

# European Respiratory Society Annual Congress 2013

**Abstract Number:** 1094

**Publication Number:** P1918

**Abstract Group:** 4.1. Clinical respiratory physiology, exercise and functional imaging

**Keyword 1:** COPD - exacerbations **Keyword 2:** Respiratory muscle **Keyword 3:** Biomarkers

**Title:** Neural respiratory drive during recovery from exacerbations of COPD

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**Body:** Background: Neural respiratory drive (NRD), obtained from 2<sup>nd</sup> intercostal parasternal muscle electromyography (EMG<sub>para</sub>), is a useful physiological biomarker of treatment failure in acute exacerbations of COPD (AECOPD) (Murphy et al, Thorax 2012). However, the trajectory of NRD change following hospital discharge is unknown. We hypothesised that there would be improvements in NRD, spirometry and symptoms 1 month after discharge. Methods: AECOPD patients were enrolled within 12 hours of hospital admission. EMG<sub>para</sub>, spirometry, inspiratory capacity (IC), modified Borg scale and COPD Assessment Test (CAT) score were recorded when medically fit for discharge and at 1 month. NRD (expressed as EMG<sub>para%max</sub>) was derived by normalising the per-breath peak inspiratory parasternal muscle EMG activity to a value obtained during a maximal manoeuvre. Data were analysed using paired t- or Mann Whitney U tests. Results: 30 hospitalised AECOPD patients were recruited and attended 1 month follow-up. Mean age was 66±9years, 47% male, BMI 27.0±7.2kg/m<sup>2</sup> and %predicted FEV<sub>1</sub> 29.0±9.3. Median length of hospital stay was 2 (IQR 2-7) days. Admission EMG<sub>para%max</sub> was 20.3±9.7%. There were improvements in EMG<sub>para%max</sub> (15.8±6.3% to 13.1±6.0%; p<0.001), FEV<sub>1</sub> (0.76±0.29L to 0.92±0.45L; p=0.002) and IC (1.65±0.54L to 1.90±0.60L, p=0.005) between discharge and 1 month. Surprisingly, there were no improvements in Borg or CAT scores. Conclusions: There was no change in the recorded symptom scores at 1 month following AECOPD. NRD, airways obstruction and hyperinflation were however improved at this point, suggesting that patient-reported symptoms, as measured, may not be a reliable indicator of the changes in respiratory load during recovery from AECOPD.