

## CF Guidelines - Nebulisers

### **Nebulisers:**

Nebulisers deliver a fine mist of water, saline or drugs in a form that can be inhaled by the patient. If a mask is used, as advised for very young children, the mouth should be open or all the medication is deposited in the nose and none reaches the lower respiratory tract. If tolerated a nose clip may be used to assist with this. Older patients should always use a mouthpiece and breathe through the mouth rather than the nose. An exception may be patients, who, after lung transplant may use a mask to target specific infection in the upper airways. Nebuliser therapy often plays a major role in treatment and it is important that all factors regarding nebuliser therapy are considered each time a patient is reviewed in clinic or on the ward. Details concerning the use of nebulisers are of great practical importance and the following should be considered; drug to be nebulised, which compressor/nebuliser system to be used and patient preference/suitability. The correct combination of drug, nebuliser and compressor will ensure optimal droplet size, thus increasing drug deposition in areas where it is required and so improve treatment.

### **Conventional nebulisers:**

Conventional compressor type nebulisers have a flow rate of approximately 6 - 8 litres/minute which is adequate to drive modern Venturi type nebulisers. Each compressor and nebuliser has its own characteristics, so simply combining any nebuliser with any compressor may not provide the optimum performance characteristics and hence the greatest benefit to the patient. Nebulisers designed for bronchodilators, steroids, Pulmozyme, and hypertonic saline use the compressor airflow to entrain additional air, (Venturi effect), through the nebuliser and thereby increases the output from the nebuliser, and drug deposition, and reduces nebulising time. Nebuliser systems have been developed which exploit the Venturi effect to enhance drug delivery. Nebulisers which are used for antibiotics, direct the patient's inspiratory flow through the nebuliser chamber, thereby increasing the effective inhaled nebuliser output. For this to occur the respiratory flow must exceed the compressor flow rate through the nebuliser for a significant proportion of the inspiratory period. This does not always occur in younger children and patients with poor lung function. It is important that the disposable nebulisers are changed regularly as their useful life varies according to the type.

### **Vibrating membrane technology:**

The eFlow rapid electronic nebuliser uses vibrating membrane technology in order to convert liquid to aerosol. Treatment time may be reduced by more than 50% with this system and silent and discreet operation makes it especially appealing to patients with CF. The eFlow rapid has been designed for use with all inhalation medications approved in Europe and it can be used in any country worldwide. This system is portable and offers at least 90 minutes operation with fully charged rechargeable batteries. In order to clean this system the nebuliser should be taken apart completely, washed with warm tap water and washing up liquid. The nebuliser parts and aerosol head should be disinfected in a steam steriliser for about 15 minutes or boiled thoroughly in distilled water. Parts should then be allowed to air dry (for at least 4 hours).

### **Adaptive aerosol delivery:**

Adaptive aerosol delivery devices (AAD) such as the I-neb can adapt to the patient's breathing pattern and stop drug delivery when a pre set dose has been delivered. The vibrating mesh has a variable power range for the optimization of the aerosol

output. I-neb incorporates an AAD algorithm that pulses medication delivery into 50 to 80 percent of each inspiration, based on a rolling average of the last three breaths. Throughout the treatment, the I-neb provides continuous feedback to the patient through a liquid crystal display and upon successful delivery of the treatment, the patient receives audible and visual feedback. Cleaning this system involves the use of a washing basket to hold the nebuliser parts during the cleaning process (provided by the company). It is recommended that the working parts of this system are boiled in distilled water once a week.

### **Cleaning of conventional nebulisers:**

The cleaning of nebulisers and compressors is an essential part of the treatment regimen. Studies have shown that nebulisers may be contaminated with a variety of bacteria, including *B. cepacia* complex and *S. maltophilia*. Nebulisers should be washed after every use in warm soapy water, rinsed well, dried with a paper towel and left disassembled to air dry. Those paying close attention to good nebuliser care, particularly through drying, are least likely to encounter problems with nebuliser contamination. Tubing should be changed on a regular basis as this becomes damp during use, and is difficult to dry. It is suggested that the compressor be left switched on for a short time following disconnection of the nebuliser in order to expel any water droplets. Nebuliser handsets and compressors should be kept clean and dry and dust free. Inlet and outlet filters on the compressor should be changed every 3 - 6 months (see manufacturers recommendations) and serviced yearly. Local policies may stipulate alternative servicing arrangements.

### **Additional Information:**

- <http://www.pari.de>
- <http://www.ineb.respironics.com>

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