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| **Gravitational lung density gradient in asthma with fixed airflow obstruction** |
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| **Introduction/Aim:** Lung density and alveolar expansion is affected by gravity, because of its weight due to pulmonary capillary blood. Fixed airflow obstruction (FAO) in asthma is strongly associated with reduced lung elastic recoil, which may manifest as reduced lung density in dependent zones due to gas trapping. We aimed to examine the gravitational gradient of lung density in asthma with FAO. We hypothesized that reduced lung density in the dependent lung zones, due to gas trapping, is associated with airflow obstruction. **Methods:** Participants with asthma performed seated spirometry and oscillometry. Supine chest computed topography (CT) scans were obtained at standard breath hold at TLC. Non-dependent (anterior), middle and dependent (posterior) zones, were identified by dividing the lung height (in the gravitational direction) equally. Mean lung density of the whole lung (MLD), and of each zone (ZLD), and percentage of low attenuation area (Hounsfield Units <-910, LAA-910) were calculated using ImageJ. Relationships between spirometry, oscillometry and MLD or ZLD were examined by spearman correlation. Differences between lung density sections were examined by ANOVA with post-hoc Tukey’s comparisons. **Results:** Six participants (4 female, 4 with FAO) had mean ±SD age 68 ±14 years and normal FEV1 z-score (-1.41 ±1.0). Oscillometry showed normal resistance (z-score 0.13 ±0.5) and abnormal reactance (-2.45 ±2.4). MLD and LAA-910 showed a gravitational gradient with lowest density in the dependent zone. MLD and ZLD were unrelated to age, spirometry or oscillometry. There was a trend of higher percentage of LAA-910 in participants with FAO, in each lung zone. **Conclusion:** Patients with asthma, including those with FAO, demonstrate a gravitational distribution of lung density that is expected in healthy lungs. This suggests that there is minimal gas trapping in dependent zone, on inspiratory CT scans, even in those with FAO. The gravitational gradient in expiratory CT images may demonstrate differences in FAO. **Grant Support:** KECB was supported by the Berg Family Trust.  |