Peer Review File

Reviewer A

The authors evaluated the significance of the area under the waveform (AUW) of electromyography for monitoring the external branches of the superior laryngeal nerve during thyroidectomy in 927 patients. The authors concluded that the sensitivity of AUW was greater than amplitude for warning EBSLN injuries.

There are major criticism and limitations.

Comment 1: The AUW might be a reasonable parameter to evaluate the exact amount of depolarization of all the motor muscle fibers stimulated. However, the authors did not assess the precise status of EBSLN injury after thyroidectomy using electromyography; The stroboscopic finding is not accurate in evaluating EBSLN injury. Therefore, we cannot judge the real condition of EBSLN injury and the significance of AUW. Therefore, this study should first be performed in animal models, as the authors already mentioned as the limitations to this study.

Reply 1: Dear Reviewer. Thank you for your constructive comment. This was a limit for the current study. We mentioned limitations paragraph in the Discussion Section. However, please consider that during each surgery, we evaluated intraoperative electromyography by means of S1 and S2 EBSLN stimulations. That is, we stimulated the cranial aspect of the exposed EBSLNs with 1.0 mA after surgical manipulation (S2 signal), and we compared to S1 to evaluate whether EBSLN injury happened. The criteria have been supplemented in Methods Section (see page 8, line 14-16).

We agree with your comment that there is no effective method to evaluate EBSLN injury postoperatively. A future animal experiments to verify the EBSLN monitoring effect of the AUW is needed, and we are planning this.

Changes in the test: Page 8, line 14-16.

Comment 2: Furthermore, the measurement of AUW is not available in real-time during the operation. Therefore, it is not helpful for intraoperative decision making, as the

authors mentioned.

Reply 2: Dear Reviewer. Again, thank you for your constructive comment. This was another limit for the current study. The measurement of AUW couldn't be displayed in real-time yet. But we collected all the real-time waveform and amplitude data in each surgery, thus the real-time AUW during surgery could be restored. This study was aimed to designed a concept of a parameter for more sensitive EBSLN integrity monitoring, and we tested its monitoring performance. As the results of this study confirmed the efficiency of AUW for intraoperative neuromonitoring, we could program AUW into the monitoring systems softweres next, at that time, the function of real-time AUW display would be more helpful and instructive for intraoperative decision selection. We added this explanatory content as limitation, in Page 18, line 6-13.

Changes in the test: Page 18, line 6-13.

Comment 3: The manuscript description and English used in the paper is neither clear nor concise. Please, check the manuscript and English used throughout this paper to ensure that it is correct, clear, and concise.

Reply 3: Thank you for your advice. We have polished this revised manuscript by experts from AME Editing Service.

Comment 4: Also, the manuscript is too long and redundant. Tables might not be necessary.

Reply 4: Thank you for your advice, the manuscript has been shorted and refined by AME Editing Service, and we have deleted all the tables.

Comment 5: There are some errors in using the terms "AUW" and "AUC". Please, make it correct.

Reply 5: All the terms of "AUW" and "AUC" were rechecked, thank you for your

reminding.

Comment 6: The inclusion and exclusion criteria are not clear. Are the eligibility criteria for only this study? Or Is it the general indication of intraoperative monitoring in the author's hospital?

Reply 6: It's only for this study, thank you for your reminding, we added the supplementary instruction.

Changes in the test: Page 6, line 21.

Comment 7: Of a total of 1,006 patients, 79 cases were excluded from the study. Please, provide the reasons for the exclusion.

Reply 7: Dear Reviewer. Thank you for your comment. Inclusion and exclusion selection criteria are presented in the Methods Section. In detail, among these cases, 17 cases for vocal cord paralysis before surgery, 33 cases for the surgical plan was changed to total thyroidectomy during the surgery, 29 cases for both the RLN and EBSLN were injured simultaneously during surgery.

Thanks again for your precious suggestions, they really helped us.

Reviewer B
Comment 1: Your paper is interesting, well done but I do think that you can do a focused discussion and shorter. At last, I ask you to point some perspectives for your results as you say that they can not be used during the operative time.

Reply 1: Thank you for your great suggestion. The discussion has been enhanced, and the total manuscript has been shortened, Tables were deleted according to another reviewer's opinion. The perspectives about why AUW cannot be used during surgery yet was added in last paragraph.

Changes in the test: Page 18, line 6-13.

Comment 2: I do want you to explain why do you excluded some patients of your study .

Reply 2: Dear Reviewer. Thank you for your comment. Inclusion and exclusion selection criteria are presented in the Methods Section. In detail, the main purpose of this study is to design a monitoring parameter which can be more sensitive to monitor the integrity of EBSLN during surgery. More influence factor as study variables had nothing help for testing the monitoring performance of AUW, thus we excluded some patients according to the eligibility criteria to minimize variables. In this way, many interference factors could be eliminated and the monitoring performance of AUW can be tested more intuitively and simply.

Comment 3: Another point, your surgeons almost operate 10 patients every day. Would please coment it?

Reply 3: The average annual number of surgical procedures in our division was above 3500 cases. In our division, there are about 220 days for operative works, thus we operate 10-20 patients every day. And the patients involved in this study were from these patients. The sample size was ample. Our division own 6 permanent operating room with 6 NIM-3.0 monitors only for thyroid and parathyroid surgery. P.S. The following is clinic work index of our division for 10 years.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Annual outpatient visits	28082	28738	34999	45494	56680	67345	84342	104239	104479	123466	135144
Annual in-patients	1822	1729	1783	2259	2815	3111	3154	3245	3694	3975	4670
Annual surgeries	1714	1408	1550	1988	2427	2749	2881	3032	3267	3503	4271
Benign proportion	60.5%	51.3%	41.7%	31.7%	20.3%	15.8%	7.3%	5.83%	5%	4.5%	4.9%
Malignant proportion	39.5%	48.6%	58.3%	68.3%	79.7%	84.2%	92.7%	94.17%	95%	95.5%	95.1%