

## **Evaluation of a non-invasive pepsin dipstick test for the diagnosis of extra-oesophageal reflux - results of a pilot study**

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**Background:** Diagnosis of extra-oesophageal reflux (EOR) remains difficult. 24hr pHmetry or impedance monitoring are invasive and insufficiently sensitive enough for use in EOR and the laryngoscopic signs of EOR can be non-specific. An objective, non-invasive test for the presence of EOR is warranted.

**Aim:** Here we present data from a multi-centre pilot study the primary outcome of which was to establish whether a non-invasive in vitro test was capable of diagnosing patients with EOR by detection of the presence of gastric enzyme pepsin in sputum/saliva. The secondary outcome was to determine the appropriate time frame in which to obtain samples from subjects either when attending clinic or when suffering from symptoms.

**Methods:** Ethical approval for this study was granted by MREC. Subjects were recruited based on their score of the validated reflux symptom index (RSI). Controls had  $RSI \leq 3$  with no recent heartburn symptoms. Patients had  $RSI \geq 20$  with visual evidence of reflux on laryngoscopy. Subjects gave written informed consent and were asked to provide a sample of throat contents by coughing up and spitting into a collection vessel. Patients were also asked to provide a sample at home when they were experiencing symptoms. Samples were tested for the presence of pepsin using a lateral flow dipstick test incorporating two unique monoclonal antibodies to human pepsin.

**Results:** 20 subjects were recruited into this pilot study. There were 10 control subjects (5M5F, mean (SD) age 36.9 (20.0) yrs) with a mean RSI of 0.4. 9 out of 10 sputum samples obtained from control patients were negative for pepsin. There were 10 patient subjects (7M3F, mean (SD) age 56.5 (19.7) yrs ( $p=0.0402$  compared to control)) with a mean RSI of 27. All provided a sample in clinic of which 40% were positive for pepsin. 6 patients returned a second sample when symptomatic of which 67% were positive for pepsin. In total, at least one positive sample was seen in 70% of patients compared to only 10% in controls ( $p=0.0062$  Chi Squared test).

**Conclusion:** The results from this pilot study show that pepsin, as a marker for reflux, can be detected in sputum/saliva obtained non-invasively from patients using a novel lateral flow dipstick test. 90% of control patients were found not to have pepsin in their sample. 70% of patients suspected of having EOR were found to have pepsin in their sample giving clear objective evidence for the presence of reflux in the larynx, pharynx or upper airways. Providing a sample when the patient was symptomatic was shown to improve the diagnostic yield of the test compared to collection in clinic.