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USE OF NASAL DECONGESTANTS TO CORRECT THE RESPIRATORY AND OLFACTORY FUNCTIONS OF THE NOSE

Nuriddinov Khusniddin Noriddinovich
Bukhara State Medical Institute,
Republic of Uzbekistan, Bukhara City

Abstract

As you know, the nose performs several important functions, among which a special place is occupied by the respiratory and olfactory. Nasal breathing is absolutely physiological, unlike breathing through the mouth. This process is carried out by resisting the intra-nasal structures (nasal valve, nasal concha) to the air flow, which createsется отрицательное давла negative pressure in the chest, which directsair from the nasal cavity and paranasal sinuses to the underlying respiratory tract. On exhalation, when the pressure inthe chest is equalized,the remaining air from the respiratory tract is directed to the nasal cavity and paranasal sinuses [1].

Introduction

Nasal breathing is closely related to the sense of smell. Odorous substance molecules (odorants) together with the inhaled air are directed to the olfactory cleft area, where there is a cluster of olfactory sensory cells. By binding to the receptors, odorants generate a signal that issent along the olfactory filaments tothe olfactory bulbs, and then to the olfactory center in the brain. The sense of smell playsan important role in human life, participates in the formation of mood, performs protective, informational functions. For workers in the field of cooking and perfumery, the ability to smell is extremely important in their work [2]. Nasal breathing difficulties, nasal congestion, and nasal discharge can makethe respiratory and olfactory functions of the nose difficult or impossible. Most often, the cause is swelling of the mucous membrane. Nasal obstruction and rhinorrhea are the most common symptoms in diseases of the nasal cavity and paranasal sinuses. They are mainly observed in acute rhinosinusitis and allergic rhinosinusitis. According to EPOS-2012, acute rhinosinusitis харакіs characterized by the presence of two or more symptoms, one of which is necessarily nasal obstruction and / or nasal discharge. Additional symptoms may include headache or facial pain and changes in the sense of smell, up to complete loss of olfactory function (anosmia). The duration of acute rhinosinusitis is less than 12 weeks [3]. According to the etiological factor, viral,bacterial, fungal, allergic rhinosinusitis and риносинуситmixed rhinosinusitis are distinguished [4]. Acute viral sinusitis presents with the symptoms listed above and usually lasts up to 10 days. Themost common etiological agent of ai is viruc of influenza A, parainfluenza, respiratoryторный syncytial virus, rhinovirus, and adenovirus [5]. Acute bacterial rhinosinusitis begins 5 days after the onset of acute respiratory viral infection, its duration can reach up to 12 weeks. On examination, purulent discharge in the nasal cavity is determined, more often on the one hand, morbiditywith palpationand percussion of the projection of theparanasal sinuses, febrile fever. There is an increase in the level of C-reactive protein and ESR in the blood. Acute bacterial rhinosinusitis can be caused by such bacteria as Streptococcus

Web of Medicine: Journal of Medicine, Practice and Nursing
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pneumoniae, Haemophilus influenzae, Streptococcus pyogenes, Moraxella catarrhalis, and Staphylococcus aureus [3]. Fungal rhinosinusitis it is most often manifested in the form of superinfection and is observed in immunodeficiency states (HIV infection, chemical therapy, etc.). Currently, there is another group of acute rhinosinusitis – recurrent acute rhinosinusitis. This diagnosisis established with exacerbation of rhinosinusitismore often 3-4 times a year. This is usually facilitated by certain anatomical features (for example, additional maxillary sinus fistulae in the posterior fontanelle) [3]. The clinicalна остроro picture of acute характerhinosinusitis is characterized by complaints of nasal congestion, nasal dischargeof a mucosal or mucopurulent, purulent nature. Complaints of decreased sense of smell are characteristic. In the classification of olfactory disorders, a separate place is occupied by post-infectious olfactory disorders, most often caused by viral agents. In this case, both quantitative (anosmia, hyposmia) andqualitative (parosmia, phantosmia) impairmentsof olfactory function can be observed. Postinfectious дизос dysosmia is characterized by a sharp onset and has the most favorable prognosis. Patients may also complain about a violationof the vc of the USA due to a violation ретроназальof the retronasal mechanism of smell [2]. During anterior rhinoscopy, attentionis drawn to hyperemia of the nasal mucosa, the presenceof discharge in the nasal cavity. During mesopharyngoscopy, mucosal or mucopurulentdischarge from the nasopharynx can flow down the back wall of the pharynx. In a general blood test, there is usually an increasein the ESR level, a shift in the leukocyte formula to the left, with a predominance of lymphocytes or neutrophils. C – reactive protein, a marker of the overall inflammatory response, also increases. Currently, it is not recommended to conduct radiation research methods in the first days of acute rhinosinusitis, as this will not affect the treatment strategy. Indications for radiation testing are the absence of positive dynamics in the resolution of symptoms, as well as the suspicion of complications. The simplest andmost reliable method of radiological diagnosisof acute rhinosinusitis is radiography near the nasal sinuses. In this case, acute sinusitis will be characterized by darkening in the projection of the involved sinus or the presence of a horizontal fluid level in it. However, the" gold standard " for the diagnosis of acute rhinosinusitis is computed tomography, which allows a more accurate and complete assessment of the condition of all paranasal sinuses, including the sphenoid sinus, which is rarely visualized on radiographs, as well as the state of the natural sinus and nasopharyngeal fistulas.Parietal thickening of the mucous membrane of the paranasal лоносовыхsinuses, a decrease in their pneumatization, and the level of exudate in the sinus with the inclusion of air bubbles can be observed [6]. Possible mild, moderate and severe acute rhinosinusitis. Mild treatment of acute риносинуrhinosinusitis is characterized by nasal congestion, nasal discharge against a background of relatively normalgeneral condition of the patient and subfebrile temperature. Acute rhinosinusitis of moderate severity is manifested by the presence of general intoxication, febrile body temperature. Ona computertomogramme in the paranasal sinuses, there isa thickening of the parietal mucosa over 6 mm or a complete decrease in the pneumatization of the sinuses [7].

In severe cases, changes in blood tests are observed, namely: an increase in the total number of white blood cells, a shift in the white blood cell formula to the left, and an acceleration of ESR. The presence of rhinogenic orbital and intracranial complications also indicates a severe course of acute rhinosinusitis [8]. According to the EPOS-2012 recommendations, it is possible to determine the severity of acute rhinosinusitisнусита using visual-analog scales, on which thepatient can clearly note the severityof symptoms in accordance with a point system from 1 to 10. However,

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the method may not be completely reliable, asit is subjective and may depend onthe emotional and cognitive status of the patient. The problem of treatment of acute rhinosinusitis is extremely important. Antibiotics are used as an etiotropic therapy for rhinosinusitiscausedbybacterial agents. Antibiotic therapy should be prescribed only for the following indications: absence of positive dynamics and relief of symptoms within 10 days from the start of treatment; темпetemperature above 38 °C, purulent dischargefrom the nasal cavity, pain during palpation and percussion of the paranasal sinus area from the moment of the onsetof the disease and for the next 4 days; "second wave" symptoms of rhinosinusitis 5 days after the ARVI process subsides. The first-line antibacterial drug for adults is amoxicillin or амокси amoxicillin + clavulanate, 1000 mg 2 times a day.гической реакции на пенициллины или отсутствии эффекCephalosporins (cefixime, cefditoren) at a dose of 200-400 mg 1-2 times a day are recommended for patients with an allergic reaction to penicillins or no effect of first-line theraруцефиксим, цефдиторен. Reserve antibiotics (3rd line) счи таются josamycin, clarithromycin, levofloxacin and moxifloxacin are considered. They should be prescribed as a last resort, in the presence of recurrent acute rhinosinusitis, hemi- or pansinusitis [8, 9].

In cases of severe fever above 38 °C, severe facial and/or headaches, and the risk of complications, maxillary sinus puncture is performed after X-ray confirmation of the presence of exudate in them [6]. The advantage of this procedure is rapid drainage of the maxillary sinus, the disadvantage is poor psychological tolerance by patients. Much attention is paid to topical therapy of acute rhinosinusitis.The main role in the pathogenesis of acutero rhinosinusitis is played by the development of edema in the nasal cavity and in the area of the paranasal sinus fistula. The occurrence of edema is associated with the activation of the parasympathetic system and the activity of NO-synthetase. NO-synthetase is produced by vascular endothelial cells of the mucous membrane, as well as by ciliated cells of the respiratory epithelium. This enzyme leads to the formation of nitric oxide, which, in turn, has a vasodilating effect and causes mucosal edema [10]. Due to theincreased activity of thesympathetic nervous system, increased secretolyticлитическая activityof goblet cells is observed, which is expressed in the form of rhinorrhea. Blockage of the paranasal sinus fistula leads to a decrease in their aircontent, stagnation of secretions in the sinus cavity and, as a result, damage to the ciliated epithelium. Swelling in the nasal cavity also extendsto the nasopharynx. The mouthsof the ear tubes swell, and the ear tube ceases to perform the function of ventilation of the tympanic cavity, the pressure in the middle ear begins to decrease. This disease is called "eustachiitis" and can later develop into acute otitis media or exudative otitis. Exudative otitis media occurs with prolonged low pressure in the middle ear cavity and perspirationof fluid fromthe microcirculatory bedthat supplies blood to the middle ear, according разницы to the principleof pressure difference. According to another theory, due to a block of the auditory tube, a secret accumulates in the tympanic cavity, which is formedthere normally and does not have a drainage path. In clinicalpractice, the classification of exudative otitis media is widely used, according to which 4 stages of its course are distinguished [11]: 1. Catarrhal – this stage is characterized by the presence of edema in the auditory tube, retraction of the tympanic membrane, and the absence of exudate behind it. 2. Secretory – the beginningof exudate accumulation in the barof the bath cavity, while the upper parts of the eardrum remain retracted, and the lower parts begin to bulge. 3. Mucosal– complete filling of the tympanic cavity with exudate. The eardrum is motionless, exudate and air bubbles are visualized behind it. 4. Fibrous-resolution of the process with the formation of adhesions and scars, atrophic changes in the tympanic membrane. The

Web of Medicine: Journal of Medicine, Practice and Nursing
webofjournals.com/index.php/5

patient's complaintsabout exudative otitis and евстахиеustachia are similar and may manifest as ear congestion, autophony, and hearing loss. With exudative otitis media, there maybe a feelingof fluid overflow in the ear and a fluctuation of hearing – scalar tightness of the ear. Scalar hearingloss occurs due to migrationof exudate in the middle ear cavity during head movement from and to the circular window [11]. Otoscopy reveals either retraction of the tympanic membrane (in eustachiitis), or its bulging with sprouting exudate with air bubbles behind the membrane. With eustachiitis обычно наблюдается , tympanometry of the "C" type is usually observed, which is associated with a decrease in pressure in the tympanic cavity, with exudative otitis, the tympanogram takes the form of a flat line – type "B", due to the fact that the exudate is an incompressible liquid and makes the movement of the tympanic membrane impossible. Prolonged course of exudative otitis media can cause the formation ofcysts and scars in the tympanicregion and, as a result, persistent hearing loss. Another possible variant of the course of eustachiitis is its transition to acute otitis media. Its pathogenesis is also based on edema of the mouths of the auditory tubes and the casting of discharge from the nasal cavity through the auditory tube into the middle ear cavity. During acute otitis media, there are three stages:: 1. Doperforativnuyu-xarakterizuetsya pain in the ear,symptoms of intoxication. Otoscopy reveals hyperemia and bulging of the tympanic membrane. 2. Perforative-at this stage, purulent contents fillingthe drum cavity break through intothe external ear canal, followedby a rapid reduction in ear pain and an improvement in the general condition. 3. Resolution stage– completerecovery or chronization of хронизациятhe process is possible. In the general blood test, leukocytosis is noted with a shift of the leukocyte formula to the left and an increase in ESR. The treatment of exudative and acute otitis media, which developed against the background of pathology of the nasal cavity, is based on rehabilitationof the nasopharynx, elimination of edema in the areaof the mouths of the auditory tubes. In acute otitis media, WHO can prescribe ear drops with antibacterial and anti-inflammatory components, as well as systemic antibiotics [11]. Finally, another complicationof acute риносинуrhinosinusitisthat is associated with auditory tube dysfunction is aerotitis. It develops during airtravel with difficulty innasal breathing and / or nasaldischarge. During a sharp pressure drop during takeoff and landing, there is a sharp edema of the pharyngeal mouth of the auditory tubes and, as a result, barotrauma, up to the development of a hematotympanum. In this regard, patients are not recommendedto expose themselves to sudden pressurechanges (air travel, diving, etc.) on the background of nasal obstruction [12]. Acute bacterial and acute viralй риносинуrhinosinusitis should be differentiated from allergic rhinosinusitis. Itis caused by allergens andis characterized by the development of IgE-dependent inflammation of the nasal mucosa. Just жelike other forms of acute го rhinosinusitis, allergic rhinosinusitis can be nasal obstruction, nasal discharge, but mainly of a mucous, "watery" nature, as well as sneezing attacks and a violation of the sense of smell. Rhinoconjunctivitis may occurриноконъюнктивита. During anterior rhinoscopy, attention is drawn to the puffiness and pallor of the mucous membrane, sometimes with a bluish tinge, abundant mucus discharge in the nasal passages. Headache and soreness during palpation of the sinuses, as a rule, is not observed. Normal body temperature is characteristic. In the leukocyte formula, an increase in the level of eosinophils is observed, and the level of IgE in the blood increases IgE[3, 4]. Allergic rhinosinusitis according to the nature of the flow, it is divided into intermittent and persistent. Intermittent allergic rhinitis usually lasts up to 4 days a week or 4 weeks a year, and does not significantly affect the quality of life. Persistent аллергиче allergic rhinitis lasts more than 4 weeks a year and is characterized by a severe course,

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webofjournals.com/index.php/5

in particular, the predominance of nocturnal symptoms. In a separate form, local allergic rhinitis occurs without increasing the level of eosinophils and immunoglobulin in the blood. Diagnosis of local allergic rhinitis is possible with провеnasalprovocation tests [3, 4]. First of all, the treatment of allergic rhinosinusitis is to limit the patient's contact with the allergen. Nasal lavage is used to remove allergen and dust particles. The use of intranasal glucocorticoids has a large evidence base глюкокортикоидов. In addition, systemic antihistamines are prescribed. Thus, the use of local vasoconstrictors is of great importance to eliminate edema in the nasal cavity and prevent complications associated with auditory tube dysfunction. Nasal decongestants (congestion) – these are drugs ющиеthat cause vasoconstriction of the nasal mucosa; they are mainly represented by the group of alpha-adrenomimetics.

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