

### Reviewer's Comments:

World Journal of Cardiology "Electrocardiographic changes in Emphysema" Gupta P et al. Thanks for inviting me to review the manuscript. In this manuscript, the authors tried to describe various ECG changes in patients with emphysema. well written review which appears clear and concise: the characteristic description of the ECG changes found appears to be exhaustive. However, this manuscript contains a major fatal flaw I cannot overlook as described below. Authors amend following points. Q1 It is apparent that COPD including Emphysema is an independent risk factor for Atrial fibrillation (20-30%). [PMID: 28188041] Considering that ECG criteria are determined mainly by P -waves, a major limitation of ECG diagnosis in COPD including emphysema is the presence of atrial fibrillation, which cannot be ignored and authors should describe these limitations. Q2 Are there ECG diagnostic criteria that can reliably and specifically diagnose Emphysema even in the presence of atrial fibrillation? Q3 Many differential diagnoses are needed for P-pulmonale, which is a concept of the past. RAO (right atrial overload), LAO (left atrial overload), longitudinal position of the heart, and electrolyte imbalance have been proposed as causes of P-pulmonale. Rao, lao, electrolytes imbalance, [PMID: 24284921] [PMID: 24099885] [PMID: 14314498] Q4 Considering the mechanism of ECG development in Emphysema, the most important disease to differentiate is a Large Right or Tension Pneumothorax. [PMID: 33757495]

### Response to Reviewer's Comments:

We thank you very much for your comments and suggestions for the revisions to our manuscript. We have made appropriate revisions to the manuscript based on your comments and suggestions and have marked in red so that the changes are easier to view for the review process.

1. We have now included the suggested limitation about the inability of application of diagnostic P-wave indices/criteria in patients with AFib/atrial arrhythmias who have emphysema. [Please see Page 13 of the revised manuscript].
2. In the presence of AF/atrial arrhythmias, we can use the frontal precordial QRS voltage criteria, QRS duration, S1S2S3 sign and precordial R-wave progression to diagnose emphysema although their diagnostic sensitivity is not as remarkable as diagnostic P-wave indices as previously defined. [Please see Page 13 of the revised manuscript].
3. There are certainly other rare conditions which can attribute to P-pulmonale such as hypoxia, pulmonary hypertension, electrolyte derangements (rarely), congenital heart disorders and even left sided cardiac disease itself (but usually with co-existing pulmonary hypertension leading to concomitant right atrial strain, not necessarily enlargement). We agree that P-pulmonale itself is not necessarily a sign of right atrial enlargement. Even our group has previously reported an interesting case of Himalayan P-waves in severe COPD without presence of right atrial enlargement. The giant P-waves were likely the result of underlying pulmonary hyperinflation, right atrial hypoxia, and transient atrial strain or mechanical load directly resulting from the bronchospasm [PMID: 21907999]. We had previously not cited this study in our references. Even in the suggested reference by the reviewer with PMID:24284921, it is to be noted that whenever P-pulmonale is present in left sided failure patients, there is usually evidence of right atrial strain or pulmonary hypertension (possibly type-2 or even underlying type-3 or mixed type) as speculated by the writing authors to which we agree. It is also plausible that many of these patients may have undiagnosed/undocumented underlying co-existing chronic lung disease. [Please see Page 11 of the revised manuscript].
4. We have included the suggested differential of large right sided or tension pneumothorax as suggested by the reviewer with suggested reference [PMID: 33757495] [Please see Page 17 of the revised manuscript].