

Lateral Approach to Thyroid Surgery: An Alternative Open Thyroidectomy TechniqueRamesh Bhandari,^{1*} Bivek Aryal,¹ Anita Sapkota,¹ Damodar Kandel,¹ Sona Sharma²¹Department of ENT-Head and Neck Surgery, Bharatpur Hospital, Bharatpur-10, Chitwan, Nepal, Nepal, ²Manmohan Cardiothoracic Vascular and Transplant Center, Maharajgunj, Kathmandu, Nepal.**Received:** 17th March, 2023**Accepted:** 27th May, 2023**Published:** 30th June, 2023**DOI:**10.3126/jnhls.v2i1.56203.**Correspondence:**

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ABSTRACT

Background: Thyroidectomy is one of the common surgical procedures for thyroid related various pathology. Midline approach is the classical and common in which thyroid gland is approached after splitting the strap muscles in midline. The objective of this research is to elaborate the surgical technique of lateral thyroid approach for hemi-thyroidectomy, also to measure the efficacy in preserving the important anatomical structures and to assess the complications.

Methods: A cross-sectional study was conducted in the department of ENT of Bharatpur Hospital, Chitwan, Nepal during January 2019 to March 2021. Benign thyroid diseases that required hemi-thyroidectomy were included in this study. Surgical technique was discussed with special focus for access of superior pedicle and preservation of important anatomical structures.

Results: Among 36 cases most of those 16(44.4%) were operated after 1 year of disease occurrence. Not a single case was undergone strap muscle cutting or sacrifice of superior belly of omohyoid muscle. Recurrent laryngeal nerve was found in 94.4% (33 cases). External branch of superior laryngeal nerve (EBSLN) was in 91.7 % (33) cases. Superior parathyroid glands were found in majority of the cases but not found in 8.3 % (3). Inferior parathyroid glands were found in all cases. Post-operative drainage was 38 ml(mean).

Conclusion: Vital structures were preserved in more than 90% cases and major complication occurred in none of the cases. We conclude that this approach is good, safe and comfortable to the surgeon.

Keywords: hemi-thyroidectomy; lateral thyroid approach; strap muscles.

INTRODUCTION

Thyroidectomy is one of the common surgical procedures for thyroid related various pathology. Midline approach is the classical and common in which thyroid gland is approached after splitting the strap muscles in midline. Lateral approach is the safe alternative where thyroid gland is exposed through natural tissue plane after separating the lateral boarder of strap muscle from anterior boarder of sternocleidomastoid muscle (SCM). Chances of strap muscles injury are high in midline approach as these are separated, retracted vigorously to expose superior pedicle. Strap muscles have role in pith control of voice and swallowing.^{1, 2} These problems are negligible in post-operative period after lateral approach. Superior thyroid vessels, external branch of superior laryngeal nerve, middle thyroid vein are in head on view so it is comfortable to ligate the vessels and preserve the nerve. Other important anatomical structures like superior and inferior parathyroid glands, recurrent laryngeal nerve are easily identified as there is wider exposure in lateral dissection of thyroid gland. This approach can be used for unilateral or bilateral disease, re-do surgery, malignancy, approach to parathyroid glands.^{3,4} It is the reliable alternative to

midline approach. We aimed this study to elaborate the surgical technique in this approach, to measure the efficacy in preserving the important anatomical structures and to assess the complications.

METHODS

A cross-sectional study was conducted in the department of ENT Bharatpur Hospital, Chitwan, from January 2019 to March 2021. Ethical clearance was taken from Institute Review committee (IRC) of Bharatpur hospital. Patients who presented in ENT OPD with thyroid swelling were evaluated. Benign pathology, irrespective of the size, that needs hemi-thyroidectomy was included in our study. Malignant growth, previous surgery cases, total thyroidectomy cases were excluded from this study. Non-probability convenient sampling technique was applied. Preoperative work-up was done before surgery. Nasopharyngolaryngoscopy (NPL) was done to know the vocal cord status of the patient. Informed consent was taken. All cases were anesthetized with general anesthe-

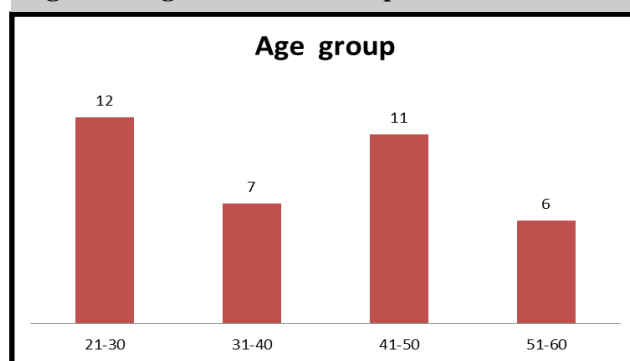
sia. Patients were kept in supine position with 15 degree head elevation. Lower collar incision was fashioned in between anterior boarder of sternocleidomastoid (SCM) muscle. Sub-platysmal flap was elevated superiorly till thyroid notch and inferiorly till suprasternal notch exposing both anterior jugular veins. Investing layer of deep cervical fascia was incised in between lateral boarder of strap muscle and SCM thus exposing thyroid lobe, superior belly of omohyoid muscle. Inferior constrictor muscle was exposed after retracting omohyoid muscle cranially and SCM laterally. Superior pole is identified, fascial attachment is cleared thus exploring the superior thyroid artery and corresponding vein. Cricothyroid muscle, inferior constrictor muscle of pharynx is identified, and then external branch of superior laryngeal nerve (EBSLN) is searched with reference of these muscles along with superior pole of the gland and superior vessels. Most of the time, it is found in posterior to the artery. Individual vessel is ligated and cut as near as the gland. Superior pole of the gland is dissected and pulled superomedially by Babcock forceps. Middle thyroid vein is ligated and cut. Now dissection is focused towards postero-lateral aspect thus identifying inferior thyroid artery, recurrent laryngeal nerve, superior and inferior parathyroid glands. Tubercle of Zuckerkandl (TZ) and cricothyroid junction are also reliable landmarks to identify and trace recurrent laryngeal nerve. TZ is the posterolateral expansion of gland. It points towards the intersection of recurrent laryngeal nerve and inferior thyroid artery and RLN is just inferior to it. TZ is visible in around 60% cases; more towards right side.⁵ Inferior thyroid artery is ligated in its tertiary branches to preserve the vascular supply of both superior and inferior parathyroid glands. Parathyroid glands are identified by their position, colour. Superior parathyroids are more constantly found in location i.e posterior surface of gland around 1 cm above the intersection of inferior thyroid artery and RLN. Inferior parathyroid are variable in location around inferior pole of thyroid gland. Parathyroid gland is light yellow to reddish brown in color depending upon content of fat, vascularity and oxyphil. Their hilum contents blood vessel and they are non-pitted in appearance that distinguishes from lymph node. Parathyroid glands are preserved along

with vascular plexus. Thyroid lobe is cleared from vascular and fascial attachment including ligament of Berry. Lobe is delivered after separating from isthmus. Negative pressure drain is secured, wound is repaired in layers but space between lateral boarder of strap muscle and SCM was left open without suturing. Post-operative drainage was measured every day and drain removed when its volume was less than 15 ml in 24 hour duration.

RESULTS

Thirty six cases were enrolled in the study. Age of the patient was 21 through 60 year with mean age 38 year. Most common age group was 21-30(33%) followed by 41-50(31%). Male were 8(22.2%), female were 28(77.8%) (Figure 1).

Figure 1. Age distribution of patients.



They had history of swelling in neck for 6 month to 10 years, most of those 16(44.4%) were operated after 1 year of disease. Right lobe was involved in 15(41.7%) cases, left lobe was involved in 18 (50%) and both lobes were in 3(8.3%) cases. Size of nodule was measured by ultrasonography in millimeter (in two dimensions) and calculated as square millimeter ranging from 35.36 to 2944 square millimeter. Other sonographic features like echogenicity, vascularity and calcification were documented. Most of the thyroid nodules were hypoechoic 26 (72.2%), followed by anechoic 8(22.2%). Most of the nodule 19(52.8%) had no increased vascularity, followed by peripheral vascularity 13, central vascularity 1 and mixed (both peripheral and central) 3 cases. Similarly, most of the nodule 31(86.1%) had no calcification, followed by macrocalcification in 3(8.3%) cases and microcalcification in 2(5.6%) cases. All the surgeries were done in euthyroid state. Pre-operative statuses of vocal cord mobility

Echogenicity	Number of cases
Hyperechogenicity	1(2.8)
Hypoechoogenicity	26(72.20)
Isoechoogenicity	1(2.80)
Anechoic	8(22.20)

were normal in all cases. Not a single case was undergone strap muscle cutting or sacrifice of superior belly of omohyoid muscle. Recurrent laryngeal nerve was found in 94.4% (33 cases). Post-operative voice was normal in all cases including those non-traceable recurrent laryngeal nerve cases. External branch of superior laryngeal nerve (EBSLN) was in 91.7 %(33) cases. Middle thyroid vein (MTV) was found in 91.7 %(33) cases. Superior parathyroid glands were found in majority of the cases but not found in 8.3 %(3). Inferior parathyroid glands were found in all cases. Minimal intraoperative blood loss was 10 ml, maximum 80 ml with mean 35.5 ml and standard deviation 16.24. Tubercle of Zuckerkandl was found in 27(75%) cases and most frequently found in right side. Post-operative drainage was minimum 5 ml to maximum 90 ml with mean 38 ml and standard deviation 22.21. Complication was seen in none of the cases.



Figure 1. Incision site between lateral border of strap muscle and medial border of SCM. (Left side)

Figure 2. Superior belly of Omohyoid muscle. Superior pedicle of thyroid lies deep to it. (Left side)

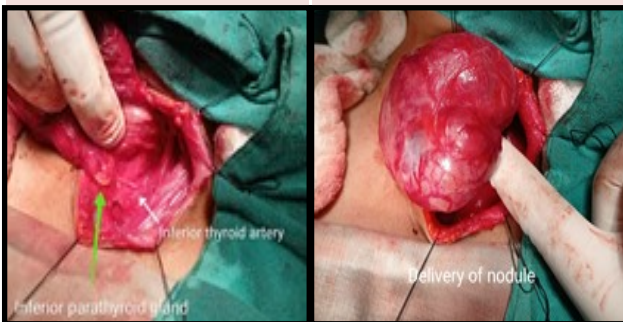


Figure 3. Inferior thyroid artery and inferior parathyroid gland in left side (Left side)

Figure 4. Thyroid nodule after release of vascular and fascial attachment just before excision.

DISCUSSION

Lateral thyroid approach was initially done for redo thyroid surgery, re-exploration to avoid the fibrosed surface developed by previous mid-line approach.³ This approach is also useful in malignancy for lymph node clearance in various type of neck dissection. This approach is used nowadays in endoscopic and robotic thyroid surgeries.^{6,7} Classical midline approach requires midline separation of strap muscles, occasional transectioning, vigorous pulling of muscles during superior pole dissection and re-suturing of muscle in midline. These activities injure the strap muscle and increase the chance of post-operative adhesion. Lateral approach has lower incidence of adhesion as compare to mid line approach.⁸ Post-operative pain score was increased in Midline Approach cases.⁹ Strap muscle has established role in quality and pitch control of voice and swallowing. Handling of strap muscles and reconstruction or even excessive retraction may affect voice quality and swallowing function in post-operative phase.¹⁰ Lateral approach has minimal injury to strap muscles. We included benign pathology only, irrespective of size of nodule. We included hemithyroidectomy cases only to make more specific and homogenous because malignant cases are less in number. Reeve’s space is an avascular space between upper pole of thyroid gland and cricothyroid muscle, EBSLN lies in this space.¹¹ Prevalence of middle thyroid vein is variable. It was mentioned in 62% of operated patient. Presence of MTV was more frequent in hyperthyroidism and large goiter ($p < 0.05$).¹² We found MTV in 91.7% cases. After incising of deep cervical fascia and cranial retraction of omohyoid muscle, superior pole of thyroid along with superior thyroid vessels, EBSLN are in direct view. Posterolateral dissection is easier due to wider surgical field with identification of superior and inferior parathyroid glands, Tubercle of Zuckercandl, recurrent laryngeal nerve.^{14,15} We identified vital structures in more than 90% cases. Voice was normal in those cases where we couldn’t trace EBSLN, RLN. But in total thyroidectomy cases, voice changes occurred transiently without RLN injury.¹³ Intraoperative blood loss is minimal, in average 35.5ml in our study. Operative time depends upon various surgical and non-surgical causes so we didn’t mention in our study

but other surgeons stressed out less intra operative time in this approach. Post-operative drainage is also minimal due to less tissue trauma. It was 38 ml in average which is comparable with other studies. No complication is noted during and after the surgery.

CONCLUSION

In this study, we elaborated the surgical technique that doesn't require any extra setting or instruments. We used same as in conventional method.

Early reports are promising. Vital structures are preserved in more than 90% cases and major complication occurred in none of cases. We conclude that this approach is good, safe, and comfortable to the surgeon. We included only benign disease that requires only hemithyroidectomy so we suggest to include all pathology like malignancy and total thyroidectomy cases as well in large scale.

Conflict of Interest: None.

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