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Our Robotic Surgery Experience Thyroidectomy of Graves' Disease: Is it a Feasible and Safe Procedure?

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Abstract

Background: Thyroid surgery technique has undergone significant changes in recent years from traditional open approach to robotic surgery. This evolution has recently included surgery for Graves's disease that always was a challenging condition for surgeons, moreover when it is performed by transaxillary robotic assist. The aim of this paper is to define the indications, feasibility and the safety of this procedure in Graves' disease.

Material and Methods: A Retrospective cohort study of patients who underwent transaxillary robotic assisted thyroidectomy at the American Hospital of Paris (AHP) during 2010-9/2017.

All patients were operated by same surgeon (P.A) at the American Hospital of Paris (AHP).

Results: A total of 46 patients with known Graves' disease were reviewed and analyzed. Four patients were excluded due to incomplete data.

Forty two patients were included in this study, 3 males and 39 females. Mean age was 37.2 years. No major events were observed, no special complications were reported regarding bleeding amount, and vocal cord paralysis or hypocalcemia. Length of stay was 0.9 ± 0.5 days. Operative time was (165.8 ± 36.5 min). The mean follow-up time was 24.6 months.

Conclusion: The transaxillary robotic approach for thyroid surgery has become a viable alternative to traditional open or endoscopic methods and has been predicted to gain momentum and popularity in the future. The indications for this technique are continually expanding; beyond the cosmetic benefits, robotic transaxillary thyroidectomy is a technically feasible and safe procedure for the patients with Graves' disease. Furthermore, careful patient selection and reducing the range of indication especially for the first dozens cases is essential to achieve consistently successful results.

Keywords: Graves' disease; Robotic thyroidectomy; Transaxillary approach

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Introduction

Graves' disease, also known as toxic diffuse goiter, is the most common cause of hyperthyroidism in the United States. Usually occurs in people younger than age 40 and is seven to eight times more common in women than men. Women are most often affected between ages 30 and 60.

People with Graves' disease have three treatment options: Radioiodine therapy, medications, and thyroid surgery. Radioiodine therapy is the most common treatment for Graves' disease in the United States.

Thyroidectomy is not recommended as fist-line therapy for treating Graves' disease but this option can be useful and practicable when medicamental treatment is not useful. However, a retrospective cohort study showed that a significant number of patients underwent surgery as primary care for treating Graves' disease. Surgery is a safe alternative therapeutic option in patients who are noncompliant with or cannot tolerate antithyroid drugs, have moderate-to-severe ophthalmopathy, have large goiters, or refuse or cannot undergo radioiodine therapy [1-6]. Also, surgical treatment results have been found to be more effective than radioiodine therapy for achieving cure and reduce recurrences [7].

In a recent study, researchers aimed to determine the effectiveness of total thyroidectomy (classical approach) in treating persistent hyperthyroidism and improving quality of life.

Overall, there were few post-operative complications, and no participants experienced any laryngeal nerve damage during the procedures [8,9]. However we believe this paper to be the second in literature.

Surgery provides rapid treatment of Graves' disease and permanent cure of hyperthyroidism in most patients.

However, due to the enlarged gland size, their high vascularity, and the difficulty to control bleeding makes it challengeable surgery and more complicated, interestingly many authors feel that Graves' disease remains a contraindication to current endoscopic techniques.

Preoperative preparation to render the patient euthyroid is essential in order to prevent thyrotoxic crisis (thyroid storm). The hyperthyroid state can be rapidly corrected using a combination of Iopanoic acid, Dexamethasone, Beta-blockers, and Thioamides [10].

The learning curve for transaxillary robotic thyroidectomy is rather steep; reasonable progress in terms of operating times can be achieved within few cases. Consistency in the team and careful patient selection are paramount factors for success [11]. However with more cases the standard becomes wider and more complicated cases such as large thyroid carcinomas, Goiter and Graves' disease can be dealt well.

The aim of the current study is to present our results of transaxillary robotic assisted thyroidectomy for Graves' disease, comparable with the results and complications of classical cervical approach, and to show the efficacy, feasibility and safety of this technique.

Patients and Methods

Patients

The computerized database of the Department of Otolaryngology-Head and Neck Surgery of the American Hospital of Paris was retrospectively reviewed for all patients over 18 years of age that underwent RATS from January 2010 to September 2016.

Over all 503 patients underwent transaxillary robotic thyroid and parathyroid surgery (total, subtotal and hemi thyroidectomy) during the study period. The indications were thyroid carcinomas, thyroid benign nodules, multi nodular goiters, Graves' disease and parathyroid adenoma or hyperplasia. We started thyroidectomy for Graves' disease after more than 100 transaxillary robotic procedures due to other diagnosis as mentioned before. Forty-Two patients were included in the study, 39 were women and the mean age at surgery was 37.2 years (range: 24 to 58). Of these, two patients (0.48%) failed therapeutic treatment, 29 patients (69%) desire pregnancy, the other 11 (26%) patients were seeking for surgery as definitive treatment 8 of them were encourage hearing bout robotic surgery and cervical scar less operations.

Exclusion criteria were Para-thyroidectomies, thyroidectomy due to: Carcinomas, MNG, and lack of follow-up, incomplete data.

Thirty-Four patients were given prophylactic treatment with Lugol (7 of them combined with steroids) prior to surgery, 3 patients didn't receive the treatment after it was prescribed for them. There were no data regarding the other 5 patients.

Patients were followed-up one and four weeks after the procedure, and every three months thereafter.

Surgical Procedure

All patients were operated by a single surgeon (A.P). The procedure was performed under general anesthesia using NIM tube Xomen NIM III EMG Endotracheal Tube II; Medtronic Inc., Jacksonville, Fla., USA). The patient is positioned supine with a slightly extended neck and the contralateral arm alongside the body [12,13]. The ipsilateral arm to the axillary incision was placed in position with an extended shoulder, right-angle-flexed elbow and forearm in front of the head in a padded and safe position on an arm board overlying the forehead [14].

Skin markings are made. The medial border is the vertical line from the sternal notch to the midline of the thyroid. The vertical axillary incision is marked by the intersection of the superior and inferior borders of the dissection with the anterior axillary fold [15]. The markings are made prior to arm positioning to check for scar concealment with the arm in a neutral position.

Patients were prepped and draped in a sterile fashion; a 5 cm to 6 cm vertical incision is made using a scalpel through the skin and using electrocautery to the fascia overlying the pectoralis major muscle. Then creation of working space [16], dissection along the anterior surface of the pectoralis major muscle until the sternocleidomastoid muscle is reached. The dissection advances between the sternal and clavicular heads and a retractor is used to elevate the sternal heads to expose the strap muscles and identify the omohyoid muscle. The dissection is continued beneath the strap muscles exposing the thyroid gland [17].

The space was maintained using the Chung retractor or the Kuppersmith robotic Thyroidectomy retractor (Marina Medical, Sunrise, Fla., USA) the retractor system is attached to the operating table on the contralateral side of the patient [18].

The da Vinci robot cart is positioned on the contralateral side of the patient and the robotic arms are introduced into the space created by the retractor. Three arms are inserted into the space to control three instruments (Harmonic Shears, Ethicon, and Somerville, N.J., USA), Maryland Dissector (Intuitive Surgical Inc.) and Pro-Grasp Forceps (Intuitive Surgical Inc.) and the endoscope, which is positioned centrally using a 30-degree camera aimed dorsally [17].

The operation proceeds in a similar fashion to open thyroidectomy. More details- superior pole, RLN and para-identification, retract trachea to view contralateral lobe.

Hemostasis control was done, the robotic instruments were removed then hemostatic control to the working space has also done. Ropivacaine was administered along with the positioning of a Blake drain and the working space. The axillary wound is then closed.

Results

All forty-One patients underwent total thyroidectomy, except one who underwent a lobectomy.

During surgery, no major events-such as tracheal damage, esophageal injuries, and major vessel bleeding or recurrent laryngeal nerve injuries-were noted.

The average time of the working space was 22 min. The Docking average time was 9 min.

All the ipsilateral RLN to the operated side were exposed and have normal function *via* NIM detector. Thirty nine contralateral RLN were exposed and have normal function *via* NIM system. Only 2 contralateral RLN were not identified at the operation time.

Due to the known hypervascularity of the thyroid gland in Graves' disease, higher than usual (average of 20 ml to 30 ml) amount of bleeding were reported in operation time from the thyroid gland, good hemostasis control was obtained by the surgeon. No case was converted to open approach due to bleeding or any other reason.

Hematoma in the working space occurred in only two cases (4.7%) demonstrate which required re-operated by robotic assist; the bleeding was noted to be from the working space with no cervical or tracheal compression.

During hospitalization no major events were reported, the drains were taken off 48 h after surgery, only one patients need 72 h.

Three patients (7.4%) had temporary hypocalcemia after the surgery that was corrected conservatively and resolved after 3 to 5 days. Only one patient needed blood transfusion due to blood loss and hemoglobin decrease from 11 mg/l to 7.5 mg/l one day after the surgery, 6 weeks later the hemoglobin was within normal limits. All patients were discharged 3 days after the surgery.

Final pathology data revealed Graves' disease for all patients, the specimens mean weight after surgery was 43.4 gr (range 24 gr to 125 gr); mean pathological size (by each lobe) was 5.8 cm (range 4.2 cm to 9.3 cm).

Four patients out of 42 (9.5%) had temporary vocal cord hypo-mobility(unilateral) , fiber optic laryngoscopy exam 6 weeks after surgery confirmed normal vocal cords movement for three of them and the fourth patient recovered completely 3 months after surgery.

All patients underwent cervical ultra sound post-operatively which revealed no remnant thyroid gland tissue except one patient with minor contralateral remnant tissue (one of those with unidentified contralateral RLN). Thyroglobulin (TG) levels were decreased for all patients' numbers.

Discussion

In this retrospective study, we present our results of transaxillary robotic thyroidectomy for Graves' disease, describing the feasibility and safety of robot thyroid surgery. This study is limited due to the bias of surgical technique selection, and these limitations are from both the patient's and surgeon's perspectives.

The patient's perspective is that younger (mean age 37.2) and/or female patients (92.8%) may pay more attention to the cosmetic benefits of robot thyroid surgery compared to older and/or male patients [3,4,19,20]. This preference may actually influence the oncologic outcomes of robot thyroid surgery but not in our patients with Graves' disease. The surgeon's perspective is more complex. Robot thyroid surgery cannot be applied to all thyroid surgeries, and institutions that perform robot surgery for thyroid carcinoma have their own inclusion criteria. In addition, the inclusion criteria could be dependent on the surgeon's experience and ability to perform the surgery.

Little is known regarding the robotic transaxillar thyroidectomy for Graves' disease. While our study demonstrated feasibility and safety approach, and achieved good surgical and endocrine test results in most cases, including reoperation procedures. No major events were noted during surgery as mentioned before, unlike other studies were those injuries were noted especially in the first cases and in low-moderate surgery cases volumes, that's why it was so important for us to pick up the appropriate patients for the first doses cases, reaching the learning curve just then to start applying the tranaxillary approach for Grave's.

The benefit was remarkable according to the patient's willing. In the current study, the average operation time was improved significantly in the last 10 cases, which is less than demonstrated in our previous study and other published series [12,16,18,21].

Conclusion

In conclusion, the transaxillary robotic approach to thyroid surgery is fast becoming a viable alternative to open or endoscopic methods and has been predicted to become more common technique for thyroid surgery in the future [4,21]. The indications for this technique are continually expanding. It has been shown to be efficacious in the management of benign thyroid disease including the previously excluded Graves' disease. Furthermore, careful patient selection is fundamental to achieve consistently successful results.

The excellent cosmetic results of this procedure make it ideal for patients who have esthetic concerns or particular difficulties with healing [3]. As with all new surgical techniques, further studies should be done to confirm its indications over time. In addition, the inclusion criteria could be dependent on the surgeon's experience as the learning curve of each surgeon intends to be an important factor.

References

1. Sung TY, Yoon JH, Han M, Lee YH, Song DE, Chung KW, et al. Oncologic safety of robot thyroid surgery for papillary thyroid carcinoma: A comparative study of robot versus open thyroid surgery using inverse probability of treatment weighting. Plos One. 2016;11(6):e0157345.
2. Park JH, Lee CR, Park S, Jeong JS, Kang SW, Jeong JJ, et al. Initial experience with robotic gasless transaxillary thyroidectomy for the management of graves disease: Comparison of conventional open versus robotic thyroidectomy. Surg Laparosc Endosc Percutan Tech. 2013;23(5):e173-7.
3. Lee J, Nah KY, Kim RM, Ahn YH, Soh EY, Chung WY. Differences in postoperative outcomes, function, and cosmesis: Open versus robotic thyroidectomy. Surg Endosc. 2010;24(12):3186-94.
4. Lee J, Lee JH, Nah KY, Soh EY, Chung WY. Comparison of endoscopic and robotic thyroidectomy. Ann Surg Oncol. 2011;18(5):1439-46.
5. Grodski S, Stalberg P, Robinson BG, Delbridge LW. Surgery versus radioiodine therapy as definitive management for Graves 'disease: The role of patient preference. Thyroid. 2007;17(2):157-60.
6. Myrick C, James TB, Ratnam N, Shinall JB, Kiernan C, Parks L, et al. Total thyroidectomy for Graves' disease: Compliance with American Thyroid Association guidelines may not always be necessary. Surg. 2013;154(5):1009-15.
7. Genovese BM, Noureldine SI, Gleeson EM, Tufano RP, Kandil E. What is the best definitive treatment for Graves ' disease? A systematic review of the existing literature. Ann Surg Oncol. 2013;20(2):660-7.
8. Vishnu S, Juan PB, Zhen W, Prokop LJ, Stan MN, Murad MH, et al. Comparative effectiveness of therapies for graves' hyperthyroidism: A systematic review and network meta-analysis. J Clin Endocrinol Metab. 2013;98(9):3671-7.
9. Palit TK, Miller CC, Miltenburg DM. The efficacy of thyroidectomy for Graves' disease: A meta-analysis. J Surg Res. 2000;90(2):161-5.
10. Panzer C, Beazley R, Braverman L. Rapid preoperative preparation for severe hyperthyroid Graves' disease. J Clin Endocrinol Metab. 2004;89(5):2142-4.
11. Lörincz BB, Busch CJ, Möckelmann N, Knecht R. Initial learning curve of single-incision transaxillary robotic hemi- and total thyroidectomy-A single team experience from Europe. Int J Surg. 2015;18:118-22.

12. Boccara G, Guenoun T, Cohen B, Aidan P. Perianaesthetic concerns for the new robot assisted transaxillary thyroid surgery: A report of seven first cases. Ann Fr Anesth Reanim. 2011;30(7-8):600-3.

13. Chang EH, Lobe TE, Wright SK. Our initial experience of the transaxillary totally endoscopic approach for hemithyroidectomy. Otolaryngol Head Neck Surg. 2009;141(3):335-9.

14. Kuppersmith RB, Holsinger FC. Robotic thyroid surgery: An initial experience with North American patients. Laryngoscope. 2011;121(3):521-6.

15. Kandil E, Noureldine S, Abdel Khalek M, Alrasheedi S, Aslam R, Friedlander P, et al. Initial experience using robot- assisted transaxillary thyroidectomy for Graves' disease. J Visc Surg. 2011;148(6):e447-51.

16. Kang SW, Lee SC, Lee SH, Lee KY, Jeong JJ, Lee YS, et al. Robotic thyroid surgery using a gasless, transaxillary approach and the da Vinci S system: The operative outcomes of 338 consecutive patients. Surgery. 2009;146(6):1048-55.

17. Janus JR, Moore EJ, Price DL, Kasperbauer. Robotic thyroid surgery: Clinical and anatomic considerations. Clin Anat. 2012;25(1):40-53.

18. Kang SW, Jeong JJ, Yun JS, Sung TY, Lee SC, Lee YS, et al. Robot-assisted endoscopic surgery for thyroid cancer: Experience with the first 100 patients. Surg Endosc. 2009;23(11):2399-06.

19. Son SK, Kim JH, Bae JS, Lee SH. Surgical safety and oncologic effectiveness in robotic versus conventional open thyroidectomy in thyroid cancer: A systematic review and meta-analysis. Ann Surg Oncol. 2015; 22(9):3022-32.

20. Yi O, Yoon JH, Lee YM, Sung TY, Chung KW, Kim TY, et al. Technical and oncologic safety of robotic thyroid surgery. Ann Surg Oncol. 2013;20(6):1927-33.

21. Kang SW, Jeong JJ, Yun JS, Sung TY, Lee SC, Lee YS, et al. Gasless endoscopic thyroidectomy using trans-axillary approach; surgical outcome of 581 patients. Endocr J. 2009;56(3):361-9.