Reviewer’s report

Title: Superb microvascular imaging (SMI) compared with conventional ultrasound for evaluating thyroid nodules

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Reviewer: Yingxin Chen

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Thyroid sonography has been widely used to differentiate malignant thyroid nodules from benign ones. Tumors are highly dependent on angiogenesis, which presents different features in malignant and benign processes. Color and power Doppler features were used to predict malignant thyroid nodules. However, the conclusions of different researchers have been controversial.

Toshiba's Aplio TM 500 ultrasound system provides a new technology, superb micro-vascular imaging (SMI), specifically for the visualization of minute vessels without clutter by using a unique algorithm. To date, seldom clinical research with SMI to predict malignant thyroid nodules has been reported.

In this study, SMI for depiction of microvascular flow in thyroid nodules was compared with color/power Doppler imaging (CDI/PDI) and contrast-enhanced ultrasonography (CEUS) on 52 thyroid nodules. They analyzed the gray-scale ultrasound signs and nodules' microvascular flow patterns to differentiate between benign and malignant nodules. They found that microvascular flow and vessel branching in the peripheral and internal microvasculature of thyroid nodules was depicted with greater detail and clarity with SMI, compared with conventional ultrasound. And SMI offers a low-cost/low complication alternative to CEUS for the differentiation of benign and malignant thyroid nodules.

Overall, the manuscript is relatively well written, the statistics are nicely performed and the study contains some provocative data given previous findings. This manuscript would be very useful for the differentiation of thyroid nodules. However, I have a number suggestions detailed below.

1. If possible, please collect more cases over one hundred to strong the data.

2. Please provide some histological figures of malignant nodules after surgery.

3. Please provide statistical data about the sonographic features and vascularity patterns between benign and malignant thyroid nodule on SMI.

4. Did authors compare with other imaging method, such as CT, MRI or SPECT?

5. Were these cases evaluate with IHC test, such as MVD, VEGF,„?”
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

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

Yes

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

Yes

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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