Reviewer’s report

Title: Parathyroid Function Index: A New Index For Differentiation of Primary and Secondary Hyperparathyroidism

Version: 0 Date: 22 May 2019

Reviewer: Reviewer 2

Reviewer's report:

PEER REVIEWER ASSESSMENTS:

OBJECTIVE - Full research articles: is there a clear objective that addresses a testable research question(s) (brief or other article types: is there a clear objective)?

Yes - there is a clear objective

DESIGN - Is the current approach (including controls and analysis protocols) appropriate for the objective?

No - there are major issues

EXECUTION - Are the experiments and analyses performed with technical rigor to allow confidence in the results?

No - there are major issues

STATISTICS - Is the use of statistics in the manuscript appropriate?

No - there are issues with the statistics in the study

INTERPRETATION - Is the current interpretation/discussion of the results reasonable and not overstated?

No - there are major issues
OVERALL MANUSCRIPT POTENTIAL - Is the current version of this work technically sound? If not, can revisions be made to make the work technically sound?

Maybe - with major revisions

PEER REVIEWER COMMENTS:

GENERAL COMMENTS: The idea of using a simple index to distinguish different forms of HPT is a good one as it uses readily available tests to make a presumptive diagnosis as soon as Ca, P and PTH levels are available. Concerns I have are listed below

REQUESTED REVISIONS:

The authors need to better justify the value of their index for inclusion of patients in the SHPT group based on slightly low D values considering the high frequency of low D in their study population.

1. Page 3 line 10: Is it really difficult to distinguish between D-deficiency SHPT and PHPT? It seems that a 25-OHD level would be sufficient. This brings me to the next problem

2. Page 4 line 10: I have a major problem with the allocation of patients to the SHPT group as they define D deficiency as <50 mol/L but they state that 72% of the patients in that part of China are D-deficient and all of the groups shown in Table 1 have mean 25-OHD <50 mol/L.

Also it is noted that PTH levels in the SHPT group are much lower than in the PHPT group, while in kids with severe D deficiency the PTH levels are typically 5-10x the upper end of the normal range. The authors concede in the discussion that there is no "gold standard" for inclusion in the SHPT group but that seems to be a major problem with assessing the value of their index.

3. If the journal allows, I would include metric units for PTH and 25 OHD normal ranges in parentheses as many readers are more familiar with these than with the SI units.

4. The authors define the PF index in the abstract but need to repeat the definition in the Methods section of the body of the manuscript.

5. To better show how the groups segregate, a graph showing the range of PF index values for the PHPT, NPHPT, SHPT, and control groups would be helpful.

Note: This reviewer report can be downloaded - see attached pdf file.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

No

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

Quality of written English
Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

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