defined as an extended response time in the delivery of airway pressure following initiation of inspiratory effort by the patient. Although bench tests of ventilators have demonstrated variation in trigger response times (120–500ms), there are limited data reporting the effect of trigger delay on a subject’s NRD and comfort. We therefore investigated the relationship between ventilator trigger delay, NRD and comfort perception.

**Methods** A custom-made NIPPV + ventilator (B&D Electro-medical, Stratford-upon-Avon, UK) with modifiable trigger delay was used. A standardised protocol of 10cm H2O inspiratory positive airway pressure, 4cm H2O expiratory positive airway pressure and back up rate of 6 breaths per minute was utilised in healthy subjects familiarised with NIV. Subjects were blinded to the settings and asked to assess perceived comfort using a visual analogue score (VAS) at 20 randomised trigger delay timings ranging from 10ms to 1000ms following a 2 minute assessment period. Second intercostal space electromyography (EMGpara%max), as a marker of NRD, mask pressure and flow were used to assess PVI. Transcutaneous carbon dioxide and oxygen saturations were controlled within limits of 0.5 kPa and 4% respectively of the subject’s baseline values to minimise changes in the biochemical drive to breathe.

**Results** 5 subjects (1 male) were enrolled to date with a mean age of 34 ± 8 years, BMI 22 ± 3 kg/m², FEV1 105 ± 11% predicted and FVC 114 ± 13% predicted. 500 breaths were analysed. The EMGpara%max was lowest at a trigger delay setting of 400ms (5.9% (4.8–8.0)) and largest at a trigger delay of 800ms (10.1% (6.0–16.5)). (Figure 1). There was a corresponding decrease in the VAS score from 78 cm (63.5–92.5) at 400ms trigger delay to 47 cm (30–66) at 1000ms trigger delay. The highest comfort score was 89 cm (52–92) observed at 170ms trigger delay.

**Conclusion** This is the first study to comprehensively investigate NIV trigger delay in healthy subjects. Based on NRD, these data suggest that the optimal NIV trigger response time was up to 400ms. This challenges previous bench studies that reported ventilators with response times over 100–150ms have limited clinical utility.
compared to the least (MRC 2 and 3) (HR 0.40, 95% CI 0.18–
0.88, p = 0.023).

**Conclusion** These data show that COPD patients who receive acute NIV have high risk of hospital readmission including requirement for repeat NIV treatment, which contributed to a significant number of hospital bed days. Although overall outcomes are better than previously reported (Murray, Thorax 2011), patients with high levels of premorbid dyspnoea have the highest mortality following acute hypercapnic exacerbations of COPD requiring NIV.

**Airways disease: fungus and the bogeyman**

**S89 THE USE OF ASPERGILLUS POLYMERASE CHAIN REACTION TESTING TO GAIN A FURTHER UNDERSTANDING OF SEVERE FUNGAL ALLERGIC ASTHMA**

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10.1136/thoraxjnl-2013-204457.96

**Background** Severe Asthma with Fungal Sensitisation (SAFS) is a newly described phenotype of Fungal Allergic Asthma. There is much debate about the disease’s mechanism of action, the best method of treatment and how treatment with antifungal agents such as Itraconazole brings about the improvement in disease control that has been shown in previous studies.

This study aims to answer those questions, through the use of Sputum Aspergillus Polymerase Chain Reaction testing as a method of determining whether a patient has pulmonary colonisation with Aspergillus.

**Methods** PCR samples were collected between September 2012 and May 2013 samples taken clinically in the previous 2 years were also included. Patients had their antifungal therapy status recorded and received Total serum IgE and Aspergillus Specific IgE testing when providing sputum samples. The study was split into 2 arms. The primary retrospective opportunistic arm had a patient cohort of 135 who provided 254 samples for testing and analysis. The secondary prospective arm of the study looked at 10 patient’s commencing Itraconazole therapy. Patients received PCR testing before commencing treatment and then at every opportunity whilst on treatment.

<table>
<thead>
<tr>
<th>SAFS Patients Off</th>
<th>Antifungal Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCR Positives</td>
<td>PCR Negatives</td>
<td>X² (p value)</td>
</tr>
<tr>
<td>61 (70%)</td>
<td>26 (30%)</td>
<td>37.90 (&lt;0.0001)</td>
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</tbody>
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The primary study arm showed a 70% rate of pulmonary colonisation in the Untreated Severe Asthma population, which differs significantly to the 9% rate of positivity seen in the control population. The rate of PCR positivity fell to 23% in the SAFS population who were receiving treatment. The secondary arm showed that Itraconazole removed fungus from the airways of 9 patients; this was correlated with a decrease in patient’s total serum IgE’s.

**Discussion** The 70% rate of PCR positivity in the untreated SAFS population supports the concept that patients with SAFS have pulmonary colonisation with Aspergillus. The study has also shown that the antifungal agent Itraconazole removes this fungus from patient’s airways and that is correlated with an improvement in patient’s disease control. This study supports the use of Itraconazole in patients with SAFS.

**S90 EFFECTIVENESS OF VORICONAZOLE IN THE TREATMENT OF ASPERGILLUS FUMIGATUS ASSOCIATED ASTHMA**

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10.1136/thoraxjnl-2013-204457.97

**Background** IgE sensitisation to Aspergillus fumigatus and a positive sputum fungal culture are common in refractory asthma. It is not clear whether these patients would benefit from anti-fungal treatment.

**Objectives** To determine if a three-month course of voriconazole improved asthma related outcomes in people with asthma who are IgE sensitised to A. fumigatus.

**Methods** Asthmatics IgE sensitised to A fumigatus with a history of at least two severe exacerbations in the previous twelve months were treated for three months with voriconazole two hundred milligrams twice daily, followed by observation for nine months, in a double blind, placebo controlled, randomised design. Primary outcomes were improvement in quality of life at the end of the treatment period and a reduction in the number of severe exacerbations over the twelve months of the study.

**Results** 65 patients were randomised. 59 patients started treatment (32 voriconazole and 27 placebo) and were included in an intention to treat analysis. 56 patients took the full three months of medication. There was no significant difference in the number of severe exacerbations between the voriconazole and placebo groups (1.25 vs 1.52/patient/year; mean difference 0.27; 95% CI 0.24 to 0.31) respectively, quality of life (change in AQLQ 0.44 vs 0.35, mean difference between groups 0.08; 95% CI 0.07–0.09), or in any of our secondary outcome measures between the two groups.

**Conclusion** We were unable to show a beneficial effect of three months treatment with voriconazole in people with moderate to severe asthma who were IgE sensitised to A fumigatus on either the rate of severe exacerbations, quality of life or other markers of asthma control.

**REFERENCES**