

# SALT CHAMBER TREATMENT DOES NOT AFFECT INDUCED SPUTUM INFLAMMATORY MARKERS IN ASTHMA PATIENTS TREATED WITH INHALED STEROIDS

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## AIMS

We have shown that salt chamber treatment reduces bronchial hyperresponsiveness as an add-on therapy in asthmatics on inhaled steroids (Hedman, *J et al. Allergy* 2006; 61: 605-610).

Now we assessed the effects of salt chamber treatment on selected inflammatory markers: induced sputum ECP concentrations (eosinophil cationic protein) and numbers of eosinophils and neutrophils.

## METHODS

After a 2-week baseline 39 asthmatics with a small to moderate dose of inhaled steroid were randomised to receive low salt chamber treatment (n=14) or high salt chamber treatment (n=15), or to form a placebo (n=10). The mean salt concentrations (particles <20 µm) were 6.6 mg/m<sup>3</sup>, 10.8 mg/m<sup>3</sup> and 0.2 mg/m<sup>3</sup>, respectively. Patients were treated 40 minutes at a time, five times per week for 2 weeks in a double-blind manner.

The treatments were administered in the salt chamber at Lappeenranta Spa (12.5 m<sup>2</sup> in area and with a volume of 27.5 m<sup>3</sup>). The roof, walls and floor were covered with a 20-50 mm thick coating of salt (rock salt, NaCl 98.5 %). Both the active and the placebo treatments were administered in the same salt chamber. During the active treatment 24 g (3 g/5 min =low) or 39 g (3 g/3 min =high) of salt were fed into the salt generator (Polar and Iris salt generator, PolarHealth Oy, Finland, IndiumTop LLC, Estonia). During the placebo treatment salt was not fed into the salt generator. The generator was, however, running and patients could hear its sound. Measurements of the conditions were carried out by the Lappeenranta Regional Institute of Occupational Health.

Induced sputum ECP, the numbers of eosinophils and neutrophils, as well as lung volumes (FEV<sub>1</sub>, FVC), PEF-values during 2 weeks, symptoms and rescue beta-2-agonists were recorded before, immediately after, and four weeks after, the treatment. The sputum samples were analysed by the methods described elsewhere (Ryttilä P, *et al. Eur Respir J* 2000; 16: 824-830).



## RESULTS

No differences were detected in any of the parameters between the treatment groups.

Before and after the 2-week treatment the mean induced sputum ECP values (µg/L) in the low concentration group were 3,070 vs. 4,651, in the high concentration group 12,192 vs. 11,803, and in the placebo group 3,942 vs. 4,144.

The mean PEF values (L/min) just before, and immediately after, each individual salt chamber treatment were 461 vs. 465 in the low concentration group, 486 vs. 491 in the high concentration group, and 440 vs. 448 in the placebo group.

Table 1. Baseline characteristics of the study subjects. Inhaled steroid doses are expressed as beclomethasone equivalent dose. \* Means with ranges. † Means with standard deviations.

	Placebo	6.6 mg/m <sup>3</sup>	10.8 mg/m <sup>3</sup>
Subjects n	10	14	15
Sex male/female	1 / 9	2 / 12	5 / 10
Age yrs *	62 (52-74)	60 (43-68)	57 (48-69)
Atopy	6	9	9
Duration of asthma yrs *	11.5 (6-17)	10.0 (2-23)	14.7 (2-39)
Inhal. steroid dose µg *	1,160 (200-2,000)	871 (200-2,000)	813 (200-1,600)
FEV1 L <sup>†</sup>	2.37 (0.32)	2.70 (0.57)	2.76 (0.60)
FEV1 % of predicted †	95.3 (15.1)	98.0 (15.0)	92.1 (10.2)
FVC L <sup>†</sup>	3.35 (0.44)	3.92 (0.99)	3.95 (0.97)
FVC % of predicted †	109.8 (18.7)	114.3 (14.2)	105.4 (11.0)

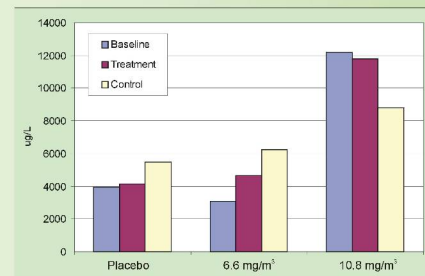


Figure 1. Mean induced sputum ECP concentrations before, immediately after, and four weeks after, the treatments. Kruskal-Wallis p=0.38, 0.40, 0.97.

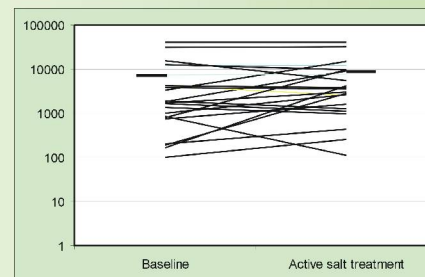


Figure 2. Changes in induced sputum ECP concentrations (µg/L) before, and immediately after, the treatments. Active groups are pooled (N=24). Thick lines represent mean values. Wilcoxon p=0.43.

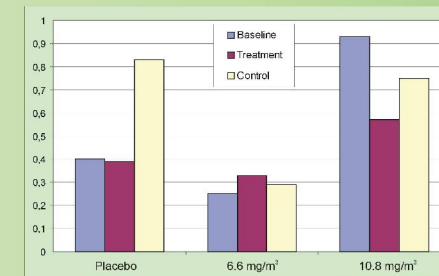


Figure 3. Mean sputum eosinophils before, immediately after, and four weeks after, the treatments (semi-quantitative scale 0-3). Kruskal-Wallis p=0.34, 0.83, 0.54.

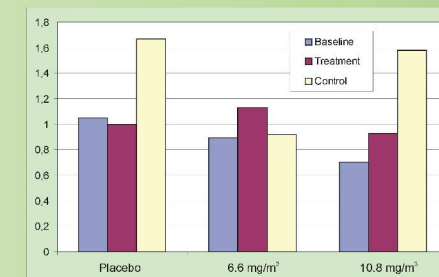


Figure 4. Mean sputum neutrophils before, immediately after, and four weeks after, the treatments (semi-quantitative scale 0-3). Kruskal-Wallis p=0.59, 0.20, 0.25.

## CONCLUSIONS

Salt chamber treatment did not affect the selected inflammatory markers. This may partly be due to the good asthma control of the patients on inhaled steroids. Mechanisms other than the anti-inflammatory effect may also explain the previously observed reduction of bronchial hyper-responsiveness during salt chamber treatment (e.g. direct effect on airway smooth muscles or enhancement of the steroid effect).