

Production and Clinical Application of the First Iranian Ultrasonic Desktop Nebulizer

Sir,

Patients suffering from chronic airway diseases commonly rely on inhalation therapy.^[1] Nebulizers have been used for sputum induction and drug delivery to the respiratory system since 1940.^[2] Then, beyond technical improvement, there has been a lot of progression in medical indications and clinical application of nebulizers. There are different techniques to produce small particles of the mentioned medications in ultrasonic, jet, or vibrating membrane nebulizers. Nebulizers are used in the hospital and home setting; however, new nebulization technologies have enabled more portable use. There are some differences between various types, for example, the ultrasonic systems nebulize with higher rate than jet nebulizer devices.^[3] If the concentration of antibiotic is raised in the reservoir, the jet nebulizers will increase drug output. The ultrasonic systems reduce output very fast more than jet nebulizers if antibiotic concentrations are increased. When antibiotic has the highest concentration, the ultrasonic system has the minimum output. Each jet system has special particle size distribution, and antibiotics and their concentrations cannot change the distribution of particle size. If reservoir concentrations are increased, the release of antibiotic is raised by jet nebulizers. The kind of nebulizer system and the antibiotic concentrations determine antibiotic output. From the clinical point of view, these systems are not only used to deliver medications to control the symptoms and the progression of lung disease in people with cystic fibrosis, asthma, chronic obstructive pulmonary disease, and other chronic lung problems, but there also continues to be a strong interest in developing inhalable formulations for both local and systemic diseases, and the current trends show novel applications that include needle-free vaccines, gene therapy, and targeted lung cancer treatments.^[4] We have produced and tested the first Iranian type of ultrasonic desktop nebulizer. This nebulizer is a desktop model with a flow regulator. The patients can change the flow rate of the drug. The piezoelectric part of it oscillates at 1.63 MHz. This frequency produces particle sizes between 0.5 and 6.0 μm . The lungs absorb these sizes of particles very well. The minimum and maximum rates of spraying are 0.4 and 3.36 ml/min, respectively, and the power consumption of nebulizer is 52 Watts. These power and rate of spraying are suitable for using at home and also at hospital.

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Conflicts of interest

There are no conflicts of interest.

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