Reviewer's report

Title: Thoracic gas compression during forced expiration in patients with emphysema, interstitial lung disease and obesity

Version: 2
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Reviewer: Tomasz Golczewski

Reviewer's report:

As I have written previously, the manuscript presents findings on so called ‘thoracic gas compression’ that can be found interesting by scientists in the field. Unfortunately, the main doubts (imperfections) are still present. Additionally, some new imperfections have been introduced.

Major Compulsory Revisions

1. As I have stressed previously, the term ‘compression’ can mean (see dictionaries, please) both the process of compressing and its effect (compressed gas, i.e. alveolar pressure higher than the atmospheric one). Additionally, the term ‘thoracic gas compression’ may mean the general phenomenon. The authors use this term without explanation or another sign, which of those meanings are used in particular places. For example, the examined difference between thoracic and mouth flows corresponds entirely to the compressing process while ‘compression’ as the phenomenon or compressed gas seems to be mainly used in the Introduction and Discussion parts. For that reason, evaluation of the poor Discussion is now difficult.

I would suggest to use ‘compressing’ instead of compression=process and ‘compressed air/gas’ instead of compression=effect to avoid confusions.

2. Since the examined difference between flows is related to compression=process, the negative difference in majority of ILD patients means a temporary decrease of the alveolar pressure from the initial value that causes expiratory airflow beginning and thus is higher than the atmospheric one. This should be discussed taking into account mechanics of airflow (esp. why is ‘negative compressing’ observed mainly in ILD patients and one healthy?); problems with measurement may be noted only as a possible additional cause.

3. The authors treat the ‘thoracic flow’ versus volume of expired air curve as ‘true’. Why? In particular, why we, the others, should treat this curve as the ‘true curve’ when spirometry is considered? Additionally:

- on the one hand, the parameter called as the thoracic flow is the change of body volume, in fact, i.e. it is the change of the gas volumes both in thorax (exhaled and compressed) and abdomen (compressed); (is it possible that obese
subjects have wider intestines, and thus more gas inside the abdomen?)
- on the other hand, the mouth flow per se is treated as ‘bad’ while its integration (i.e. the volume) is ‘good’.

4.
Despite I have noted previously that elastic properties of parenchyma have not any direct influence on the gas compression, the authors seem to discuss again this influence. In particular, there are unexplained statements related to association between the gas compression and these properties (the paragraph next to the last one). Certainly, indirect association exists (through two-ways influence of the properties on airways resistances), which should be discussed (both ways).

Minor Essential Revisions
5. (Abstract) It is not true that the authors compared the magnitude of thoracic compression. They compared the difference between the thoracic and mouth flows.
6. Captions for Figs.2-5 and Table 3 - those items do not present gas compression but the difference between flows.
7. Fig.1 is again incorrect. This time the horizontal axis is wrongly described (I suppose that this axis is related to % of FVC).
8. FRCpleth is defined differently three times (including the list of abbreviation), and only the first definition is related to the commonly used abbreviation of the functional residual capacity.
9. The term ‘significant’ (e.g. ‘significant gas compression’ in the first sentence of the Discussion) is related only to the statistical significance but may be understood as equivalent to ‘big’, ‘great’, etc. compression. Therefore, the term ‘statistical significance’ should be used. Moreover, the authors did not show ‘significant gas compression’ but only statistically significant difference between the thoracic and mouth flows.
10. Despite that the text has been checked by a native English, there are many errors such as typographical errors (e.g. ‘p=0.01-<0.001’ in the Abstract, ‘froups’ instead of ‘groups’ in the Results, or ‘recidual’ instead of ‘residual’, etc.) and meaning of words (e.g. neither the difference between the thoracic and mouth flows nor gas compression was measured; they are calculated, estimated, assessed, etc.). Check, please, the text really carefully.

Discretionary Revisions
(Abstract) The statistical significance is usually presented as p<x rather than p=x (from the definition of this statistical measure).

Level of interest: An article of importance in its field

Quality of written English: Not suitable for publication unless extensively edited
**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

'I declare that I have no competing interests'