

## CURRENT ISSUES OF NEBULIZER THERAPY

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**Background.** The modern inhalational therapy includes usage of inhalers and nebulizers. Frequent mistakes in the inhalers' usage lead to the wrong distribution of active substance in airways, increase side effects and decrease the cost-effectiveness of the therapy. Nebulization therapy (NT) gains more and more popularity in the clinical practice, nevertheless, both doctors and patients often make mistakes in the usage of this method. **The aim.** Explanation of the peculiarities and important issues of NT with the aim of avoiding mistakes in its usage. **Materials and methods.** Analysis of modern literature and consensus documents on this topic. **Results and discussion.** NT aims at the delivery of therapeutic dose of the drug directly into the patient's airways with the pharmacodynamical answer during the short period of time. Devices of NT — nebulizers — are divided into jet, mesh and ultrasonic. Jet nebulizers generate aerosol with the help of compressed air or oxygen, and ultrasonic — with the help of high-frequency vibration of piezoelectric crystals. The disadvantage of the latter is the warming of drug solution during nebulization. The main parameter of inhalation device effectiveness is thought to be lung deposition (LD), which depends in aerosol particles size, inhalation technique, device type and patient's individual characteristics (age, anatomic and physiological peculiarities of airways). To reach better LD children aged 3-4 years and adults must use a mouthpiece, and in case of mask usage the patients must be encouraged to breathe via mouth, because the nose is a natural filter and it can detain the active substance particles. The choice of the solvent is also an important question. The most optimal option is to use isotonic pH-neutral sterile solutions (for instance, isotonic saline). Talking about mineral waters, at the moment in Ukraine there are no waters, approved for the inhalation therapy. This is caused by the fact that the mineral water is non-sterile, it contains non-volatile acids (for instance, metasilicic), which can't be eliminated from the lungs, and carbon dioxide, which can increase hypoxia. Time of inhalation depends on the stable aerosol formation (80 % of the drug is inhaled during the first 8 minutes). Drugs, which are not designed for NT, namely, suspensions, syrups, crushed tablets, solutions from ampules, can't be used for such aim. Ready solution for NT must be used during the first 30 minutes after preparation. Possibility of concomitant drug usage for the simultaneous delivery is defined solely by the instruction for the medical usage; if the information is absent, the drugs can not be mixed. During NT it is important to clean the device after each inhalation with the aim to decrease the microbial contamination of the device. Incorrect care for the nebulizer there is a risk of getting of the potential allergens into its chamber and stable obturation of Venturi hole by the solution remnants. With the aim of risk prevention, it is recommended to use one-dose containers. Talking about antibiotics, aminoglycosides, colomycine and tobramycine can be nebulized in cystic fibrosis and bronchiectasis. There are no recommendations on the topic of antibiotics nebulization in bronchitis, bronchiolitis and pneumonia. Physicians are often interested by the problem of usage of inhaled corticosteroids (ICS) and NT during COVID-19 pandemics. All world respiratory societies (Global Initiative on Asthma (GINA), Asthma and Allergy Foundation of America (AAFA), European Lung Foundation (ELF), British Thoracic Society (BTS), World Allergy Organization (WAO), USA Center for Disease Control and Prevention, WHO etc) underline the importance of continuous basic asthma therapy with the aim of prevention of exacerbations and hospitalizations. According to the experts, nebulizers don't form virus-containing aerosol, because aerosol drops during nebulization form from the nebulizer, not from the patient. During treatment of bronchial asthma exacerbations at home in COVID-19 pandemics it is reasonable to use nebulization. During the treatment the amount of the people in the same room must be limited. Absolute contraindications to NT include lung bleeding, traumatic or spontaneous pneumothorax, bullous emphysema, arrhythmia or severe heart failure. **Conclusions.** 1. LD is the main parameter of nebulizer effectiveness. It depends on aerosol particles' size, inhalation technique, device type and individual characteristics of the patient. 2. The best solvents for NT drugs are represented by isotonic pH-neutral sterile solutions. 3. If the drug is not designed for NT, it can't be used for such aim. 4. It is very important to clean the device thoroughly after each inhalation and use one-dose containers. 5. Previously administered NT, including NT for asthma, must be continued during COVID-19 pandemics. 6. During pandemics it is reasonable to continue to use ICS, to wash hands regularly and clean inhalation devices, and to use individual nebulizers. **Key words:** nebulizer therapy, bronchial asthma, COVID-19 pandemics.