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EDITORIAL

Aerosol therapy in ENT disorders

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Aerosols are microparticles of a liquid or solid nature dispersed in a gaseous medium. Aerosol therapy refers to the administration of certain medicinal substances in the form of microparticles to the upper respiratory tract. Initially conceived as a method of systemic treatment (due to the large absorption surface at the pulmonary level), this therapeutic method is now primarily used for its topical effect on the respiratory mucosa. The benefits of aerosol therapy have been recognized since ancient times[1-3]. The first reference to the use of aerosols as a treatment method dates back to 1554 BC, recorded on an Egyptian papyrus found in the Theban necropolis[4]. Their use in the treatment of asthma was described as early as 600 BC by two Indian physicians, Charaka and Sushruta, who used various herbs with anticholinergic properties[2]. In ancient Greece, Hippocrates (460-377 BC) and, later, Galen of Pergamon (2nd century AD) described the use of therapeutic aerosols for various conditions, including nasal, pulmonary, and laryngeal pathologies[1,5].

Primarily used in the treatment of bronchopulmonary diseases, aerosol-based therapy is also particularly useful in numerous ENT conditions[6]. In 2005, the NUAGES survey, which monitored the use of nebulizers in the medical field in France, revealed that this therapy was most frequently prescribed by pulmonologists, with ENT specialists ranking second at that time, accounting for 89% of prescriptions[7,8].

A significant group of sinonasal conditions can benefit from aerosol therapy. Aerosols have been successfully used in the treatment of rhinosinusitis or rhinitis, including allergic rhinitis[6,9-12]. The main advantage of the therapy is the high concentration of the substances used at the level of the rhinosinus mucosa, leading to a rapid therapeutic effect and minimal systemic response. Larger aerosol particles most frequently deposit in the upper airways, with their concentration increasing with particle size (90% for 10µm particles, and 10% for 2µm particles)[3,7,13,14]. Particles smaller than 5µm tend to deposit more in the mucosa of the oral cavity, larynx, and lungs[3,13]. The accumulation of particles in the sinonasal mucosa is also influenced by the air flow velocity; the higher the velocity, and thus the speed of particle movement, the greater the level of deposition in the upper airways.

There are different types of aerosol generators that can be used: sprays or nebulizers. Sprays release particles with sizes ranging from 10 to 150µm, at a high velocity, resulting in a greater accumulation in the anterior region of the nasal cavities[7]. Nebulizers release particles at a lower velocity, ranging from 1 to 10µm, thus favoring their deposition also in the posterior region of the nasal cavities[7], thereby increasing the treatment's efficacy. Among all types of nebulizers, there are studies indicating that pulsating aerosol devices may be more effective in delivering a larger amount of medication to the paranasal sinuses[6,9,15].

Aerosol therapy represents an extremely useful therapeutic method in combination with oral or intravenous medication. Depending on the sinonasal pathology, different medications can be used in aerosol therapy: saline solutions, corticosteroids, mucolytics, antibiotics, and even essential oils. Essential oils, such as eucalyptus or menthol, improve mucociliary clearance and have antibacterial, antifungal, and antiviral effects[16,17]. The use of corticosteroids in aerosols, although controversial and insufficiently studied, seems to have slightly greater efficacy in reducing rhinosi-

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nusitis inflammatory symptoms compared to topical steroid nasal sprays[9]. Administration should not exceed 10 days of treatment. Antibiotics delivered locally through aerosols can accumulate in higher concentrations in the rhinosinus mucosa, providing evident benefits[9]. There are studies showing a positive effect of this type of treatment in the case of rhinosinusitis refractory to medical and surgical treatment[7,9,10].

Aerosol-based treatment in conjunction with antibiotic and anti-inflammatory therapy can also be found in the therapeutic protocol for acute or chronic laryngitis and vocal nodules.

This therapeutic method is also useful in the treatment of Eustachian tube dysfunction or chronic otitis media with effusion, in which case the aerosols are made from a mixture of vasoconstrictor and/or antibiotic substances. The sessions performed have a beneficial effect on the mucosa of the Eustachian tube and the middle ear.

Due to the wide range of medicinal substances used in aerosol therapy (anti-inflammatory, mucolytic, vasoconstrictor, antibiotic), the therapeutic effects can vary.

Regarding aerosol devices, there are three types of devices used: pressurized metered-dose inhalers (MDIs) primarily used in patients with pulmonary conditions, dry powder inhalers (DPIs) and nebulizers.

In ENT pathology, nebulizers are the most frequently used devices. They do not require patient coordination and are used to deliver a larger amount of medication in a short time. They utilize high quantities of medicinal substances, leading to increased concentrations at the mucosal and pulmonary levels. The high operating pressure ensures a high nebulization rate for greater therapeutic efficacy. Smaller-capacity nebulizers can be used for both adults and children, even during sleep.

Particularly effective as a method of administration, under the right indication, aerosol-based therapy represents a therapeutic alternative in inflammatory or infectious pathologies within the field of ENT.

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