

Lillian Fernandes de Araújo¹
 Leonardo Wanderley Lopes¹
 Priscila Oliveira Costa Silva¹
 Victor Jose Ferreira Perrusi²
 Vívian Lisboa de Lucena Farias³
 Elma Heitmann Mares Azevedo⁴

Sensory symptoms in patients undergoing thyroidectomy

Sintomas sensoriais em pacientes submetidos à tireoidectomia

Keywords

Thyroidectomy
 Dysphonia
 Swallowing Disorders
 Signs and Symptoms
 Sensation

Descritores

Tireoidectomia
 Disfonia
 Transtornos de Deglutição
 Sinais e Sintomas
 Sensação

ABSTRACT

Purpose: To verify the occurrence of sensory symptoms in thyroidectomy patients pre- and post-operatively. **Methods:** This is a prospective, quantitative, descriptive study conducted with a sample of twelve patients undergoing thyroidectomy. The participants underwent visual laryngeal examination and responded to the Upper Aerodigestive Symptoms (UADS) and Vocal Tract Discomfort Scale (VTDS) questionnaires before and after the surgery. **Results:** There was higher occurrence of vocal fatigue, hoarseness, pharyngeal bolus, dry throat, and throat clearing preoperatively, whereas higher occurrence of hoarseness, vocal fatigue, cough, and pharyngeal bolus was observed postoperatively for the UADS. Regarding the VTDS sensory symptoms, higher frequency and severity of throat dryness were observed preoperatively, whereas more frequent tickling throat and more severe irritable and sore throat and lump in the throat were observed postoperatively. There was reduction in the choke symptom and in the frequency and severity of the throat dryness symptom pre- and post-operatively. With respect to the frequency and severity of vocal tract discomfort sensory symptoms, reduction in throat dryness was observed at both assessment times. **Conclusion:** The patients presented sensory symptoms of upper aerodigestive tract and vocal tract discomfort pre- and post-operatively characterized by self-reference of hoarseness, vocal fatigue, pharyngeal bolus, and cough, as well as dry, sore, and irritable throat. Reduction in the sensory symptom of choke and in the frequency and severity of throat dryness was self-reported by thyroidectomy patients postoperatively.

RESUMO

Objetivo: Verificar a ocorrência dos sintomas sensoriais em pacientes pré e pós-tireoidectomia. **Método:** Tratou-se de um estudo prospectivo, quantitativo e descritivo. Participaram 12 pacientes submetidos à tireoidectomia, que realizaram exame visual laríngeo e responderam aos questionários de Vias Aéreas Digestivas Superior e Escala de Desconforto do Trato Vocal pré e pós-cirurgia. **Resultados:** Houve maior ocorrência de fadiga vocal, rouquidão, sensação de bolo na garganta, garganta seca e pigarro no pré-operatório. Houve maior ocorrência de rouquidão, fadiga, pigarro e sensação de bolo na garganta no pós-operatório. Quanto aos sintomas sensoriais de desconforto do trato vocal, no pré-operatório, houve maior frequência e intensidade de secura e, no pós-operatório, maior frequência de coceira e maior intensidade de garganta irritada, sensível e bola na garganta. Houve redução do sintoma de engasgo e da frequência/intensidade do sintoma de secura na garganta pré e pós-tireoidectomia. Em relação à frequência/intensidade dos sintomas sensoriais de desconforto do trato vocal, em ambos os momentos, houve redução da secura. **Conclusão:** Os pacientes apresentam sintomas sensoriais de vias aéreas digestivas superiores e de desconforto do trato vocal tanto no pré quanto no pós-operatório, caracterizados pela autorreferência de rouquidão, fadiga vocal, sensação de bola na garganta e pigarro, assim como secura, garganta irritada, garganta sensível e bola na garganta. Houve redução na referência dos sintomas sensoriais de engasgo e frequência/intensidade de secura pós-tireoidectomia.

Correspondence address:

Elma Heitmann Mares Azevedo
 Universidade Federal do Espírito Santo – UFES
 Av. Marechal Campos, 1468, Maruípe,
 Vitória (ES), Brazil, CEP: 29043-900.
 E-mail: kikahmazesvedo@hotmail.com

Received: December 04, 2015

Accepted: January 17, 2017

Study carried out at Departamento de Fonoaudiologia, Universidade Federal da Paraíba – UFPB - João Pessoa (PB), Brazil.

¹ Universidade Federal da Paraíba – UFPB - João Pessoa (PB), Brazil.

² Hospital Municipal Santa Isabel - João Pessoa (PB), Brazil.

³ Hospital Napoleão Laureano - João Pessoa (PB), Brazil.

⁴ Universidade Federal do Espírito Santo – UFES - Vitória (ES), Brazil.

Financial support: nothing to declare.

Conflict of interests: nothing to declare.

INTRODUCTION

The thyroid gland is one of the largest endocrine organs of the human body. Its innervation derives from the superior, middle and inferior cervical sympathetic ganglia. These fibers are vasomotor and cause vasoconstriction. The secretory motor function is regulated by the endocrine system. The thyroid gland presents intimate anatomic relation with its recurrent laryngeal nerve, a branch of the vagus nerve, which justifies the risk of injury during surgical access due to their anatomic proximity. The thyroid gland is responsible for the production of two hormones: thyroxine (T_4) and triiodothyronine (T_3), which influence nearly all cells and are responsible for the control of various parts of the metabolism of the human body organs⁽¹⁾, acting on all systems of the organism and regulating heart rate, intestinal peristalsis, menstrual cycle, fertility, temperature, weight, mood, memory, and cognitive and emotional functions.

Different treatments such as monitoring, surgery, radioactive iodine therapy, hormone replacement, radiation therapy, and chemotherapy are used when benign or malignant nodules occur in the thyroid gland. In addition to the presence of nodules, structural aspects, size, and location are also considered for surgical indication. Patients may evolve with voice and/or swallowing disorders and present compromised quality of life to a greater or lesser degree preoperatively and postoperatively in both total or near total thyroidectomy⁽²⁾.

Prior to thyroidectomy, patients may present myxedema and vocal fold thickening because of the higher concentration of hyaluronic acid, with presence of hoarseness, low-pitched voice, and variation in frequency and severity due to hypothyroidism and hoarseness; vocal instability, including wobbly or shaky voice; shortness of breath; reduced loudness; vocal fatigue; and dry cough in cases of hyperthyroidism caused by decreased subglottic pressure owing to respiratory muscle weakness⁽³⁾. A previous study⁽⁴⁾ investigated swallowing changes preoperatively and found self-reported symptoms of choke, aching, swallowing discomfort, burning, lump in the throat, and dysphagia for liquids, pastes, and solids.

According to the specific scientific literature, vocal alteration following thyroidectomy is associated with the manipulation and/or injury of the laryngeal nerves close or adhering to the thyroid gland, causing changes in laryngeal sensitivity, which plays an important role in the protection reflex of the upper airways, and alteration in vocal fold mobility related to the sphincteric, protective and phonatory functions⁽²⁾.

Thyroidectomized individuals may evolve with upper aerodigestive sensory symptoms of varied etiology, such as laryngeal nerve injury, hormonal changes, post-oro-tracheal intubation injury, local infections, postoperative bleeding, and temporary dysfunction of the cervical musculature⁽⁵⁾. They may also evolve with some vocal tract discomfort, referred as of low degree, within the range of “absence of pain” and “bearable pain”, being essentially subjective^(6,7).

Another survey⁽⁵⁾ conducted with patients undergoing thyroidectomy described prevalence of upper aerodigestive symptoms for hoarseness, vocal fatigue, low-pitched voice, difficulty in speaking loudly, pharyngeal bolus, choke, throat clearing, and dry throat. In the following year⁽⁸⁾, another group of researchers assessed such population retrospectively and found the following upper aerodigestive symptoms four years postoperatively: hoarseness, vocal fatigue, cough, and neck strangling. Sensory symptoms can be found in patients with dysphonia. They include unpleasant sensations during vocal emission, more specifically in the region of the shoulders and the neck, or auditory symptoms, when patients audibly perceive that their emission has been altered. These symptoms can vary in frequency and severity⁽⁶⁻⁹⁾.

Few studies have been conducted on vocal tract discomfort, and those which have, addressed manual laryngeal therapy^(6,8), voice professionals⁽⁹⁾ such as teachers⁽¹⁰⁾, and different laryngeal diagnostic groups⁽¹⁰⁾.

A survey conducted with teachers⁽¹⁰⁾ observed that individuals with vocal complaint present greater frequency and severity compared with those of individuals without vocal complaint. This usually occurs with teachers who are exposed to a larger number of risk factors and emotional problems⁽¹¹⁾. In teachers with vocal complaints, the most frequent and severe sensory symptoms were, respectively, irritable throat (3.91/3.88) and dry throat (3.69/3.66). In the group without vocal complaints, the most frequent and severe symptoms were, respectively, dry throat (2.23/3.30) and irritable throat (1.17/ 1.23). The self-reference of patients regarding the symptoms they present is closely related to frequency and severity of symptoms.

Few individuals spontaneously report the presence of sensory symptoms related to the voice and swallowing because they consider them as an irreversible consequence of the thyroid problem. In clinical practice, voice professionals are the ones who perceive changes most intensively and suffer the highest impacts⁽⁵⁾.

Our intention is to achieve more comprehensive knowledge on the symptoms associated with the upper aerodigestive tract and vocal tract discomfort in order to maximize clinical and scientific speech-language pathology performance. To this end, the present study aimed to investigate the occurrence of sensory and vocal symptoms in thyroidectomy patients pre-and post-operatively.

METHODS

This prospective, quantitative, descriptive study was approved by the Research Ethics Committee of the aforementioned Institution under protocol no. 712.194/2013. All participants were informed about the procedures of the research and signed an Informed Consent Form (ICF) prior to study commencement.

Patients undergoing partial or total thyroidectomy assisted at the head and neck departments of two public hospitals

were included in the study. The participating individuals were assessed pre- and post-operatively. The choice for the 3-month postoperative criterion was based on previous studies that report the presence of vocal and swallowing symptoms in the short and long terms; however, reduction in this symptomatology is expected in approximately 3 months, although some symptoms might persist over time^(2,3,12,13). Exclusion criteria comprised laryngeal and thyroid hormone changes and gastroesophageal reflux verified by videolaryngoscopy at both assessment times.

Study participants were evaluated by means of the Upper Aerodigestive Symptoms (UADS)⁽⁵⁾ and the Vocal Tract Discomfort Scale (VTDS) questionnaires⁽⁶⁾. The first instrument addresses sensory symptoms of voice (vocal fatigue, difficulty in speaking loudly, hoarseness, low-pitched voice, loss of speaking range, and high-pitched voice) and swallowing (burning, pharyngeal bolus, pain during deglutition, pharyngeal pain, choke, dry throat, discomfort during deglutition, throat clearing, neck scar stiffness during deglutition, strangling, foreign body in the pharynx, and cough). Positive responses to this questionnaire were calculated according to a 4-point Likert scale that ranked the symptoms from 1 (not a problem) to 4 (a major problem).

It is worth emphasizing that the prevalence of a sensory symptom was characterized when the patient considered the symptom as a “problem”, even if it was a minor one.

The latter instrument - the Vocal Tract Discomfort Scale⁽⁶⁾ - measures the frequency and severity of eight sensory symptoms (burning, tight, dry, aching, tickling, sore, irritable, and lump in the throat) using a 7-point Likert scale that ranks the frequency of symptoms from 0 (never) to 6 (always) and their severity from 0 (none) to 6 (extreme).

The scores of the instruments were calculated by the simple sum of each scale, in which the voice and swallowing domains of the UADS and the frequency and severity of the VTDS were evaluated separately without summing the subscale scores; the data reported by the patients pre- and post-operatively were compared.

Sixteen patients were included in the study. Of these, four individuals were excluded: two patients who presented laryngeal alterations after surgery (one evolved with right vocal fold paralysis in paramedian position and the other with right vocal fold paresis), one who decided not to continue with the treatment, and one who was not able to be any longer contacted. Thus twelve participants responded to the two aforementioned instruments before surgery and three months after surgery.

For assessment of the data, statistical descriptive analysis of the variables investigated regarding the sensory symptoms was conducted both at pre- and post-thyroidectomy times using the McNemar’s chi-square test for comparison of prevalence values and the Wilcoxon test for comparison of frequency and severity values.

All statistical analyses were performed using the SPSS 2.0 software. Because of the small sample size and the interest in observing variables that may present greater statistical difference in studies with larger samples, the significance level of 0.10 ($p < 0.1$) was adopted. This statistical decision does not harm the analysis, considering that the present study is only aimed at identifying a possible association between the variables described.

RESULTS

Twelve individuals aged 45.5 years ($SD \pm 13.8$), with prevalence of females (83.3%; $n=10$), were included in the study. Most of them had undergone total thyroidectomy (83.3%; $n=10$) (Table 1).

Regarding the prevalence of the Upper Aerodigestive Symptoms (UADS), greater occurrence of vocal fatigue (pre: 41.7%, $n=5$; post: 33.3%, $n=4$) and hoarseness (pre: 33.3%, $n=4$; post: 50.0%, $n=6$) was observed for the voice domain, whereas higher prevalence values of pharyngeal bolus (pre: 41.7%, $n=5$; post: 25.0%, $n=3$), dry throat (pre: 41.7%, $n=5$; post: 16.7%, $n=2$), and throat clearing (pre: 41.7%, $n=5$; post: 25.0%, $n=3$) were found for the swallowing domain. Comparison of the UADS showed no statistically significant difference between the vocal and swallowing sensory symptoms, except for a reduction in the choke symptom ($p=0.07$) (Table 2).

With respect to the VTDS, greater frequency of the symptom “dry” - degrees 2 (33.3%, $n=4$) and 5 (8.3%, $n=1$) - was observed preoperatively and greater frequency of the symptom “tickling” - degree 2 (25%, $n=3$) was found postoperatively. As for severity, the values were higher for the symptoms “dry” - degrees 2 (50%, $n=6$) and 5 (8.3%, $n=1$) preoperatively and “irritable” - degree 3 (8.3%, $n=1$), “sore” - degree 2 (8.3%, $n=1$), and “lump in the throat” - degrees 2 (8.3%, $n=1$) and 3 (8.3%, $n=1$) postoperatively (Table 3).

Comparison of the frequency of the VTDS symptoms pre- and post-operatively showed statistically significant difference only for the symptom “dry” ($p=0.059$) (Table 3), whereas comparison of the severity of the VTDS symptoms between both times showed reduction of the same symptom ($p=0.02$) (Table 3).

Table 1. Distribution of the study participants according to the variables gender and type of thyroidectomy

VARIABLE	N (%)
GENDER	
MALE	2 (16.7)
FEMALE	10 (83.3)
TYPE OF THYROIDECTOMY	
PARTIAL	2 (16.7)
TOTAL	10 (83.3)
TOTAL	12 (100.0)

Table 2. Comparison between pre- and post-thyroidectomy prevalence of UADS

VOCAL SYMPTOMS	PRE (%)	POST (%)	p-value
VOCAL FATIGUE	5 (41.7)	4 (33.3)	0.414
DIFFICULTY IN SPEAKING LOUDLY	1 (8.3)	2 (16.7)	0.414
HOARSENESS	4 (33.3)	6 (50.0)	0.705
LOW-PITCHED VOICE	0	2 (16.7)	0.18
LOSS OF SPEAKING RANGE	0	1 (8.3)	0.317
HIGH-PITCHED VOICE	0	0	-
SWALLOWING SYMPTOMS	PRE (%)	POST (%)	p-value
BURNING	1 (8.3)	1 (8.3)	-
PHARYNGEAL BOLUS	5 (41.7)	3 (25.0)	0.317
PAIN DURING DEGLUTITION	1 (8.3)	0	0.317
PHARYNGEAL PAIN	3 (25.0)	1 (8.3)	0.317
CHOKE	4 (33.3)	0	0.066*
DRY THROAT	5 (41.7)	2 (16.7)	0.257
DISCOMFORT DURING DEGLUTITION	1 (8.3)	1 (8.3)	-
THROAT CLEARING	5 (41.7)	3 (25.0)	0.157
NECK SCAR STIFFNESS DURING DEGLUTITION	0	2 (16.7)	0.157
STRANGLING	0	0	-
FOREIGN BODY IN THE PHARYNX	1 (8.3)	0	0.317
COUGH	2 (16.7)	1 (8.3)	0.317

*Statistically significant values (< 0.10) – McNemar's chi-square test

Caption: UADS= Upper Aerodigestive Symptoms**Table 3.** Distribution and comparison between the frequency and severity of pre- and post-thyroidectomy VTDS sensory symptoms

SYMPTOM	FREQUENCY			p-value	SEVERITY			p-value
	PRE		POST		PRE		POST	
	Degree	N(%)	n(%)		Degree	n(%)	n(%)	
BURNING	0	12 (100.0)	12 (100.0)	-	0	12 (100.0)	12 (100.0)	-
TIGHT	0	11 (91.7)	12 (100.0)	0.317	0	11 (91.7)	12 (100.0)	0.317
	2	1 (8.3)	-		2	1 (8.3)	-	
DRY	0	7 (58.3)	10 (83.3)	0.059*	0	5 (41.7)	10 (83.3)	0.02*
	2	4 (33.3)	2 (16.7)		2	6 (50.0)	2 (16.7)	
	5	1 (8.3)	-		5	1 (8.3)	-	
ACHING	0	9 (75.0)	10 (83.3)	0.336	0	10 (83.3)	10 (83.3)	-
	2	2 (16.7)	1 (8.3)		2	2 (16.7)	2 (16.7)	
TICKLING	3	1 (8.3)	1 (8.3)	0.564	-	-	-	-
	0	8 (66.7)	9 (75.0)		0	9 (75.0)	9 (75.0)	
SORE	2	4 (33.3)	3 (25.0)	0.157	2	3 (25.0)	3 (25.0)	0.414
	0	12 (100.0)	10 (83.3)		0	11 (91.7)	10 (83.3)	
IRRITABLE	2	-	2 (16.7)	0.102	2	1 (8.3)	1 (8.3)	0.276
	-	-	-		3	-	1 (8.3)	
	0	8 (66.7)	11 (91.7)		0	9 (75.0)	11 (91.7)	
LUMP IN THE THROAT	2	3 (25.0)	1 (8.3)	0.48	2	3 (25.0)	-	0.705
	3	1 (8.3)	-		3	-	1 (8.3)	
	0	8 (66.7)	10 (83.3)		0	10 (83.3)	10 (83.3)	

*Statistically significant values (< 0.10) – Wilcoxon test

Caption: VTDS = Vocal Tract Discomfort Scale

DISCUSSION

Preservation of the laryngeal nerves is one of the major concerns during thyroid surgeries⁽²⁾. The manipulation and/or injury of the vagus nerve can importantly impact function and the quality of life of patients, considering that they can evolve with motor and sensorial alterations such as reduction/absence of laryngeal

sensitivity, modulation restriction of the acute frequency, and compromised vocal fold mobility⁽²⁾. In thyroidectomy, surgical manipulation accounts for respectively 46% and 56% of the cases of unilateral and bilateral vocal fold paralysis, which often result in severe dysphonia, dysphagia and dyspnea^(14,15). Therefore, it is important to document laryngeal evaluation before and after thyroidectomy due to the potential impact that may be caused

by thyroidectomy⁽¹⁶⁾ and orient the patient preoperatively with respect to the possible sequels of surgery⁽¹⁷⁾.

Vocal and swallowing disorders are common in patients with preserved function of the laryngeal nerves after thyroidectomy. Some patients may experience pain, infection, bleeding, laryngeal mucosa alteration, compressive hematoma, hypocalcemia, laryngeal edema, vocal fold edema, inflammation caused by orotracheal intubation, temporary injury or dysfunction of the extralaryngeal musculature, and laryngotracheal fixation that prevent vertical movement of the larynx and may alter laryngeal sensitivity, which is important in the protection reflex of the upper airways⁽¹⁸⁻²¹⁾.

Prevalence of thyroid nodules is higher in the female gender compared with that in the male gender, varying from 19% to 67% in women and the elderly⁽²²⁾. In the present study, greater prevalence was observed for the female gender with mean age of 45 years submitted to total thyroidectomy. Previous studies have shown prevalence of total thyroidectomy, with such conduct being justified by the histological and clinical characteristics of thyroid disease⁽²⁾.

In the present research, the most frequent preoperative Upper Aerodigestive Symptoms (UADS) were vocal fatigue, hoarseness, pharyngeal bolus, dry throat, and throat clearing, with hoarseness was the most severe symptom. Preoperatively, these symptoms can occur owing to metabolic dysfunction and thyroid nodules⁽²³⁾; however, these participants did not present metabolic alteration, therefore the size of the nodule may have been the main cause of such symptoms, considering that, depending on its size, there may be compression of the structures of the upper aerodigestive tract and of the recurrent laryngeal nerve, causing motor alteration, and evolving with the aforementioned symptoms.

The most prevalent sensory UADS observed postoperatively were hoarseness and vocal fatigue, regarding the voice domain, and throat clearing and pharyngeal bolus, with respect to the swallowing domain. These data are in agreement with the literature, which shows that, after thyroidectomy, patients can present vocal fatigue, hoarseness, low-pitched voice, difficulty in speaking loudly, pharyngeal bolus, dry throat, choke, and throat clearing^(2,5,7). Postoperative symptoms may be related to vagus nerve injury, orotracheal intubation, extralaryngeal muscle section, and laryngotracheal fixation, which may compromise the vertical movement and sensitivity of the larynx, which are important factors in the function of the protection reflex of the upper airways, and in vocal fold mobility, related to the primary protective sphincteric function and to voice production^(13,24,25).

Some studies report sensory symptoms of swallowing in the absence of lesion of the laryngeal nerves, usually resolved after a short time⁽³⁾, but they may persist long after surgery in approximately 30% of cases^(13,26). A previous study showed that of the 88 thyroidectomized individuals analyzed postoperatively, 6.8% reported swallowing complaints⁽³⁾. Anxiety⁽⁴⁾ before surgery is a factor that should be addressed and more comprehensively studied, considering that surveys^(3,4) have reported significant decrease in postoperative symptoms, and anxiety may be related with these data.

With regard to the voice-related UADS, no difference was observed pre- and post-operatively. As for the swallowing-related UADS, there was a reduction in the choke symptom. A possible reason for choke symptoms to remain after thyroidectomy may be the alteration of the extrinsic perithyroid neural plexus⁽²⁾, which innervates the pharyngolaryngeal structures and may have been modified by surgical manipulation.

The most frequent Vocal Tract Discomfort (VTD) sensory symptoms were “dry”, preoperatively, and “tickling”, postoperatively. No evidence to justify such symptoms has been found in the literature; however, it is believed that “dry” may be associated with vocal demand and/or absence of hydration, whereas “tickling” may occur due to the healing and drying process, as pruritus is activated in the absence of sufficient mucus to protect the sensitive tissue.

The most severe VTD sensory symptoms were “dry”, preoperatively, and “irritable”, “sore”, and “lump in the throat”, postoperatively. The sensory symptoms “irritable”, “sore”, and “lump in the throat” may have occurred because of the surgical intervention. The extrinsic musculature of the larynx may present dysfunction depending on the extension and manipulation performed^(2,3,5).

It is worth noting that the Vocal Tract Discomfort Scale (VTDS) seems to be a promising tool. It has been used in three countries so far, namely, United Kingdom^(6,7), Brazil^(9,14), and Poland⁽¹⁰⁾. Normally, publications are conducted with populations (teachers and voice professionals) different from that addressed in this study. Nevertheless, it is important to use this instrument not only in behavioral cases, but also in organic dysphonia.

A study⁽¹⁴⁾ conducted in Brazil with five groups of different diagnoses using the VTDS described lesion in the membranous part of the vocal folds, absence of laryngeal lesion, glottic clefts, speech disorder secondary to gastroesophageal reflux, and voice disorder of neurological origin. In that study, the group without laryngeal changes presented number of VTD sensory symptoms well distributed among 1-4 (48.21%) and 5-8 (42.85%) symptoms; result similar to that found in this study, where patients presented a maximum of four symptoms, in which it was possible to observe a change in the report of the number of symptoms pre- and post-operatively, with “dry” as the most frequently reported symptom at both assessment times.

When the VTD sensory symptoms were compared pre- and post-operatively, reduction in the frequency and severity of these symptoms was observed postoperatively, but the symptom “dry” presented significant decrease. This finding corroborates the results of a study⁽²³⁾ conducted with thyroidectomized individuals in which the aforementioned sensory symptom decreased postoperatively.

In this study, it was possible to observe that the sensory symptoms were the ones that caused the greatest impact on the patients. It is important that patient complaints be valued, especially with regard to sensory issues, considering that they reflect not only in quality of life, but also in some degree of disability⁽²⁷⁾. Lack of knowledge about the existence of trained professionals to assist with this field and especially the lack of speech-language pathologists in public health services are

factors that contribute to the absence of spontaneous reports from the part of these individuals on the symptoms they present.

The outcomes of this study show the importance of performing pre- and postoperative monitoring with patients undergoing thyroidectomy, considering that they may evolve with vocal and swallowing sensory symptoms described in the literature^(2,3,5), in addition to VTD sensory symptoms. The applicability of the Vocal Tract Discomfort Scale as an assessment tool of organic dysphonia was observed in the present study, in addition to its use in behavioral dysphonia, being of great value to assist with the self-reference of the frequency and severity of VTD.

CONCLUSION

Patients undergoing thyroidectomy present sensory symptoms of upper aerodigestive tract and vocal tract discomfort pre- and post-operatively characterized by self-reference of hoarseness, vocal fatigue, lump in the throat, and cough, as well as dry, sore, and irritable throat. Reduction in the sensory symptom of choke and in the frequency and severity of throat dryness was self-reported by thyroidectomy patients postoperatively.

REFERENCES

1. Tortora GJ, Grabowski SR. *Corpo humano*. 6. ed. Porto Alegre: Art Med; 2006.
2. Arakawa-Sugueno L. *Voz e deglutição de pacientes com e sem mobilidade laringea após tireoidectomia [tese]*. São Paulo: Faculdade de Medicina, Universidade de São Paulo; 2007.
3. Netto IP. *Laringe, voz e deglutição pré e pós-tireoidectomia [dissertação]*. São Paulo: Fundação Antônio Prudente; 2005.
4. Senise AT, Queija DS, Degani C, Córrea LAC, Deviditis AR, Lenh CN, et al. Sintomas e sinais de alterações da deglutição após a tireoidectomia. *Rev. Bras. Cir. Cabeça Pescoço*. 2009;38(2):67-71.
5. Silva ICM, Netto IP, Vartanian JG, Kowalski LP, Angelis EC. Prevalence of upper aerodigestive symptoms in patients who underwent thyroidectomy with and without the use of intra operative laryngeal nerve monitoring. *Thyroid*. 2012;22(8):814-9. PMID:22780215. <http://dx.doi.org/10.1089/thy.2011.0118>.
6. Mathieson L, Hirani SP, Epstein R, Baken RJ, Wood G, Rubin JS. Laryngeal manual therapy: a preliminary study to examine its treatment effects in the management of muscle tension dysphonia. *J Voice*. 2009;23(3):353-66. PMID:18036777. <http://dx.doi.org/10.1016/j.jvoice.2007.10.002>.
7. Mathieson L. Vocal tract discomfort in hyperfunctional dysphonia. *J Voice*. 1993;2:40-8.
8. Pereira JA, Girvent M, Sancho JJ, Parada C, Sitges-Serra A. Prevalence of long-term upper aerodigestive symptoms after uncomplicated bilateral thyroidectomy. *Surgery*. 2003;133(3):318-22. PMID:12660645. <http://dx.doi.org/10.1067/msy.2003.58>.
9. Rodrigues G, Zambon F, Mathieson L, Behlau M. Vocal tract discomfort in teachers: its relationship to self-reported voice disorders. *J Voice*. 2013;27(4):473-80. PMID:23528674. <http://dx.doi.org/10.1016/j.jvoice.2013.01.005>.
10. Woźnicka E, Niebudek-Bogusz E, Kwiecień J, Wiktorowicz J, Sliwińska-Kowalska M. Applicability of the vocal tract discomfort (VTD) scale in evaluating the effects of voice therapy of occupational voice disorders. *Med Pr*. 2012;63(2):141-52. PMID:22779321.
11. Costa DB, Lopes LW, Silva EG, Cunha GMS, Almeida LNA, Almeida AAF. Fatores de risco e emocionais na voz de professores com e sem queixas vocais. *SciELO*. 2013;15(4):1001-10.
12. Lombardi CP, Raffaelli M, D'Alatri L, Marchese MR, Rigante M, Paludetti G, et al. Voice and swallowing chances after thyroidectomy in patients without inferior laryngeal nerve injuries. *Surgery*. 2006;140(6):1026-32. PMID:17188153. <http://dx.doi.org/10.1016/j.surg.2006.08.008>.
13. Stojadinovic A, Shaha AR, Orlikoff RF, Nissan A, Kornak MF, Singh B, et al. Prospective functional voice assessment in patients undergoing thyroid surgery. *Ann Surg*. 2002;236(6):823-32. PMID:12454521. <http://dx.doi.org/10.1097/00000658-200212000-00015>.
14. Lopes LW, Cabral GF, Almeida AAF. Vocal tract discomfort symptoms in patients with different voice disorders. *J Voice*. 2015;29(3):317-23. PMID:25499523. <http://dx.doi.org/10.1016/j.jvoice.2014.07.013>.
15. Francis DO, Penson DF, Ni S, Garrett CG. Epidemiology of vocal fold paralysis after total thyroidectomy well-differentiated thyroid cancer in a medicare population. *Otolaryngol Head Neck Surg*. 2014;150(4):548-57. PMID:24482349. <http://dx.doi.org/10.1177/0194599814521381>.
16. Chandrasekhar SS, Randolph GW, Seidman MD, Rosenfeld RM, Angelos P, Barkmeier-Kraemer J, et al. Clinical practice guideline: improving voice outcomes after thyroid surgery. *Otolaryngol Head Neck Surg*. 2013;148(6, Suppl):1-37. PMID:23733893. <http://dx.doi.org/10.1177/0194599813487301>.
17. Kuhn MA, Bloom G, Myssiorek D. Patient perspectives on dysphonia after thyroidectomy for thyroid cancer. *J Voice*. 2013;27(1):111-4. PMID:22925427. <http://dx.doi.org/10.1016/j.jvoice.2012.07.012>.
18. Hong KH, Kim YK. Phonatory characteristics of patients undergoing thyroidectomy without laryngeal nerve injury. *Otolaryngol Head Neck Surg*. 1997;117(4):399-404. PMID:9339803. [http://dx.doi.org/10.1016/S0194-5998\(97\)70133-5](http://dx.doi.org/10.1016/S0194-5998(97)70133-5).
19. Shimokojin T, Takenoshita M, Sakai T, Yoshikawa K. Vocal cord bowing as a cause of long-lasting hoarseness after a few hours of tracheal intubation. *Anesthesiology*. 1998;89(3):785-7. PMID:9743419. <http://dx.doi.org/10.1097/00000542-199809000-00032>.
20. Aluffi P, Policarpo M, Cherovac C, Olina M, Dosdegani R, Pia F. Post-thyroidectomy superior laryngeal nerve injury. *Eur Arch Otorhinolaryngol*. 2001;258(9):451-4. PMID:11769989. <http://dx.doi.org/10.1007/s004050100382>.
21. Stojadinovic A, Henry LR, Howard RS, Gurevich-Uvena J, Makashay MJ, Coppit GL, et al. Prospective trial of voice outcomes after thyroidectomy: evaluation of patient-reported and clinician-determined voice assessments in identifying post thyroidectomy dysphonia. *Surgery*. 2008;143(6):732-42. PMID:18549889. <http://dx.doi.org/10.1016/j.surg.2007.12.004>.
22. AMBNS: Associação Médica Brasileira e Agência Nacional de Saúde Suplementar [Internet]. *Doença Nodular de Tireóide: diagnóstico*. São Paulo: Associação Médica Brasileira e Agência Nacional de Saúde Suplementar; 2011 [citado em 2014 Mar 10]. Disponível em: http://www.projetodiretrizes.org.br/ans/diretrizes/doenca_nodular_da_tireoide-diagnostico.pdf
23. Montoni NPC. *Avaliação eletromiográfica de superfície e nasofibroscópica da deglutição em pacientes submetidos à tireoidectomia e seu impacto na qualidade de vida [tese]*. Fundação Antônio Prudente, São Paulo; 2012.
24. McIvor NP, Flint DJ, Gillibrand J, et al. Thyroid surgery and voice-related outcomes. *Otolaryngol Head Neck Surg*. 2011;63:32-9.
25. Sinagra DL, Montesinos MR, Tacchi VA, Moreno JC, Falco JE, Mezzadri NA, et al. Voice changes after thyroidectomy without recurrent laryngeal nerve injury. *J Am Coll Surg*. 2004;199(4):556-60. PMID:15454138. <http://dx.doi.org/10.1016/j.jamcollsurg.2004.06.020>.
26. Lombardi CP, Raffaelli M, De Crea C, D'Alatri L, Maccora D, Marchese MR, et al. Long-term outcome of functional post thyroidectomy voice and swallowing symptoms. *Surgery*. 2009;146(6):1174-81. PMID:19958946. <http://dx.doi.org/10.1016/j.surg.2009.09.010>.
27. Daher JL. *Análise da qualidade de vida, voz e deglutição no paciente com câncer de cabeça e pescoço pré e pós tratamento oncológico [dissertação]*. Fundação Pio XII, Hospital de Câncer de Barretos, São Paulo; 2013.

Author contributions

All authors fully contributed in the development of the present study. LFA participated in the collection, classification, and interpretation of data; LWL contributed in the interpretation of data and writing of the manuscript; POCS participated in the interpretation and statistical analysis of data; VJFP and VLLF were responsible for the selection of patients; EHMA was the study adviser and contributed in its design and guidance and in the final revision of the manuscript.