

Peer Review File

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Reviewer A

The authors present the learning curve of robotic-retroauricular thyroidectomy using the method of cumulative-sum analysis and concluded that it was at approximately 15 cases. The authors also present the experience gained in docking and manipulating the instrument. Congratulations to the authors for their work.

RESPONSE:

Thank you for the thoughtful and constructive feedback you have provided concerning our manuscript.

My comments are as follows:

- There are 36 patients across a 3-year interval. This might interfere with the accumulation of experience, as the learning curve might be shortened if more cases were done over a shorter time period. Would the author explain the interval of the first 15 cases and the cases between 16 - 36 cases?

RESPONSE:

Thank you for raising the pertinent question.

The author has consistently performed approximately 1–3 cases of robotic retroauricular thyroidectomy per month since March, 2018. There were no special intervals between the phases or cases.

Case 1 (2018-03-14), case 2 (2018-05-14), case 3 (2018-05-21), case 4 (2018-06-04), case 5 (2018-06-18), case 6 (2018-06-25), case 7 (2018-07-02), case 8 (2018-07-16), case 9 (2018-07-30), case 10 (2018-09-03), case 11 (2018-11-12), case 12 (2019-03-04), case 13 (2019-03-18), case 14 (2019-05-22), case 15 (2019-08-14), case 16 (2019-11-13), case 17 (2019-11-13), case 18 (2019-11-27), case 19 (2019-12-11), case 20 (2020-01-08), case 21 (2020-01-08), case 22 (2020-01-22), case 23 (2020-02-26), case 24 (2020-09-09), case 25 (2020-10-07), case 26 (2020-10-14), case 27 (2021-01-06), case 28 (2021-01-13), case 29 (2021-01-20), case 30 (2021-02-03), case 31 (2021-02-03), case 32 (2021-02-03), case 33 (2021-02-10), case 34 (2021-02-24), case 35 (2021-03-10), case 36 (2021-03-24)

- Also, did the author apply the retroauricular-robotic approach to other procedures, such as salivary-gland tumor excision or neck dissection, during the study period? A similar approach might interfere with the learning curve of retroauricular thyroidectomy, especially if we compare it with other robotic thyroidectomies, such as the transaxilla, BABA, or transoral approaches.

RESPONSE:

Thank you for providing these insights.

There was no neck dissection. Nine cases of robotic retroauricular approach were performed for SMG tumors from 12-02-2020 for the first time until 24-03-2021.

We believe that it did not significantly affect the learning curve of robotic retroauricular thyroidectomy for the following two reasons:

- (1) SMG tumor surgery was performed after the phase was divided.
- (2) Thyroidectomy requires robot arm access to the inside of the strap muscles, which are far from retroauricular incision; thus, docking and manipulation of the instruments are important considering the collision between the instruments. However, SMG resection is performed in a relatively large surgical field in the posterior belly of digastric muscles near the retroauricular incision. Therefore, docking, which was an important element of this study, is not critical.

- Because the object of this study is to evaluate the learning curve of retroauricular thyroidectomy, we expect the author to compare their data to similar literature and explain the possible differences or distinguishing characteristics of this manuscript.

RESPONSE:

Thank you for your valuable suggestion.

(1) Comparing their data to similar literature

- Lee et al. reported that in endoscopic hemithyroidectomy, the retroauricular approach had a shorter operative time than that for the transaxillary approach and the learning curve was stabilized earlier.

(Lee DY et al. Comparison of Learning Curves for Retroauricular and Transaxillary Endoscopic Hemithyroidectomy. Ann Surg Oncol 2016;23:4023-8.)

- Sun et al. reported that the surgical time significantly decreased after 30–35 cases of robotic thyroidectomy via the bilateral axillo-breast approach.

(Sun HX et al. Robotic thyroidectomy via bilateral axillo-breast approach: Experience and learning curve through initial 220 cases. Asian J Surg 2020;43:482-7.)

- Park et al. evaluated the learning curve for robotic thyroidectomy using the transaxillary approach of surgeons without experience in endoscopic thyroid surgery. The learning curve was stabilized after 20 cases; thus, the authors suggest that no major obstacle exists in initiating robotic surgery even without endoscopic surgery experience.

(Park JH et al. Robotic thyroidectomy learning curve for beginning surgeons with little or no experience of endoscopic surgery. Head Neck 2015;37:1705-11)

- Kandil et al. evaluated the learning curve using the CUSUM analysis for robotic thyroid and parathyroid surgery performed by a single surgeon with various approaches for 10 years using the CUSUM analysis. Similar to the findings in our study, the retroauricular approach demonstrated that the learning curve was divided based on approximately 20 cases. In contrast, for the transaxillary approach, the learning curve was divided into 69 cases.

(Kandil E et al. A Single Surgeon's 10-Year Experience in Remote-Access Thyroid and Parathyroid Surgery. Am Surg 2021;87:638-44.)

- Kuo et al. performed the CUSUM analysis on the operating time and reported that TOEVA became competent in 35 cases with the accumulation of proficiency.

(Kuo TC et al. Practice Patterns and Learning Curve in Transoral Endoscopic Thyroidectomy Vestibular Approach With Neuromonitoring. Front Endocrinol (Lausanne). 2021 Oct 21;12:744359.)

- As a result of analyzing the learning curve for TOEVA using CUSUM analysis, Luo et al. also reported that the operation time stabilized after 40–50 cases.

(Luo JH et al. The Learning Curve for Transoral Endoscopic Thyroid Surgery: A Single Surgeon's 204 Case Experience. J Laparoendosc Adv Surg Tech A. 2020 Feb;30(2):163-169.)

- Chen et al. reported that in a study comparing TOEVA and TORT, a definite learning curve was not seen in the TOEVA group, whereas the learning curve of the TORT was 25 cases.

(Chen YH et al. Transoral robotic thyroidectomy versus transoral endoscopic thyroidectomy: a propensity-score-matched analysis of surgical outcomes. Surg Endosc. 2021 Nov;35(11):6179-6189.)

(2) Explain the possible differences or distinguishing characteristics of this manuscript.

- Although the reported data are heterogeneous, it can be hypothesized that compared with the other approaches, the retroauricular approach is advantageous for surgeons for achieving competency.

- If the surgeon becomes proficient in thyroid surgery using the retroauricular approach, a wide range of head and neck surgeries, such as salivary gland tumor excisions and neck dissection can be performed using the same approach. Therefore, it may be considered advantageous for novice surgeons who want to start performing robotic head and neck surgery using the retroauricular approach.

- In this study, we introduce a method inserting all four arms through a retroauricular incision with minimal intraoperative collision of instruments.

We have revised the discussion section (p. 12, lines 6 – p. 13, lines 6) in accordance with your comment.

- The author concluded that the modification of the robotic-arm docking and shifting from three to four arms shortens the operation time. Would the author mark the changes in their learning curve in Figure 1?

RESPONSE:

Thank you for the valuable suggestion.

Four robot arms were used from the 6th case. Of course, it was more helpful than using three arms; however, in the early days of trying four robot arms, we were unable to incorporate an efficient docking method; thus, we continued to experience collision during

surgery. Since the efficient method of docking the four arms was gradually developed, it is difficult to define this as a specific case point.

Reviewer B

In the thyroid surgery field, there are many good approaches without anterior neck scar such as transoral, bilateral axillary breast approach (BABA), transaxillary (TA) and etc. Recently, the transoral, BABA, and single port transaxillary approach are most famous methods for this kind of research field. Retroauricular approach is not the brand new in these days and less than 40 cases are very little in cases.

As for the year of 2022, retroauricular robotic thyroid surgery is not the novel approach. Also, the cases are very small under the 40 cases, relatively to other reports. I think that this manuscript has little value for publication in SCIE level journal.

RESPONSE:

Thank you for your thoughtful and constructive feedback concerning our manuscript.

Although various approaches exist to robotic thyroid surgery, currently no study has confirmed the superiority of any approach. In order to compare the role of each approach for robotic surgery advancement, data on retroauricular approach should be more publicly disclosed and discussed since the retroauricular approach may be considered advantageous over other approaches for various head and neck robotic surgeries. Therefore, in this study, we aimed to provide useful information to the readers by providing information on the learning curve and methods to reduce it in the retroauricular approach.

Reviewer C

This manuscript seems informative. However, several points should be revised to be published.

RESPONSE:

Thank you for considering our paper.

1. Page 3 Line 3: “The retroauricular approach has the advantage of requiring only a small extent of flap dissection and a short distance from the incision to the thyroid gland~” © This seems the area of controversy. Because various approaches do have their own advantages, this statement is better to be revised more reasonably.

RESPONSE:

Thank you for your valuable suggestion.

We have revised the Abstract (page 3, lines 2–5) for brevity and clearer focus.

2. Is 36 patients enough for your statistics? How did you calculate the analyzing case number?

RESPONSE:

Thank you for your pertinent question.

The cumulative sum analysis can better reflect the degree of change because the fluctuation range is accumulated even for small changes between the sequential event values and the predetermined threshold value. Since the CUSUM analysis examines the changes in sequential events over time, compared with a previous study that used the CUSUM analysis to analyze the learning curve of video-assisted mini-laparoscopic partial nephrectomy in 20 patients with renal cell carcinoma, it is possible to analyze the findings in 36 cases.

(Park JS et al. Cumulative sum analysis of learning curve for video-assisted mini-laparotomy partial nephrectomy in renal cell carcinoma. Medicine (Baltimore). 2019 Apr;98(17):e15367.)

3. page 3 line 13: 'stage' ← 'phase'

RESPONSE:

Thank you for your valuable suggestion.

We have revised the text (page 3, lines 11–13) according to your comment.

4. Minimizing fighting between 4 arms in workspace should be the key point of this report. This should be presented in much more detail in Methods section with better arranged figures or illustrations.

RESPONSE:

Thank you for your thoughtful and constructive feedback

We have revised the material and methods (page 7, lines 2– lines 20) section according to your comment with a revised figure 1.

5. The inclusion criteria should be listed.

RESPONSE:

Thank you for your valuable suggestion.

Before surgery, the thyroid nodules and cervical lymphnodes were evaluated using ultrasonography, fine needle aspiration cytology, and computed tomography. The inclusion

criteria included benign thyroid nodule with a maximal diameter less than 5 cm and papillary thyroid carcinoma less than 2 cm. The exclusion criteria included patients with papillary thyroid carcinoma with clinically suspected extrathyroidal extension and patients with cervical lymph node metastasis or distant metastases on preoperative image.

We have revised the materials and methods (page 5, lines 18– page 6, lines 1) section according to your comment.

6. How did you manage level 6? This is better to be added and analyzed.

RESPONSE:

Thank you for your valuable suggestion.

Patients were treated according to the “*Korean Thyroid Association Management Guidelines for Patients with Thyroid Nodules and Thyroid Cancer.*” Specifically, prophylactic level VI cervical lymph node dissection was not performed in patients with papillary thyroid carcinoma with small primary cancer size (T1 or T2), non-invasive and clinically without lymph node metastasis. Therefore, level VI LN dissection was not performed among the study participants.

(Yi KH. The Revised 2016 Korean Thyroid Association Guidelines for Thyroid Nodules and Cancers: Differences from the 2015 American Thyroid Association Guidelines. Endocrinol Metab (Seoul). 2016 Sep;31(3):373-378.)

7. Outcome measure analyses, including sensory loss.

RESPONSE:

Thank you for your valuable suggestion.

Unfortunately, the questionnaire for postoperative paresthesia/hyperesthesia was not employed, thus, the concerning data are lacking. However, according to the description of the medical record, no patients complained of neck or auricular paresthesia in Phase 1, while two patients complained of this in Phase 2. There were no differences between phase 1 and phase 2 ($p=0.500$). This was attributed to the identification and preservation of the great auricular nerve (GAN) in all the cases by using the GAN as a landmark and adjusting the appropriate depth during retroauricular flap elevation. It would be beneficial to analyze the results using a questionnaire for postoperative paresthesia/hyperesthesia in a follow-up study.

We have revised the results (page 10, lines 5–6) section according to your comment.

8. Discussion seems redundant, better to be more concise.

RESPONSE:

Thank you for your valuable suggestion.

We have revised the discussion section for brevity.

Reviewer D

This article focused on the learning curve for robotic retroauricular thyroidectomy using cumulative sum analysis in a single center of retrospective review settings. There were 36 patients undergoing robotic retroauricular thyroidectomy between 2018 and 2021, which was divided into two phases based on mean operation time using cumulative sum analysis: Phase 1 (#1-#15 cases) and Phase 2 (#16-#36 cases). As a result, the total operation time, the flap dissection and docking time, and console time were shorter in Phase 2 than that in Phase 1 according to statistically analysis. Conclusively, proficiency in docking and manipulating the instruments accelerate the learning curve. This is a good opportunity to investigate the learning curve for robotic retroauricular thyroidectomy. I have some questions for the authors about this article.

RESPONSE:

Thank you for your thoughtful and constructive feedback concerning our manuscript.

1. If you feel that your paper could benefit from polishing, you may wish to consider having your paper professionally edited for language. And the background and results in the abstract should be simplified.

RESPONSE:

Thank you for your valuable suggestion.

We have revised the abstract for brevity, and have revised the manuscript based on the English correction from a professional proofreading company.

2. Please clarify the study design in the title as long as described in the methods.

RESPONSE:

Thank you for your valuable suggestion.

Several methods exist for analyzing the learning curve, including moving average curve and CUSUM analysis. This study analyzed the learning curve of robotic retroauricular thyroidectomy by analyzing the operation time using the CUSUM analysis. Referring to the titles of other studies using similar methods, the title was revised to "Cumulative sum analysis of the learning curve for robotic retroauricular thyroidectomy" to indicate a clearer focus.

e.g.

"Cumulative sum analysis of learning curve for video-assisted mini-laparotomy partial nephrectomy in renal cell carcinoma"

"Cumulative sum analysis of the learning curve for the preclosure technique using Proglide"

"Cumulative sum analysis of the learning curve for endoscopic resection of juvenile nasopharyngeal angiofibroma"

3. I would like to know why you choose the CUSUM analysis within your study and the reason of a second-order polynomial but not a third-order polynomial. Do you try risk-adjusted CUSUM methods to represent the observed procedure-related complications in the this study since the main outcomes are misted. Please clarify the above details.

RESPONSE:

Thank you for these insightful comments.

The moving average curve is a method that can assess the degree of change by smoothing the range of change when the magnitude of the change is large. However, in the case of a small change, confirming the degree of change is challenging. Unlike the moving average curve, the cumulative sum analysis accumulates fluctuations based on a predetermined threshold value; hence, it can better reflect the degree of change.

The third-order polynomial curve has an R^2 of 0.9075 (second-order polynomial R^2 0.7891), confirming that the predicted value of the trendline is more consistent with the actual data. We revised the text using a third-order polynomial curve according to your comment.

Risk-adjusted CUSUM methods require a definition of surgical failure based on "postoperative complications" or "conversion to open surgery." However, in this study, risk-adjusted CUSUM methods could not be performed. Since the probability of complications of thyroidectomy was very low, and the number of cases was small, presenting the risk factors by logistic regression was challenging.

(Kim S, Yoon YS, Han HS, Cho JY, Choi Y, Lee B. Evaluation of a single surgeon's learning curve of laparoscopic pancreaticoduodenectomy: risk-adjusted cumulative summation analysis. Surg Endosc. 2021 Jun;35(6):2870-2878.)

Previous studies analyzing the learning curve of other robotic thyroidectomy, such as transaxillary approach, TORT and TOEVA, also used the CUSUM analysis for the operating time for the same reason.

(Kandil E et al. A Single Surgeon's 10-Year Experience in Remote-Access Thyroid and Parathyroid Surgery. Am Surg 2021;87:638-44.)

(Kuo TC et al. Practice Patterns and Learning Curve in Transoral Endoscopic Thyroidectomy Vestibular Approach With Neuromonitoring. Front Endocrinol (Lausanne). 2021 Oct 21;12:744359.)

We have revised Figures 2 and 3 according to your comment.

4. How about the port settings including additional axillary port? And the drainage placement policy?

RESPONSE:

Thank you for your pertinent question.

No additional incisions other than a single retroauricular incision were utilized. In some cases, if necessary, we consider that an additional port could be used as an alternative. A drain was placed with a negative pressure suction and removed when the drainage amount decreased to less than 20 ml.

5. I am wondering the comparisons between other approaches or remotes, such as TOETVA, robotic BABA or TORS since excellent anesthetic and identical oncological outcomes.

RESPONSE:

Thank you for your valuable suggestion.

(1) Upon comparing their data to similar literature

- Lee et al. reported that in endoscopic hemithyroidectomy, the retroauricular approach had a shorter operative time than that for the transaxillary approach and the learning curve was stabilized earlier.

(Lee DY et al. Comparison of Learning Curves for Retroauricular and Transaxillary Endoscopic Hemithyroidectomy. Ann Surg Oncol 2016;23:4023-8.)

- Sun et al. reported that the surgical time significantly decreased after 30–35 cases of robotic thyroidectomy via bilateral axillo-breast approach.

(Sun HX et al. Robotic thyroidectomy via bilateral axillo-breast approach: Experience and learning curve through initial 220 cases. Asian J Surg 2020;43:482-7.)

- Park et al. evaluated the learning curve for robotic thyroidectomy using the transaxillary approach of surgeons without experience in endoscopic thyroid surgery. The learning curve

was stabilized after 20 cases; thus, the authors suggested that no major obstacle exists in initiating robotic surgery even without endoscopic surgery experience.

(Park JH et al. Robotic thyroidectomy learning curve for beginning surgeons with little or no experience of endoscopic surgery. Head Neck 2015;37:1705-11)

- Kandil et al. evaluated the learning curve using the CUSUM analysis for robotic thyroid and parathyroid surgery performed by a single surgeon with various approaches for 10 years using the CUSUM analysis. Similar to the findings of our study, the retroauricular approach demonstrated that the learning curve was divided based on approximately 20 cases. In contrast, for the transaxillary approach, the learning curve was divided into 69 cases.

(Kandil E et al. A Single Surgeon's 10-Year Experience in Remote-Access Thyroid and Parathyroid Surgery. Am Surg 2021;87:638-44.)

- Kuo et al. performed the CUSUM analysis based on the operating time and reported that TOEVA became competent in 35 cases with the accumulation of proficiency.

(Kuo TC et al. Practice Patterns and Learning Curve in Transoral Endoscopic Thyroidectomy Vestibular Approach With Neuromonitoring. Front Endocrinol (Lausanne). 2021 Oct 21;12:744359.)

- As a result of analyzing the learning curve for TOEVA using the CUSUM analysis, Luo et al. also reported that the operation time was stabilized after 40–50 cases.

(Luo JH et al. The Learning Curve for Transoral Endoscopic Thyroid Surgery: A Single Surgeon's 204 Case Experience. J Laparoendosc Adv Surg Tech A. 2020 Feb;30(2):163-169.)

- Chen et al. reported that in a study comparing TOEVA and TORT, a definite learning curve was not seen in the TOEVA group, whereas the learning curve of the TORT was established for 25 cases.

(Chen YH et al. Transoral robotic thyroidectomy versus transoral endoscopic thyroidectomy: a propensity-score-matched analysis of surgical outcomes. Surg Endosc. 2021 Nov;35(11):6179-6189.)

(2) Explain the possible differences or distinguishing characteristics of this manuscript.

- Although the reported data are heterogeneous, it can be hypothesized that compared with other approaches, the retroauricular approach is advantageous for surgeons for attaining competency.

- If the surgeon is able to attain proficiency in thyroid surgery using the retroauricular approach, a wide range of head and neck surgeries, such as salivary gland tumor excisions and neck dissection, can be performed using the same approach. Therefore, it may be advantageous for novice surgeons who desire to perform robotic head and neck surgery to start with the retroauricular approach.

- In this study, we introduce a method concerning the insertion of all four arms through a retroauricular incision with minimal intraoperative collision of instruments.

We have revised the discussion (p. 12, lines 6 – p. 13, lines 6) section in accordance with your comment.

6. Please express the shortage of this study.

RESPONSE:

Thank you for your valuable suggestion.

The current study has several limitations. First, since this study was a retrospective observational setting, analysis was performed only on the available data. Second, the study includes the analysis of data from a single institution and single surgeon, and since the surgeon has 10 years of thyroid surgery experience and also has experience with a transaxillary approach, caution is warranted in the interpretation of the learning curve of this study. Third, long-term oncological outcomes were not analyzed in this study. Fourth, in addition to the clinical characteristics presented in this study, it is possible that different anatomical or oncological characteristics of each patient may have influenced the learning curve. Fifth, in this study, only the retroauricular approach was analyzed; therefore, a comparison with other approaches could not be made. Sixth, in this study, the learning curve is analyzed only by the operation time; hence, if the number of cases increases, it is necessary to analyze the learning curve comprehensively using other parameters in the follow-up study.

We have revised the discussion (p. 13, lines 22 – p.14, lines 11) section in accordance with your comment.

7. The conclusion should be simplify and move several sentences to discussion.

RESPONSE:

Thank you for your valuable suggestion.

We have revised the conclusion (page 14, lines 19-21) section for brevity.

Reviewer E

This is a retrospective study that evaluates the learning curve of robotic retroauricular thyroidectomy performed by a single surgeon. The authors found that the operative time decreases after approximately 15 cases. They also develop a way to dock four robotic arms, which they believe to be beneficial for better traction-counter traction, shortening the operative time, and improving safety.

The article is well-written. However, there are some questions need to be answered and concerns that should be addressed.

RESPONSE:

Thank you for your thoughtful and constructive feedback concerning our manuscript.
Major concerns

1. Please tell us the surgical experience of the main surgeon. How long has he been in the practice of thyroid surgery? What is his annual surgeon volume for conventional thyroidectomy? Did the surgeon have experience of other endoscopic/robotic approach (e.g., transaxillary, BABA, transoral) before this study? In learning curve study, it is important to disclose the prior surgical experience of the surgeon.

RESPONSE:

Thank you for your pertinent question.

The surgeon (WJJ) started performing thyroid surgery in 2011 and performs approximately 100 thyroid surgeries, including advanced cases, per year. From 2012, out of 26 transaxillary approaches, 5 cases were performed using the da Vinci robot system, and the rest were performed using the endoscopic system. Since 2018, starting with the robotic retroauricular thyroidectomy for the first time, consecutive robotic thyroidectomy surgeries were performed using only the retroauricular approach.

We have revised the discussion (p.14, lines 1–4) section in accordance with your comment.

2. In the discussion section, the author stated that the CUSUM method can better reflect the degree of change when comparing with the moving average method in the analysis of learning curve. Please use your data to show the figure of operative time using the moving average method, so the readers can better understand the difference between these two statistical methods.

RESPONSE:

Thank you for your valuable suggestion.

The moving average curve is a method that can assess the degree of change by smoothing the range of change when the magnitude of the change is large. However, in the case of a small change, confirming the degree of change is challenging. Unlike the moving average curve, the cumulative sum analysis accumulates fluctuations based on a predetermined threshold value; hence, it can better reflect the degree of change.

As per your comments, the moving average curve has also been presented as a figure for readers for comparison.

We have revised the discussion (p. 11, lines 15 –17) section in accordance with your comment with an additional Figure 3.

3. In the discussion section, the authors stated that only three robotic arms were used in the beginning period. Four arms were used after they found a way to dock the instruments in a proper angle and distance. Please tell us how many cases in your study use three arms and how many cases use four arms. Is there a clear-cut point that the four arms were routinely applied (e.g., after the 5th case or the 9th case)? Alternatively, is the number of the robotic arms determined on a case-by-case basis? It is important because the number of the robotic arms might be a confounder of the operative time.

RESPONSE:

Thank you for your pertinent question.

Four robot arms were used from the 6th case. Of course, it was more helpful than using three arms; however, in the early days of trying four robot arms, we were unable to incorporate an efficient docking method; thus, we continued to experience collision during the surgery. Since the efficient method of docking the four arms was gradually developed, it is difficult to define this as a specific case point.

4. In the present study, the authors use operative time as a sole surrogate for learning curve evaluation. As we know, speed may not perfectly equal to proficiency. Are there any other parameters that might be used to evaluate the learning curve (e.g., complication, blood loss, drainage amount?). Please address this point in the discussion section or put it in the limitation.

RESPONSE:

Thank you for your valuable suggestion.

The learning curve could not be visualized with complications or other parameters other than the operation time. This is because thyroidectomy has a very low risk of complications and the number of cases in this study was small. Previous studies analyzing the learning curve of other robotic thyroidectomy procedures, such as transaxillary approach, TORT and TOEVA, also used the CUSUM analysis for the operating time for the same reason.

(Kandil E et al. A Single Surgeon's 10-Year Experience in Remote-Access Thyroid and Parathyroid Surgery. Am Surg 2021;87:638-44.)

(Kuo TC et al. Practice Patterns and Learning Curve in Transoral Endoscopic Thyroidectomy Vestibular Approach With Neuromonitoring. Front Endocrinol (Lausanne). 2021 Oct 21;12:744359.)

We have addressed this part as a limitation (p.14, lines 8–11) in accordance with your comment.

Minor issues

1. One patient developed hematoma after the surgery. Please specify when did the hematoma occur? (immediately or hours after the surgery) and what was the management to achieve hemostasis? (conservative or re-operation)

RESPONSE:

Thank you for your pertinent question.

Superficial hematoma with minimal swelling was found within 24 hours after surgery. The bleeding focus was presumed to be the skin flap or surface of strap muscles, and conservative management was performed owing to lack of symptoms and no progression of hematoma, which resolved within a few weeks.

2. Majority of the patients in this study are papillary carcinoma. Are those patients diagnosed preoperatively by fine needle aspiration or found by permanent section after the surgery? What is your indication for prophylactic central neck dissection in your institution?

RESPONSE:

Thank you for your pertinent question.

Patients were treated according to the “*Korean Thyroid Association Management Guidelines for Patients with Thyroid Nodules and Thyroid Cancer.*”

Based on the findings reported according to the besthesda system in the preoperative fine needle aspiration cytology of thyroid nodule, surgery was performed. The final diagnosis was made using the surgical permanent pathology.

Prophylactic level VI cervical lymph node dissection is not performed in patients with papillary thyroid carcinoma with small primary cancer size (T1 or T2), non-invasive and clinically without lymph node metastasis.

Prophylactic level VI cervical lymph node dissection is performed when there is advanced primary cancer (T3 or T4) or confirmed lateral cervical lymph node metastasis (cN1b).

If metastasis to the central cervical lymph node is clinically confirmed, therapeutic level VI lymph node dissection is performed.

(Yi KH. The Revised 2016 Korean Thyroid Association Guidelines for Thyroid Nodules and Cancers: Differences from the 2015 American Thyroid Association Guidelines. Endocrinol Metab (Seoul). 2016 Sep;31(3):373-378.)

3. In recent years, transoral thyroidectomy via vestibular approach has gained popularity worldwide. One advantage of this widespread technique is the short learning curve. What is the author's opinion regarding the learning curve between the transoral and retroauricular approach?

RESPONSE:

Thank you for your pertinent question.

According to the published studies, as a result of analyzing the learning curve for TOEVA, 40–50 cases were reported and approximately 25 cases were reported for TORT. Although it is difficult to generalize the learning curve based on 15 cases, retroauricular approach is definitely considered a good approach.

There are several pros and cons to each of the different approaches. For example, when management of thyroid superior pole is important, retroauricular approach is more advantageous than transoral approach in surgical field exposure. Moreover, retroauricular approach is advantageous for lateral LN management. On the other hand, in transoral approach, the distance from the incision to the thyroid gland is short, and external scars do not occur. In order to compare the role of each approach for robotic surgery advancement, data on the retroauricular approach should be more publicly disclosed and discussed.

4. Line 18, Page 3: “the mean operation time decrease rapidly... .. “The mean operation time is a constant number (177.4 minutes). I think this sentence should be “the operation time decrease rapidly....” Please check.

RESPONSE:

Thank you for your valuable suggestion.

We have revised the Abstract (p. 3, lines 17) in accordance with your comment.

