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ORIGINAL RESEARCH

Assessment of voice outcomes in patients after thyroidectomy

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ABSTRACT

Background: Postoperative dysphagia, hypocalcemia, hoarseness, shortness of breath, a permanent requirement for replacement therapy, scarring in the surgical site, and other complications are possible after thyroid surgery and may lower the patient's quality of life following the procedure.The present study was conducted to assess voice outcomes in patients after thyroidectomy.**Materials & Methods:**100 patients were studied.Perceptual assessment was performed using the GRBAS scale, completed by a speech therapist on a sample of spontaneous speech for each study participant. Each of the scale's parameters, including the Grade of Abnormality (G), Roughness (R), Breathiness (B), Asthenia (A), and Strain (S) were assessed on a four-grade scale (0 – normal voice, 1 – mild deviation, 2 – moderate deviation, and 3 – severe deviation).**Results:** Out of 100 patients, 54 were males and 46 were females.
tumor was Papillary in 62, Follicular/Hürthle cell in 38. Tumor size was <1 cm in 36, 1-2 cm in 14 and 2-4 cm in 50. Extent of disease was localized in 62, regional in 25 and distant in 13. Treatment done was lobectomy in 7, total thyroidectomy in 45, with dissection location unknown in 24 and with central neck dissection in 9 and with lateral neck dissection in 15 cases. The difference was significant (P< 0.05).Before voice therapy and after voice therapy, mean JITT (%) value was 1.02 and 0.58, SHIMM (dB) was 0.67 and 0.29, HNR (dB) was 2 and 3, G was 2 and 1, R was 2 and 1, B was 2 and 0, A was 2 and 0, S was 0 and 0 and VHI-T was 62 and 11 respectively. The difference was significant (P< 0.05).**Conclusion:** There were improvements in all voice parameters after voice therapy, voice rehabilitation seems to be the essential clinical activity for thyroid surgery patients who suffer from voice disorders postoperatively.

Keywords: thyroidectomy, hoarseness, voice

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INTRODUCTION

Postoperative dysphagia, hypocalcemia, hoarseness, shortness of breath, a permanent requirement for replacement therapy, scarring in the surgical site, and other complications are possible after thyroid surgery and may lower the patient's quality of life following the procedure.[1] Advanced thyroid disease stages and less competent surgeons are more frequently linked to post-thyroid surgical complications.[2] Recurrent or superior laryngeal nerve injury, one of the more common postoperative complications, has been reported less frequently in recent years. This is probably because thyroid surgery now uses modern technologies like intraoperative nerve monitoring, endoscopic surgery, and harmonic scalpels.[3]

Dysphonia is a common side effect of laryngeal nerve surgery, and it can also be brought on by laryngeal strain, intubation with a potential risk of arytenoid dislocation, and resections of the prelaryngeal muscles.[4] Vocal cord paralysis, both permanent and temporary, is 1-26% common after thyroid surgery.[5] Because the cricothyroid muscle is being used to try to accomplish glottal closure, postoperative dysphonia can present as voice hoarseness, weakness, and breathiness, as well as shorter phonation time, decreased loudness, diplophonia, pitch breaks, and falsetto. The sensation of pain and discomfort during voice production is one of the results of putting in so much work.[6,7]The present study was conducted to assess voice outcomes in patients after thyroidectomy.

MATERIALS & METHODS

The present study was conducted on 100 patients in Department of Otorhinolaryngology, Patna Medical College and Hospital. All were informed regarding

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the study and their written consent was obtained.Study duration was 1 year.

Data such as name, age, gender etc. was recorded. The objective assessment included an acoustic analysis of the retained phonation of the vowel /a/ and was performed using the PRAAT program to calculate jitter (JITT), shimmer (SHIM), and the ratio of noise and the harmonic part of the spectrum (HNR).Perceptual assessment was performed using the GRBAS scale, completed by a speech therapist on a sample of spontaneous speech for each study participant. Each of the scale's parameters, including the Grade of Abnormality (G), Roughness (R), Breathiness (B), Asthenia (A), and Strain (S) were assessed on a four-grade scale (0 – normal voice, 1 – mild deviation, 2 – moderate deviation, and 3 – severe deviation).The Croatian version of the VHI questionnaire or the total value of the VHI (VHI-T) was used as an indicator of self-assessed voice quality. A VHI score between 0-30 reflected a minimal/mild VHI, 31–60 a moderate VHI, and between 61 and 120 a severe voice handicap. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total-100		
Gender	**Male**	**Female**
Number	54	46

Table I shows that out of 100 patients, 54 were males and 46 were females.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Tumor	Papillary	62	0.01
	Follicular/Hürthle cell	38	
Tumor size, cm	<1	36	0.05
	1-2	14	
	2-4	50	
Extent of disease	Localized	62	0.75
	Regional	25	
	Distant	13	
Treatment	Lobectomy	7	0.04
	Total thyroidectomy	45	
	With dissection location unknown	24	
	With central neck dissection	9	
	With lateral neck dissection	15	

Table II shows that tumor was Papillary in 62, Follicular/Hürthle cell in 38. Tumor size was <1 cm in 36, 1-2 cm in 14 and 2-4 cm in 50. Extent of disease was localized in 62, regional in 25 and distant in 13. Treatment done was lobectomy in 7, total thyroidectomy in 45, with dissection location unknown in 24 and with central neck dissection in 9 and with lateral neck dissection in 15 cases. The difference was significant (P< 0.05).

Table III Observed acoustic and subjective parameters of voice assessment after voice therapy

Parameters	Before voice therapy	After voice therapy	P value
JITT (%)	1.02	0.58	0.01
SHIMM (dB)	0.67	0.29	
HNR (dB)	2	3	
G	2	1	
R	2	1	
B	2	0	
A	2	0	
S	0	0	
VHI-T	62	11	

Table III, graph I shows that before voice therapy and after voice therapy, mean JITT (%) value was 1.02 and 0.58, SHIMM (dB) was 0.67 and 0.29, HNR (dB) was 2 and 3, Gwas 2 and 1, Rwas 2 and 1, B was 2 and 0, A was 2 and 0, S was 0 and 0 and VHI-T was 62 and 11 respectively. The difference was significant (P< 0.05).

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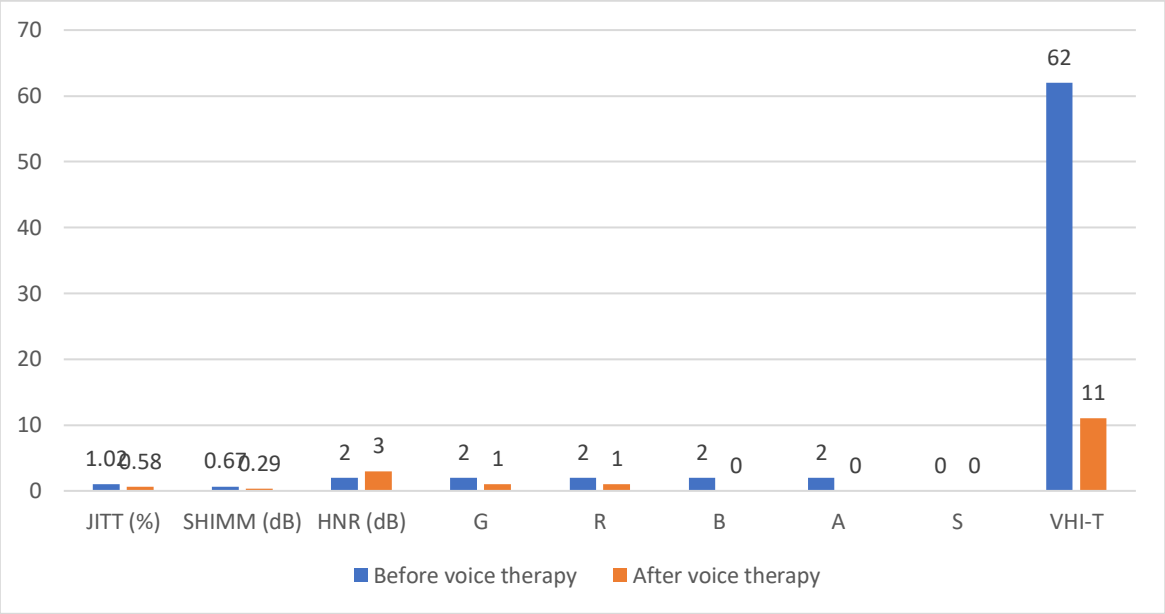
Graph I Observed acoustic and subjective parameters of voice assessment after voice therapy



DISCUSSION

The successful rehabilitation of postoperative dysphonia greatly depends on early postoperative detection of voice quality abnormalities as well as a rapid-onset, high-quality voice rehabilitation, since voice disorders following thyroidectomy are common and can have a detrimental effect on quality of life deterioration.[8,9]The present study was conducted to assess voice outcomes in patients after thyroidectomy.

We found that out of 100 patients, 54 were males and 46 were females.Bonetti A et al[10]examined the outcomes of voice therapy in 35 persons (26 women and 9 men) aged between 20 and 75 years after total thyroidectomy or lobectomy. Multidimensional voice assessment using the GRBAS scale, Voice Handicap Index questionnaire, and acoustic analysis was carried out before and after voice therapy, which included relaxation and breathing exercises, laryngeal massage, resonance therapy, and the employment of the digital compression method. Since the Wilcoxon Signed Ranks Test showed significant improvements in all voice parameters after voice therapy, voice rehabilitation seems to be the essential clinical activity for thyroid surgery patients who suffer from voice disorders postoperatively.

We found that Tumor was Papillary in 62, Follicular/Hürthle cell in 38. Tumor size was <1 cm in 36, 1-2 cm in 14 and 2-4 cm in 50. Extent of disease was localized in 62, regional in 25 and distant in 13. Treatment done was lobectomy in 7, total thyroidectomy in 45, with dissection location unknown in 24 and with central neck dissection in 9 and with lateral neck dissection in 15 cases. Kovatch KJ et al[11] identified the prevalence, severity, and factors associated with poor voice outcomes following surgery for DTC.A total of 2632 patients (63%) responded to the survey and 2325 met the inclusion criteria. With data reported as unweighted number and weighted percentage, 1792 were women (77.4%); weighted mean (SD) age was 49.4 (14.4) years. Of these, 599 patients (25.8%) reported voice changes lasting more than 3 months following surgery, 272 patients (12.7%) were identified as having an abnormal VHI-10 score, and 105 patients (4.7%) reported vocal fold motion impairment diagnosed by laryngoscopy. In multivariable analysis, factors associated with an abnormal VHI-10 score included age 45 to 54 years, black race, Asian race, gastroesophageal reflux disease, and lateral neck dissection.

We found that before voice therapy and after voice therapy, mean JITT (%) value was 1.02 and 0.58, SHIMM (dB) was 0.67 and 0.29, HNR (dB) was 2 and 3, Gwas 2 and 1, R was 2 and 1, B was 2 and 0, A was 2 and 0, S was 0 and 0 and VHI-T was 62 and 11 respectively. In a study by Haddou N[12], patients were evaluated using acoustic voice parameters, including harmonics-to-noise ratio (HNR), fundamental frequency (F0), jitter, speaker phonation frequency (SPF) range, cepstral peak prominence (CPP), maximum phonational frequency range (MPFR), and shimmer at the preoperative stage and postoperatively at the 1 day, and first-month stages.Results demonstrated a significant change in F0 parameters, SPF range, and CPP feature 1 month after surgery, depending on the type of thyroidectomy and thyroid pathology. No significant changes were observed in the HNR, shimmer, and jitter features. Age was associated with the CPP parameter in the entire sample. In contrast, the MPFR parameter was also related to the type of thyroidectomy in the entire sample. However, maximum F0 was significantly associated with the type of thyroidectomy, specifically in the female sample.

The shortcoming of the study is small sample size.

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CONCLUSION

Authors found that there were improvements in all voice parameters after voice therapy, voice rehabilitation seems to be the essential clinical activity for thyroid surgery patients who suffer from voice disorders postoperatively.

REFERENCES

1. Tedla M, Chakrabarti S, Suchankova M, Weickert MO. Voice outcomes after thyroidectomy without superior and recurrent laryngeal nerve injury: VoiSS questionnaire and GRBAS tool assessment. *Eur Arch Otorhinolaryngol*. 2016;273(12):4543-4547. doi: 10.1007/s00405-016-4163-6
2. Stojadinovic A, Shaha AR, Orlikoff RF, et al.. Prospective functional voice assessment in patients undergoing thyroid surgery. *Ann Surg*. 2002;236(6):823-832. doi: 10.1097/00000658-200212000-00015
3. Jeannon JP, Orabi AA, Bruch GA, Abdalsalam HA, Simo R. Diagnosis of recurrent laryngeal nerve palsy after thyroidectomy: a systematic review. *Int J Clin Pract*. 2009;63(4):624-629. doi: 10.1111/j.1742-1241.2008.01875.x
4. Grover G, Sadler GP, Mihai R. Morbidity after thyroid surgery: patient perspective. *Laryngoscope*. 2013;123(9):2319-2323. doi: 10.1002/lary.23850
5. Delgado-Vargas B, Lloris Romero-Salazar A, Cobeta I. Vocal changes following thyroid surgery: prospective study of objective and subjective parameters. *J Voice*. 2019;33(1):27-32. doi: 10.1016/j.jvoice.2017.09.012
6. Jacobson BH, Johnson A, Grywalski C, et al.. The Voice Handicap Index (VHI): development and validation. *Am J Speech Lang Pathol*. 1997;6(3):66-70. doi: 10.1044/1058-0360.0603.66
7. Rosen CA, Lee AS, Osborne J, Zullo T, Murry T. Development and validation of the Voice Handicap Index-10. Laryngoscope. 2004;114(9):1549-1556.
8. Hogikyan ND, Sethuraman G. Validation of an instrument to measure voice-related quality of life (V-RQOL). *J Voice*. 1999;13(4):557-569.
9. Solomon NP, Helou LB, Henry LR, et al.. Utility of the voice handicap index as an indicator of postthyroidectomy voice dysfunction. J Voice. 2013;27(3):348-354.
10. Bonetti A, Šimić I, Živković-Ivanović T. Voice Outcomes as a Results of Voice Therapy after Lobectomy and Thyroidectomy. Acta ClinicaCroatica. 2020 Nov 1;59(Supplement 1):18-23.
11. Kovatch KJ, Reyes-Gastelum D, Hughes DT, Hamilton AS, Ward KC, Haymart MR. Assessment of voice outcomes following surgery for thyroid cancer. JAMA Otolaryngology–Head & Neck Surgery. 2019 Sep 1;145(9):823-9.
12. Haddou N, Idrissi N, Jebara SB. Analysis of voice quality after thyroid surgery. Journal of Voice. 2023 Aug 21.

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