In vitro performances of a valved holding chamber with inhaled corticosteroids.

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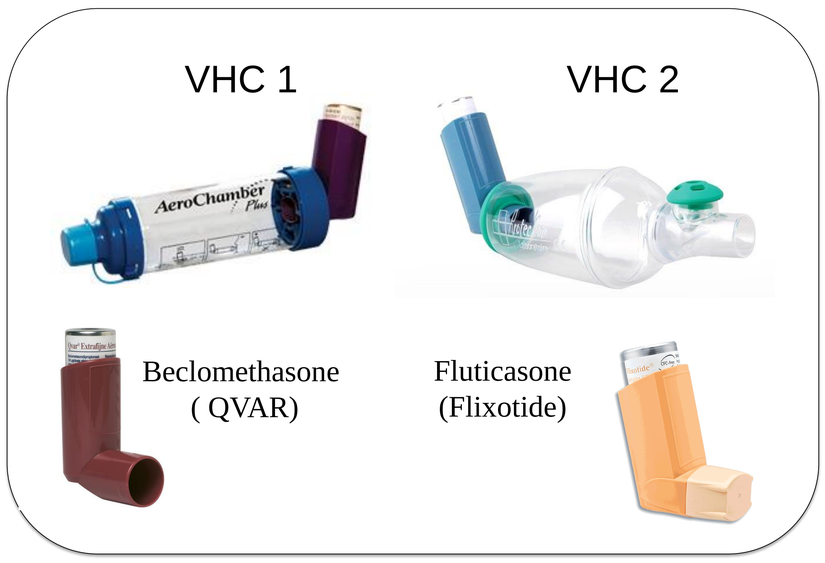
Introduction

In young children with asthma, it is recommended to use pressurised metered dose inhaler (PMDI) with a valved holding chamber (VHC). The objective of this study was to evaluate the performances of a VHC with inhaled corticosteroids.

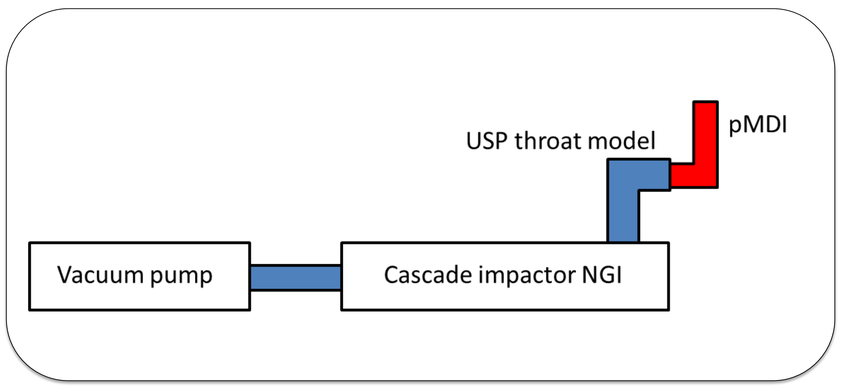
Materials and methods

- The valved holding chambers (VHCs) called VHC 1 (Trudell Medical International, Canada) and VHC 2 (Protec'som, France) was evaluated with fluticasone (Flixotide®, 50µg/dose, GlaxoSmithKline, France) and beclomethasone (QVAR®, 100µg/dose, MEDICIS, Canada).



- Prior to the experiment, pMDI was primed with 10 actuations. The VHC was connected to the NGI via the USP induction port (Copley Scientific, Nottingham, UK).

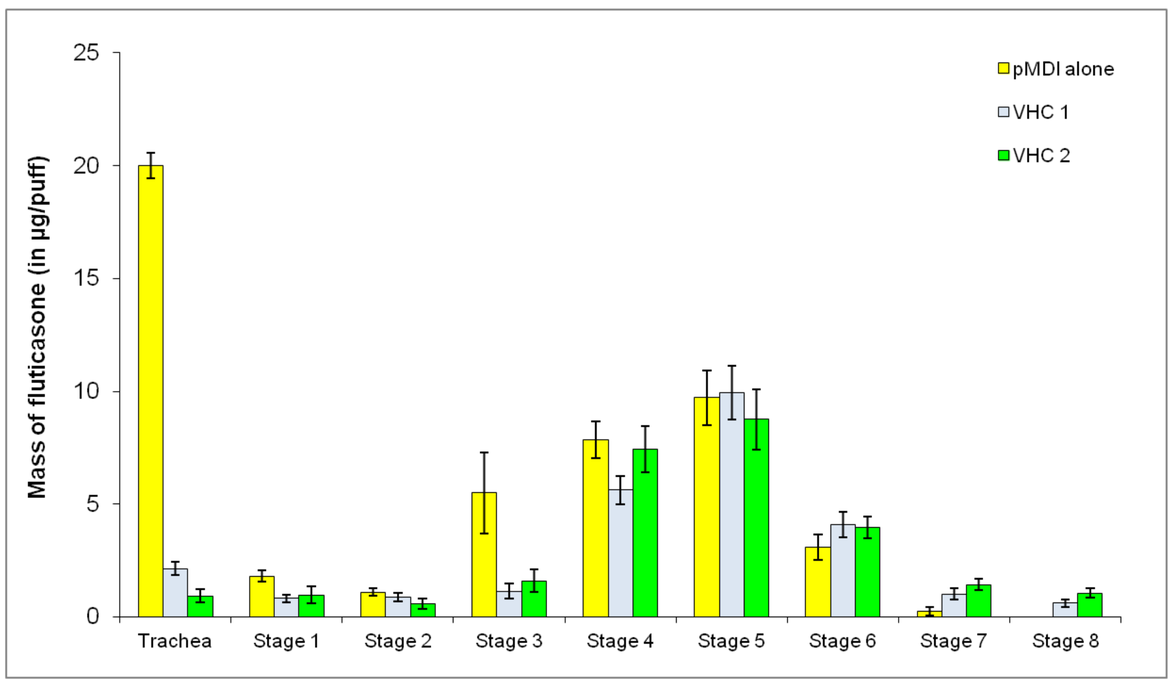
- In this study, the first method, according to the European Pharmacopoeia, used a constant flow rate (30 L/min). Particle size distribution was measured using a NGI cascade impactor (Copley Scientific, Nottingham, UK).



- The pMDI was shaken during 5 s then discharged into the throat. This procedure was repeated 10 times (10 actuations). After the end of the procedure, all samples deposited in model throat and in each stage were collected by the addition of 20 ml of methanol. The fluticasone and beclomethasone concentrations were assayed by spectrophotometry at 236 nm and 239 nm respectively. Values, expressed as mean +/- SEM.

Results

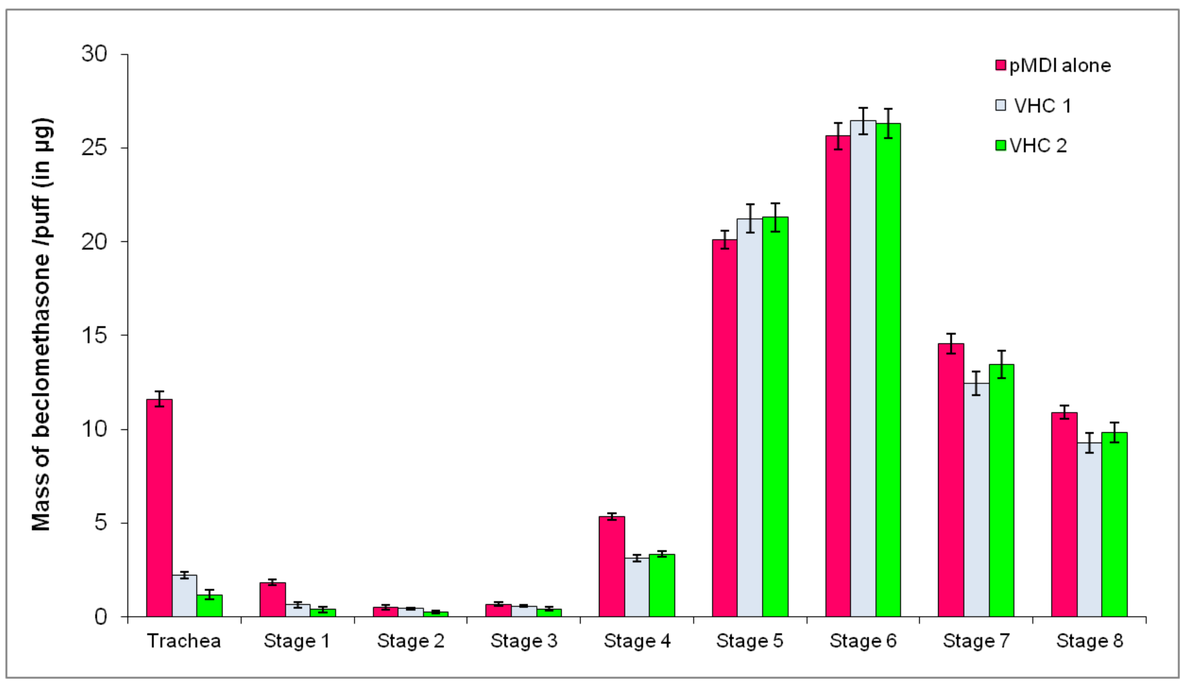
Figure 1: Mass of fluticasone (in µg per dose) deposited in the NGI in accordance with European Pharmacopoeia method. Values are means ± SD, obtained from 6 experiments.



♦ :Concerning fluticasone, In the trachea, the mass of drugs was higher with pMDI alone in comparison with VHC1 and VHC 2 (20 ± 0,6 µg vs 2 ± 0,6 µg vs 0,9 ± 0,3 µg, p <0,05).

♦ The fine particle dose of fluticasone was similar with pMDI alone compared to VHC 1 and VHC 2 (26 ± 2 µg vs 26 ± 1 µg vs 24 ± 1 µg).

Figure 2 : Mass of beclomethasone (in µg per dose) deposited in the NGI in accordance with European Pharmacopoeia method. Values are means ± SD, obtained from 6 experiments.



♦ Concerning beclomethasone, in the trachea, the mass of drugs was higher with pMDI alone in comparison with VHC 1 and VHC 2 (11,6 ± 0,4 vs 2,2 ± 0,4 vs 1,2 ± 0,2, p<0.05).

♦ In addition, deposition of fine particles of beclomethasone was similar with pMDI alone in comparison with VHC 1 and VHC 2 (77 ± 1 µg vs 73 ± 0.9 µg vs 75 ± 1 µg, p<0.05).

Conclusion

The use of valved holding chamber reduces the deposition of particles of inhaled corticosteroids in the trachea and allows efficient lung deposition of drugs.