Effect of a new simplified hygiene standard on nebulizer contamination

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Summary:
A new method of nebulizer disinfection for Cystic Fibrosis (CF) patients, presented in a previous study "An evaluation of different steam disinfection protocols for cystic fibrosis nebulizers" (Fig. 2) by the authors of the present paper was examined in real life and proved to be valid.

Introduction:
Because nebulizer hygiene is crucial our physiotherapists check the hygienic standard of the nebulizers of each CF patient every year. (Fig. 1)

Comparing disinfection procedures:
Until 2013 the disinfection procedure consisted in drying the nebulizers after steam disinfection in the disinfector with a clean lint-free hot ironed cotton towel.
Duration of the procedure: about 30’.
In 2014 the new method according to the results of the study (Fig. 2) was introduced: The nebulizer parts have to be left in the disinfector after disinfection until the next use. The patients were informed and started to practice the new method.
Duration of the procedure: 5’.
2015: The results of the hygiene checks from 2013 and from 2015 were compared in order to validate the impact of the change of disinfection procedures in hygienic respect. The data of 29 patients from 2013 and 2015 were at disposal for this purpose.

Methods:
A fixed number of swaps is taken from each nebulizer. These are cultivated on Columbia 5% sheep blood, Mac Conkey II and BCSA Agar are read after 48h at 37°C, BCSA additionally after five days at 32°C and again after five days at room temperature. Organisms are determined by MALDI-TOF. The results are documented and archived.

Results: (Fig. 3)
7 of 29 patients had 2013: no critical bacterial and fungal contamination and 2015: no critical bacterial and fungal contamination
2 of 29 patients had 2013: no critical bacterial and fungal contamination but 2015: critical bacterial and fungal contamination
17 of 29 patients had 2013: critical bacterial and fungal contamination but 2015: no critical bacterial and fungal contamination

Conclusions:
The results show that the new method of disinfection procedures produces significantly better hygienic results and is easier and quicker to perform than the traditional method. The disinfection method of leaving disinfected parts in the steam disinfector is proved successfully and is recommended to be applied in future by all CF patients. Hand hygiene should now become an educational priority to complete nebulizer hygiene.

Proposition for Recommendations for effective steam disinfection
After every use:
1. Wash the assembled nebulizer with water, with or without dish washing detergent.
2. Steam disinfect the assembled nebulizer using tap water.
3. Open the steam disinfector after disinfection only for a short time, if it is desired to let some steam out, otherwise leave the lid closed until the nebulizer is reused (a maximum of 24 hours).
4. Wash hands and dry them with a clean paper towel (e.g. the inner side of a leaf of kitchen roll) and place another clean paper towel next to the steam disinfector.
5. Open steam disinfector and assemble the parts if dismantled.
6. If the parts are too wet, shake off the water or tap it off on the clean paper towel.
7. Place the nebulizer only in the steam disinfector or on a clean paper towel
At the end of the day: Dismantle the nebulizer parts, wash them with or without dish washing detergent and steam disinfect them. Leave them inside the steam disinfector overnight and assemble just before use.
Weekly: Clean the area around the steam disinfector and the steam disinfector inside and out with a detergent and let it dry. Clean the steam disinfector outside with a disposable, singly packed, alcohol-based disinfecting wipe.
Advice: If more water than usual remains in the disinfector after the process, replace the steam disinfector with a new one.