Reviewer’s report

Title: A predictive model of thyroid malignancy using clinical, biochemical and sonographic parameters for patients in a multi-center setting

Version: 2 Date: 27 Sep 2017

Reviewer: Dong-Jun Lim

Reviewer's report:

The outline of this study is a retrospective review of 2984 patients who underwent thyroid surgery to determine the risk factors associated with thyroid cancer. I have some questions about the designs and results of your research.

Materials and methods

Patients

- It is unclear why the patients had total or partial thyroid surgery who had been confirmed as benign on post-operative pathology, even thought these nodules were presented as benign. In table 1, 'benign' category showed 2.75 ± 1.70 cm in size, which means not all nodules were excised due to large size.

- Did you include patients with all dataset (clinical, laboratory, and US variables)? Or some patients had blank? How many patients were excluded due to incomplete dataset or records?

US imaging analysis

- The authors mentioned that this was a multicenter retrospective trial but details in 'US imaging analysis of Materials and methods section' were not understandable in terms of a retrospective, multi-center trial

1) All included subjects were examined by only two skilled sonographers in only one US machine (GE LOGIQ9) in only one center? If all participant centers had US data, this description looks wrong.
2) Did you check inter-observer variability when determining US findings? Usually, US findings show substantial analytic gap between observers so the authors should mention interobserver agreement of each US findings.

3) How did you analyze your US data? Did you obtain US data without image findings from participating hospitals? Or did you reanalyze all dataset of US findings from multi-centers?

Laboratory variables

- Four tertiary hospitals had the same free T4, free T3, and TSH kits? I wonder it would be possible to compare thyroid function test from each center.

Results

- In page 9, I am curious as to why you have categorized microcarcinoma smaller than 1 cm apart. Also, is this microcarcinoma applicable to your formula? Does the practice of microcarcinoma vary based on the study?

Discussion

- Generally, discussion section is somewhat long and very redundant. Several sentences should be more concise including Page 14 line 4~11.

- There is a question about the clinical implication of your research. After performing a risk assessment based on the formula you have proposed, if you have a high risk of malignancy, do you suggest immediate surgical resection without an FNA? If so, you are suggesting a completely different clinical approach from the current practice, and you will need a clearer basis for this.
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 recommend additional statistical review

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

Acceptable

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?
If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal