryngol* **72(1)**, 73-79 (2008)
14. J.F. Ohlstein, J. Garner, M. Takashima, *Laryngoscope* **130(11)**, 2568-2573 (2020)
15. R. Philips, N. Seim, L. Matrka et al., *Laryngoscope Investig Otolaryngol* **4(2)**, 234-240 (2019)

16. S.F. Seys, S.De Bont, W.J. Fokkens, C. Bachart, I. Alobid, M. Bernal-Sprekelsen et al., *Allergy* **75**, 2867-78 (2020)
17. R. Yulzari, S. Bretler, Y. Avraham, A. Sharabi-Nov, E. Even-Tov, *P. Ann, Otol Rhinol Laryngol.* **127(1)**, 46-50 (2018)