A troublesome cough: from diagnosis to treatment

**S32 COUGH SUPPRESSION TEST: A NOVEL OBJECTIVE TEST FOR CHRONIC COUGH**

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**Introduction** A recent functional MRI study has shown that patients with chronic refractory cough (CRC) have reduced activity in the areas of the brain associated with cough suppression. Cough challenge tests focus on provoking cough and have limited clinical application due to the wide overlap between healthy subjects and patients with cough. We investigated whether patients with CRC could suppress cough in a cough challenge test.

**Methods** We recruited 13 chronic refractory cough patients and 11 healthy controls. Participants underwent an incremental capsaicin challenge test (0.49 to 1000 micromol.L⁻¹) and were instructed “please do not cough during the test”. The concentrations of capsaicin during the cough suppression (CS) protocol required to elicit 1 or more cough (CS1), 2 or more coughs (CS2), and 5 or more coughs (CS5) were documented. Patients with CRC also completed cough-severity and urge-to-cough visual analogue scales (VAS; 0–100 mm), and quality of life, Leicester Cough Questionnaire (LCQ; range 3–21).

**Results** Patients with CRC and controls had a mean (SD) age 59 (8) and 51 (7) years and 11 (85%) and 7 (64%) were female, respectively. CRC patients self-reported symptom and health status were; mean (SD) cough severity VAS 58 (31), urge-to-cough VAS 63 (30), and LCQ score 12.1 (4.4). Patients with CRC were less able to suppress cough compared to healthy controls; geometric mean (SD) CS1: 2.30 (3.56) vs 62.46 (5.62), CS2: 2.55 (3.71) vs 70.86 (5.91) and CS5: 3.37 (4.84) vs 321.70 (3.23) micromol.L⁻¹ respectively, all p<0.0001. The mean difference (95% CI) in CS5 between CRC and controls was 6.6 (4.9, 8.3) doubling doses. CS5 was better than CS1 and CS2 at discriminating CRC patients from controls (figure 1). There was no significant association between CS5 and cough severity VAS (correlation coefficient,
Voluntary suppression of capsaicin-evoked cough is significantly diminished in chronic refractory cough. Our findings suggest future research should focus on cough inhibitory as well as activation pathways. CS5 has potential to be used as a diagnostic test and to evaluate anti-tussive therapy; this should be investigated further.

Objectives In this study we explored the effectiveness of treatment with montelukast 10 mg as compared with prednisolone in chronic cough patients with an associated elevated FeNO (The fraction of exhaled nitric oxide in breath) – a marker of eosinophilic inflammation.

Methods 50 non-asthmatic patients with chronic cough were recruited sequentially from a specialist cough clinic. 30 patients with high FeNO (>30 ppb) were randomised to either two weeks prednisolone 20 mg or two weeks montelukast 10 mg followed by montelukast 10 mg for the subsequent two weeks in both arms. A control group of 20 patients with low FeNO (≤20 ppb) were enrolled who received four weeks montelukast. 24 hours cough counting at baseline after 2 and 4 weeks treatment was the primary endpoint. Subjective measures of cough, the Leicester Cough Questionnaire (LCQ), and Hull Airways Reflux Questionnaire (HARQ) were also administered.

Results At baseline the average FeNO value in both high FeNO treatment groups was similar (around 60±30 ppb). At the end of the study there was a significant fall in FeNO of approximately 30% in both high FeNO treatment groups (p < 0.005). In the low FeNO group there was no significant change during the study (12±5 ppb). Therapy reduced the number of coughs in 24 hours by approximately 50% in both low and high FeNO groups (p<0.005). HARQ and LCQ scores also improved significantly (p<0.005) in all treatment groups.

Conclusions The hypothesis that FeNO could be used as a marker of eosinophilic inflammation in chronic cough was supported by our observation at baseline in the high FeNO group of eosinophilia in both blood and sputum. However, baseline FeNO did not predict overall treatment response. Perhaps the most surprising aspect of our study is the dramatic response in the low FeNO group to montelukast. The fact

Abstract S33 Figure 1 Measurements of FeNO, 24hr cough count, HARQ and LCQ in three treatment groups in three visits. Horizontal bars represent mean and SEM value.