

Supine Posture Worsens Respiratory Mechanics in Chronic Obstructive Pulmonary Disease

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Introduction/Aim: Poor sleep quality is a major contributor to the reduced quality of life in people with chronic obstructive pulmonary disease (COPD). Supine posture is known to alter lung volume in healthy people but the effect on lung volume and respiratory mechanics in people with COPD is poorly understood. Therefore, our aim was to determine the effect of supine posture on respiratory mechanics in people with COPD. **Methods:** Eight participants with COPD performed baseline FOT, spirometry and lung volumes in the seated position before repeating FOT in the supine position. FOT was performed during 30s of tidal breathing in order to calculate respiratory system resistance (Rrs5) and reactance (Xrs5) at 5 Hz, as well as during a deep inspiration in order to calculate inspiratory capacity. Data are presented as mean±SD. **Results:** Participants were 58.3±6.2 years old with moderate airflow obstruction (FEV₁ 55.3±27.3% predicted), hyperinflation (FRC/TLC 126.0±20.2% predicted) and gas-trapping (RV/TLC 119±28.9% predicted). There was no effect of supine posture on inspiratory capacity (1.91±0.6 vs 2.06±0.66 L, p=0.16). However, compared to the seated position, supine posture worsened Xrs5 (-4.52±3.7 vs -5.1±4.0 cmH₂O.s/L, p=0.01), while there was a trend to an increase in Rrs5 (5.31±2.19 vs 6.56±3.51 cmH₂O.s/L, p=0.09). No correlation was seen between the change in Xrs5 and change in IC between postures (r=-0.12, p=0.78). However, increased worsening of Xrs5 with supine posture correlated with greater seated hyperinflation and gas trapping (r=0.75, p=0.03; r=0.84, p=0.008 respectively). **Conclusion:** Supine posture worsens respiratory mechanics in COPD, despite having no effect on lung volume. Greater severity of hyperinflation and gas trapping leads to worsening of airway mechanics whilst supine and this may contribute to poor sleep quality in patients with COPD.

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