

Original Article

Study of Recurrent Laryngeal Nerve Paralysis Following Thyroidectomy

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Introduction

Goitre is a common thyroid disease in most part of the world. Among different etiology, colloid nodule, multinodular goitre, benign thyroid cyst, papillary carcinoma, follicular carcinoma, medullary carcinoma, anaplastic carcinoma, lymphoma are most common.¹ On the basis of histopathological report, among benign goitre nodular colloid goitre was 52%, follicular adenoma was 24% and auto-immune thyroiditis was 6% and among the malignancies papillary carcinoma was 66.66%, follicular carcinoma was 22.22% and anaplastic carcinoma was 11.11%.^{2,20} Thyroidectomy is widely practiced surgical procedures to treat different type of thyroid disorder and considered as a safe procedure in well

equipped center. There are some complications following thyroid surgery can be life threatening.^{2,3} Complications such as bleeding, hypoparathyroidism and Recurrent Laryngeal Nerve Injury (RLNI) represent nearly half of all the complications of thyroid surgery.^{4,15}

One of the most feared complications of thyroid surgery is the recurrent laryngeal nerve (RLN) injury.^{4,15} RLN injury results from severing, clamping or stretching of the nerve due to inadequate anatomical knowledge, lack of surgical skill and experience, distorted anatomy as in cancer and large multinodular goiter.⁵

Review of literature revealed that the prevalence of RLN palsy varies from centre to centre depending upon the level of experience in thyroid surgery and nature of surgery.⁶ The exact incidence of recurrent laryngeal nerve injury varies widely.⁷ There is some controversy in whether the identification of RLN during surgical procedure will affect the incidence of nerve damage or not.⁵

Nerve identification has decreased the rate of nerve injury during thyroidectomy.^{8,20} In order to improve our quality of thyroid surgery we have undertaken a study using Recurrent nerve visualization technique to determine the incidence of RLN injury in our practice.

Methods

This was a cross sectional study done in Bangabandhu Sheikh Muzib Medical

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University (BSMMU) in the dept. of Otolaryngology during the period from July 2015 to June 2017. All adult patients irrespective of age and sex that were treated surgically by total or hemi thyroidectomy were enrolled into this study after taking informed written consent. Patient with previous thyroid surgery were excluded from this study. Thyroid gland status and pre operative diagnosis was done clinically, biochemically and histopathologically by fine needle aspiration cytology (FNAC). All surgical procedures were under taken by same surgical team in BSMMU.

Data collection done by predesigned questionnaire. All surgical procedure performed during the period of study were evaluated and post operative different variant of recurrent laryngeal nerve palsy were recorded.

Data analysis was performed by using SPSS version 21.

Results

This study included 60 cases among which 20 (33.33%) were male and 40 (66.66%) were female with male to female ratio of 1:2. Mean age was 45.5 yrs. with standard deviation was 8.5 yrs. There were different indications of thyroid surgery are multi nodular goiter (50%), solitary thyroid nodule(25%), carcinoma thyroid gland(25%). Some were treated by total thyroidectomy (45) and some were treated by hemithyroidectomy (15).

Table-I
Distribution of age and sex

Patients characteristics (n=60)	
Age (mean+SD)	45.5+7.5
Sex (m/F)	20/40

Table -II
Different type of surgery

Type of surgery	Number
Total thyroidectomy	45
Hemithyroidectomy	15

Table -III
Different thyroid disorders

Indication	Frequency	Percent
Multi nodular goitre (MNG)	30	50%
Carcinoma of thyroid gland	15	25%
Solitary thyroid nodule	15	25%

Table -IV
Types of RLN paralysis

Type	Number
Temporary paralysis	2
Permanent paralysis	0

Identification of rec. laryngeal nerve was done in all cases (100%). Variation of RLN were not found in this study. The overall frequency of RLN injury was unilateral especially in rt. side and found in 2 cases (3.33%). It was confirmed by Fiber optic laryngoscopy(FOL). In both cases, paralysis was temporary because those patients developed full functions of paralyzed vocal cord after having conservative treatment for six weeks.

Discussion

There are many post-operative complications of thyroidectomy, among which RLN injury is are of the most frequent. In most of the cases, it cannot be recognized during surgery.

In our study, overall frequency of RLN injury was found to be 3.33% in 2 cases. Injury was noticed immediately after operation by

developing change of voice especially in those patients who underwent total thyroidectomy for ca. thyroid. It was confirmed by Fiber optic laryngoscopy(FOL). In both cases, paralysis was temporary because those patients developed full functions of paralyzed vocal cord after having conservative treatment for six weeks.

In the study of outcomes and complication of thyroid surgery among Sudanese patient, among 1351 thyroidectomies, Saadeldin A. Idris et al. of observed incidence of recurrent laryngeal nerve injury was 1.9 (26 cases) of which the incidence of transient unilateral RLN paralysis was 1.2%. Permanent RLN paralysis was 0.5%, transient bilateral RLN palsy was 0.2 %.²

Wagner et al. have shown in their study over 1026 patient that the incidence of transient and permanent RLN paralysis was 5.9% and 2.4% respectively.⁷

Jatzko et al shown in their study over 803 patients that incidence of transient and permanent RLN paralysis was 3.6% and 0.5% respectively.⁸

Sosa et al have shown in their study over 5860 cases that incidence of permanent RLN paralysis was 0.8% and they did not record any transient RLN palsy.⁹

Rosato et al shown their study over 14.93 in their longitudinal analysis of multi centric study that incidence of transient and permanent RLN palsy was 2.0% and 1.0% respectively.¹

Goncalves et al shown in their study over 1020 patient that incidence of transient and permanent RLN palsy was 1.4% and 0.4% respectively.¹⁰

Mishra et al shown in their study that incidence of RLN injuries were ranging between 0.0% - 13%.¹¹

Jamski J et al had shown in their study on recurrent laryngeal nerve injury following thyroid surgery over 2323 cases from 1994 to 1997 that post operative RLN palsy of different grade was 8.9% among which 1.7% was permanent.

Jung H et al studied over 909 cases on recurrent laryngeal nerve paralysis after thyroidectomy and they shown 92.6% benign goiter and that post operative RLN palsy was 1.7% which was permanent.¹³

Hazem M.Zakaria et al had shown in their study on recurrent laryngeal nerve injury in thyroid surgery over 340 cases from 1990 to 2005 in King Fahd Hospital that post operative unilateral RLN palsy was 3.2% among which 0.3% was permanent and that post operative bilateral RLN palsy was 0.58% and all were transient.¹⁵

Alimoglu O et al studied over 581 cases on recurrent laryngeal nerve paralysis after thyroid surgery and shown female(79%) predominated over male(21%). They also shown 29 patients developed that post operative RLN palsy and among which 5 patient developed permanent palsy.¹⁴

Jesus Herrenz Gonzalez et al studied on complications following thyroid surgery over 335 patients and shown 2.3% unilateral palsy.¹⁷

MD Michel B.Flynn et al had shown in their study on local complication after surgical resection for thyroid carcinoma, 1% RLN palsy over 91 patient .¹⁸

Saadeldin A. Idris et al studied over 82 cases on recurrent laryngeal nerve injury during thyroid surgery and shown female(84.15%) predominated over male(15.85%) and overall frequency of RLN injury was 1.2%.¹⁹

Some factors like extension disease, extension of surgery, surgeons experience, amount of per operative bleeding, use of

diathermy can influence the injury to recurrent laryngeal nerve.¹⁹

Conclusion

This study proved that surgical exposure of RLN, prevent unwanted trauma to nerve and thereby reduce incidence of vocal cord paralysis. So, we advocate for routine identification and dissection of RLN to reduce its injury to a minimum.

References

1. Rosato L, Carlevato MT. De TG Avenia N, Rosato L. Carlevato MT, et al. Recurrent laryngeal nerve damage and phonetic modifications after total thyroidectomy: surgical malpractice only or predictable sequence? *World Journal of Surgery* 2005;29(6):780-4.
2. Saadeldin A. Idris, Mohammed H. Shalayel, Tomadir A. Idris, and Ahmed Qurashi Ali. Outcomes and complications of thyroid surgery among the Sudanese patients. *Sudan Medical Monitor (SMM)* 2008;3(4): 143-8.
3. Steurer M. Passler C. Denk DM. Schneider B. Niederle. Bigenzahn V. Advantages of recurrent laryngeal nerve identification in thyroidectomy and parathyroidectomy and the importance of preoperative and postoperative laryngologic examination in more than 1000 nerves at risk. *Laryngoscope* 2002;112(2):124-33.
4. Hisham AN, LuJunan MR. Recurrent laryngeal nerve in thyroid surgery: A critical appraisal. *ANZ J Surg* 2002; 72(7):887-9'.
5. Myssiorek D. Recurrent Laryngeal nerve paralysis: anatomy and etiology. *Otolaryngol Clin N Am.* 2004; 37(1):25-44.
6. Ardito G. Revclli R. d'Alatri L. Lerro V, Cuiicli ML., Ardito F. Revised anatomy of the recurrent laryngeal nerves. *Am J Surg* 2004; 187(2): 249-53.
7. Wagner HE, Seiler C. Recurrent laryngeal nerve palsy after thyroid gland surgery. *Br JSurg* 1994;81(2):226-8.
8. Jatzko GR. Recurrent nerve palsy after thyroid operations: principal nerve identification and a literature review. *Surgery* 1994; 115(1): 139-44.9.
9. Sosa JA. The importance of surgeon experience for clinical and economic outcomes from thyroidectomy. *Ann Surg* 1998;228(3): 320-30.
10. GoncalvesFilho J. Kowalski LP. Surgical complications after thyroid surgery performed in a cancer hospital. *Otolaryngol Head Neck Surg* 2005: 132(3): 490-4 .
11. Mishra A, Agarwal A. Agarwal G. Mishra SK. Total thyroidectomy for benign thyroid disorders in an endemic region. *World J Surg.* 2001;25(3):307-10.
12. Jamski J, Jamska A, Graca M, Barczyński M, W³odyka J. Recurrent laryngeal nerve injury following thyroid surgery. *Przegląd Lekarski.* 2004; 61(1):13-6.
13. Jung H, Schlager B. Recurrent laryngeal nerve paralysis after thyroidectomy. [LaryngoHYPERLINK "file:///C:/Users/User/search?query=JOURNAL:%22Laryngorhino-otologie%22&page=1"- Rhino- HYPERLINK "file:///C:/Users/User/search?query=JOURNAL:%22Laryngorhino-otologie%22&page=1"Otologie \[01 May 2000, 79\(5\):297-303\] DOI: 10.1055/s-2000-346](#)
14. AlimogluHYPERLINK "file:///C:/Users/User/search?query=AUTH:%22

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15. Hazem M. Zakaria,¹ Naif HYPERLINK "file://pubmed/?term =Al% 20Awad%20NA% 5BAuthor %5D&c author=true& cauthor_uid= 22043377" A. Al Awad,¹ Ali S. Al Kreedes,¹ Abdul HYPERLINK "file://pubmed/?term=Al-Mulhim% 20AM%5BAuthor%5 D& cauthor= true& cauthor_uid= 22043377" Mohsin HYPERLINK "file:// p u b m e d / ? t e r m = A l - Mulhim%20AM%5BAuthor% 5D& cauthor=true& cauthor_uid=22043377" A. Al-Mulhim,¹ Mohammed A. Al-Sharway,¹ Maha HYPERLINK "file:// p u b m e d / ? t e r m = H a d i % 2 0 MA%5BAuthor%5 D&cauthor=true& cauthor_uid=22043377" Abdul Hadi,¹ and Ahmed A. Al Sayyah². Recurrent Laryngeal Nerve Injury in Thyroid Surgery *Oman Med J.* 2011 Jan; 26(1): 34–38. doi: 10.5001/omj.2011.09
 16. Sarkan Sar A, OrhanAgcaoglu,aAdem Bayraktara, HalimIssever HYPERLINK "file:///C:/Users/User/Desktop/journal% 2525252520TB% 2525252520 lymphadenitis /thyroid %25252525209.htm"b. Evaluation of recurrent laryngeal nerve monitoring in thyroid surgery. *International Journal of Surgery* . Volume 8, Issue 6, 2010, Pages 474-478
 17. Jesús Herranz-González, MD; Javier Gavilán, MD; José Matínez-Vidal, MD; et al Cesar Gavilán, MD. Complications Following Thyroid Surgery. *Arch Otolaryngol Head Neck Surg.* 1991;117(5):516-518.
 18. MD Michael B. Flynn, Michael B. Flynn. Local complications after surgical resection for thyroid carcinoma. November 1994Volume 168, Issue 5, Pages 404–407.
 19. Saadelin A.Idris, Qurashi M.Ali, Aamir Hamza. Laryngeal recurrent nerve injury during Thyroid surgery. *Journal of Surgical Arts*,2014;7(2):80-83.
 20. Md Abul Hossain, Md Zakaria Sarkar, Utpal Kumar Dutta, Md Abdul Karim, Md Zahedul Alam . Frequency of Malignancy in solitary Thyroid nodule and Multi-nodular Goitre Bangladesh Journal of HYPERLINK "https:// www.banglajol.info/index.php/ BJO"Otorhinolaryngology > Vol HYPERLINK "https://www.bangla jol.info/index.php/BJO/issue/view/ 1311" 20, No 2 (2014).