The Relationship Between Gastro-Oesophageal Reflux Disease and Chronic Sinusitis

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Published paper
Chronic Sinusitis is a common condition which carries a significant health burden. Despite its prevalence however, its aetiology is still not fully understood. Recently, gastro-oesophageal reflux disease has been implicated as one of the pathogenetic factors in chronic sinusitis. There appears to be a clear association between the two conditions but the mechanism for this relationship is unclear. The prevailing theory in the literature is that reflux of gastric acid to the nasal cavity directly injures the sinus mucosa and leads to chronic inflammation. The evidence to support this is poor and sceptical. We proposed an alternative mechanism to account for the relationship between chronic sinusitis and gastro-oesophageal reflux disease, which is that neurogenic inflammation occurs in the sinuses via a vagal reflex in response to the reflux of acid in the oesophagus. The work presented in this thesis was undertaken in order to reject the hypothesis that the relationship between chronic sinusitis and gastro-oesophageal reflux disease is due to the direct reflux of acid to the sinuses, as well as to document evidence which support a vagal reflex model.

In our first experiment, we aimed to show that acid refluxed from the stomach does not reach as cephalad as the nasopharynx. To achieve this we utilised a specially designed sensor which is able to document pH changes in the nasopharynx without significant artefactual impairments. We studied 40 patients with both chronic sinusitis and gastro-oesophageal reflux. 24-hour pH studies were performed on all these patients using our novel pH probe. We were able to demonstrate that out of the 809 episodes of reflux which we recorded, only 2 of these ever reached as high as the nasopharynx. We were able to conclude from
these results that the inflammation seen in the sinuses in patients with gastro-oesophageal reflux is not attributable to direct acid injury, thereby rejecting the null hypothesis.

The aim of our second experiment was to document an oesophageal-nasal reflex. To achieve this, we infused normal saline, then 0.1N hydrochloric acid into the oesophagus to see if we were able to observe a measurable response in the nasal cavity. We studied 10 healthy volunteers with no past history of sinusitis or gastro-oesophageal reflux disease. We were able to demonstrate an increase in sinonasal symptom score and nasal mucous production in response to the instillation of both normal saline and acid in the oesophagus. Our results therefore confirm a neural reflex between the oesophagus and the paranasal sinuses, and provide strong support for our hypothesis that the chronic sinusitis seen in patients with gastro-oesophageal reflux disease is induced by neurogenic inflammation.