SHORT TERM QUALITY OF LIFE RELATED TO VOICE AND SWALLOWING IN PATIENTS UNDERGOING ^{131}I (IODINE) FOR DIFFERENTIATED THYROID CARCINOMA

Qualidade de vida relacionada à voz e à deglutição, a curto prazo, em pacientes submetidos à radioiodoterapia por carcinoma diferenciado de tireoide

José Ribamar do Nascimento Junior[1], Elisabete Carrara-de Angelis[2], Eduardo Nóbrega Pereira Lima[3]

ABSTRACT

Purpose: to analyze the quality of life related to voice and swallowing before and after radioiodine therapy in the short term. **Methods:** thiroidectomized individuals indicated RAI underwent two questionnaires on quality of life related to voice and swallowing before and three months after radioiodine therapy. **Results:** 32 patients, 84 % female and 16% male, were studied with a mean age of 46 years. The histological type was the classic papillary carcinoma (56%). The results indicated a tendency for better quality of life with respect to voice three months after radioiodine therapy. The protocol for quality of life related to swallowing also indicated better quality of life in the second assessment. A larger with minimal limitation on the quality of life questionnaire in swallowing was observed. **Conclusion:** quality of life and voice and swallowing symptoms in the short term after radioiodine therapy is better compared to pretreatment. It is necessary to investigate other aspects such as metabolic, surgical and individual to define the real impact of radioiodine therapy on quality of life.

KEYWORDS: Deglutition; Thyroid Neoplasms; Iodine; Quality of Life

INTRODUTCION

Diseases of the thyroid gland are common, affecting approximately 11% of the general population, with a predominance of female involvement over male in a ratio of 4:1[1]. The initial treatment of well-differentiated thyroid carcinoma consists in most cases of total or near total thyroidectomy with subsequent remnant ablation with iodine radioisotope (^{131}I) followed by L-thyroxine (L-T4) suppression[2].

The main structures at risk during thyroid surgery are the recurrent laryngeal nerves and parathyroid glands. The removal of the parathyroid glands can lead to hypoparathyroidism and consequent hypocalcemia[1,3]. Lesion to the inferior recurrent laryngeal nerve can result in vocal fold paralysis, which may cause permanent hoarseness. If the lesion is bilateral, aphonia and dyspnea are results of changes in the vocal folds[4].

In thyroid surgery, its comorbidities is post-surgical therapy with ^{131}I leading to prolonged survival, and patients may present vocal alterations, dysphagia, sialadenitis, taste changes and xerostomia[5].

Sialadenitis is a possible side effect seen in treatment with high doses of ^{131}I and correlates with the amount administered and physiological uptake, usually bilateral, in the region of the parotid or submandibular glands, which occurs within 48

(1) Instituto de Gerenciamento em deglutição – IGD São Paulo, SP, Brasil.

(2) Departamento de Fonoaudiologia do Hospital AC Camargo São Paulo, SP, Brasil.

(3) Departamento de Medicina Nuclear do Hospital AC Camargo, São Paulo, SP, Brasil.

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hours of administration and generally persists several days[6,7]. Symptoms may appear immediately after ^{131}I therapy and/or progress with time. Pain and swelling can be seen in the salivary glands, usually affecting the parotid[8].

Many studies have discussed the effects of radioactive iodine, stating that they are dose-dependent, and recent studies have shown that doses higher than 150mCi are associated with more adverse effects on the salivary glands[5].

A balanced hormonal system is very important to ensure efficiency of the numerous functions of the body, as vocal deviations may provide the first clue to the diagnosis of endocrinologic alteration or deficiency. Any change in this hormonal system can cause changes in voice frequency (pitch) and vocal quality[9]. Hormonal alterations develop around 90 days after post-radioiodine therapy[10]. Hyperthyroidism may be related to changes in vocal instability, including vocal tremor, shortness of breath, dry cough and reduced intensity (loudness). Hypothyroidism may result in an important clinical sign of hoarseness, and voice frequency and intensity may vary. The cause of these vocal changes is associated with vocal fold edema, or myxedema[9-11].

Voice changes due to hyperthyroidism correspond to vocal instability, including vocal tremor, shortness of breath, dry cough and reduced intensity (loudness). The appearance of paresis and/or vocal fold paralysis in patients undergoing radioiodine therapy is unlikely; however, when it occurs, it is believed to be due to the mechanism of stretching of the recurrent laryngeal nerve by focal edema of the surrounding tissue. In a study with laryngoscopic data evaluated at three time points, it was found that in moments of acute inflammatory, the vocal fold configurations were unaffected, with no involvement of the laryngeal nerve when performing this type of treatment[10].

Studies show that in 25 to almost 90% of patients after being submitted to surgical treatment report vocal changes in the first weeks and 11-15% report persistent vocal problems 3-6 months after the thyroidectomy, which may be associated with recurrent laryngeal nerve lesion; however, many patients experience long-term negative impact of voice without presenting any evidence of lesion[6].

The act of swallowing is important for the maintenance of life, and as it is a fast and automatic event, it may seem simple. However, its mechanisms are among the most complex in neurophysiology, and any change in the swallowing process, which can happen from the mouth to the stomach and prevents safe, efficient and comfortable oral intake, is defined as dysphagia[12,13].

In a study on the prevalence of symptoms of the upper aerodigestive tract after total thyroidectomy, standing out were not only voice disorders, but also cough, dysphagia, tightness in the neck and incidence of pre- and post-thyroidectomy colds as well[14].

Changes in voice and swallowing can interfere with the quality of life for some individuals, appearing most often in the long term, particularly those with changes in laryngeal mobility. However, there are reports of individuals with preserved vocal fold mobility[15].

In a recent study on the mid-term quality of life in thyroid cancer patients undergoing ^{131}I (iodine) therapy, 88 patients treated with total thyroidectomy and treatment with ^{131}I underwent a questionnaire to assess anxiety, another for the evaluation of depression, and an institutional questionnaire corresponding to the functional assessment of chronic illness and its therapy. It was observed that treatment with ^{131}I did not affect the quality of life of the patients studied[16].

In order to study the quality of life of patients diagnosed with differentiated thyroid carcinoma, the University of Washington quality of life questionnaire (UW-QOL) was given to 154 patients undergoing total thyroidectomy. Of these, 61 patients were not treated with ^{131}I (iodine); 73 were treated with doses ≤ 150mCi and 20 with doses > 150mCi (73 patients ≤ 45 years and 81 patients > 45 years). It was concluded that, although the quality of life for the majority of patients treated with ^{131}I is good, those who were subjected to doses > 150mCi had higher risks, requiring monitoring and more incisive treatments[5].

Due to growing evidence of thyroid disease and the consequent surgical and radioisotope treatments, it is necessary to evaluate the quality of life in relation to voice and swallowing, since these data are scarce. Therefore, this study aimed to analyze the quality of life associated with voice and the swallowing of patients undergoing treatment with radioiodine therapy.

METHODS

The study was prospective character; conducted to characterize the quality of life in relation to voice and swallowing in patients with differentiated thyroid carcinoma who were indicated for the institutional post-total thyroidectomy protocol treatment with ^{131}I. Collection was made at the Department of Nuclear Medicine and the Radioisotope Therapy Unit (RTU) at A.C. Camargo Cancer Center, from June 2010 to February 2011. All patients signed a free and informed consent form to participate in the study.

This study was approved by the Ethics Committee in Research (CEP) of the A.C. Camargo Cancer Center under number 1332/09.

Inclusion criteria

Adult individuals (>18 years) underwent total thyroidectomy and were indicated for treatment with ^{131}I.

Exclusion criteria

- Prior history of head and neck treatment or surgery
- Previous Speech-language treatment for vocal and/or swallowing changes
- Cognitive changes and/or individuals with diagnosed neurological disease
- Incomplete entering of data from all assessment stages of the study
- Illiterate patients
- Patients who underwent SLP therapy

^{131}I (radioactive) treatment protocol of the institution

Assessment was made in consultation with a medical specialist in nuclear medicine prior to radio-iodine therapy for eligibility for treatment, when the patient was given an admissions manual of conduct containing information about the hospitalization. To ensure the efficiency of the treatment, the use of thyroid hormones and the intake of seafood were suspended for at least four weeks, while a diet low in iodine was given. The patient then underwent a PCI-^{131}I pre-therapeutic dose and the dose to be administered during treatment was evaluated.

Thirty-two patients were enrolled in the study following the inclusion criteria previously described. Clinical and therapeutic data were collected from patient files at the Department of Nuclear Medicine of the institution, through a query form (Figure 1), which was completed by the treating physician. Data collection occurred at the pre-treatment and 3 months after the administration of ^{131}I.

Quality of life was studied from the completion of two questionnaires, without interference from the researcher, which are subsequently described.

Questionnaire assessing the Voice Handicap Index (VHI)

The Voice Handicap Index (VHI) is a questionnaire with 30 questions covering functional, emotional and physical aspects to voice disorders (Figure 2). The scoring varies from 60 to 40. The score of 0 is considered the best score and 40 the worst; 40 is the maximum score for each domain. The scores are defined as the sum of the values responding to domains, which may vary from 0 to 40. The final score is determined by the sum of the three domains and can vary between 0 and 120. When closer to the maximum value, the worse the quality of life is. The periods pre-thyroidectomy, post-thyroidectomy (7-15 days) and 3 months after surgery were compared; thus, when the difference between two time points was greater than 18 points in the total score, this showed that there was an impact on the VHI. When the difference between each domain in the comparison between two periods showed a difference of 8 points, this proved to be an impact on the VHI in that domain[17].

Questionnaire assessing the M.D. Anderson Dysphagia Index (MDADI)

The M.D. Anderson Dysphagia Index (MDADI) is a questionnaire that contains 20 questions: 1 global and the others divided into three areas – emotional (6 questions), functional (5 questions) and physical (8 questions). The final score for each domain ranges from 0 to 100, and the lower the score, the worse the effect of dysphagia on quality of life of the patient (Figure 3).

This questionnaire was translated and validated at the institution of orgin[18].

Statistical analysis

Measures of central tendency (mean and median) and variability (standard deviation) were used to summarize the scores of instruments and IDV MDADI, in addition to some demographic and clinical variables.

The nonparametric Wilcoxon test was used in comparisons between the scores of the VHI and MDADI instruments at the periods pre- and after 3 months of treatment. The level of significance was 5% and data analysis was performed with the aid of the R statistical software (http://www.r-project.org).

The McNemar test was used for the verification of limitations over time.

DATE: ...../...../.....
NAME OF PATIENT: .....
RGH: ..... HEALTH PLAN: ..... AGE: .....
REFERRED TO: ..... BY DR.: .....

CONSULTATION FOR TREATMENT ELIGIBILITY

TOTAL THYROIDECTOMY DATE: ...../...../..... NOTE: .....

UNDERLYING PATHOLOGY: ( ) CLASSIC PAPILLARY ( ) MIXED PAPILLARY ( ) FOLICULAR
( ) HÜRTHLE

PA: Tumor size: .....cm TNM: .....
Mitotic activity: Tumor necrosis: Encapsulation: Capsule invasion:
Vascular infiltration: Lymphatic infiltration: Extrathyroid extension:

WHAT TREATMENT? ( ) ABLATION ( ) GOAL: LOCOREGIONAL ( ) GOAL: DISTANCE

TREATMENT PREPARATION

1 – RECENT LABORATORY EXAMS:
TSH: .....µUI/Ml THYROGLOBULIN: ..... ANTI-TG: .....
PCI (< 3 months): ……..……..
SALIVARY GLANDS: ……..
HEMOGRAM: He: …….. Hg: …….. Ht: …….. Leuko: ……..……..
Platelets: ……..... BetaHCG: ……..…….....

2 – IMPORTANT INFORMATION:
2.1 – HAVE YOU RECENTLY MADE ANY RADIOLOGICAL STUDIES WITH CONTRAST IODINE?
( ) NO ( ) YES WHEN: ……..……..……..

2.2 – DO YOU HAVE PREDISPOSITION FOR NAUSEA AND VOMITING? ( ) NO ( ) YES

2.3 – OTHER MEDICATIONS? ( ) NO ( ) YES WHEN? .....

2.4 – PERSONAL HISTORY:
( ) INSOMNIA ( ) PANIC DISORDER ( ) CLAUSTROPHOBIA ( ) DEPRESSION
( ) SAH ( ) DM ( ) INTESTINAL CONSTIPATION ( ) OTHERS

2.5 – UNDERGONE SLP THERAPY ( ) YES ( ) NO

3 – PATIENT ORIENTATION:
3.1 – MEDICATIONS:
– INTERRUPTED (ER) the use of T4 (Puran, Tetroid, Synthroid, Eutirox) on ...../...../.....
– DIET POOR IN IODINE FOR 2 WEEKS (REFERRED TO NUTRITIONIST FOR ORIENTATION)

3.2 – ORIENTATION:
– BRING THE MEDICATIONS THAT YOU USUALLY TAKE
– FAST FOR 6 HOURS

4 – DATE FOR PROBABLE TREATMENT: ...../...../.....

5 – CONSULTATION BY DR.: .....

Figure 1 – Data Record

F1.	People have trouble hearing me because of my voice	0	1	2	3	4
O2.	I run out of air when I speak.	0	1	2	3	4
F3.	People have difficulty understanding me in noisy places.	0	1	2	3	4
O4.	My voice varies during the day.	0	1	2	3	4
F5.	My family has a hard time hearing me when I call for them from another room in the house.	0	1	2	3	4
F6.	Use the phone less than I would like	0	1	2	3	4
E7.	I get tense when talking to others about my voice	0	1	2	3	4
F8.	I tend to avoid groups of people because of my voice.	0	1	2	3	4
E9.	People seem irritated with my voice.	0	1	2	3	4
O10.	People ask: “What do you have in your voice?”	0	1	2	3	4
F11.	I speak less with friends, neighbors and relatives because of my voice.	0	1	2	3	4
F12.	People ask me to repeat what I say when we talk personally	0	1	2	3	4
O13.	My voice seems hoarse and dry.	0	1	2	3	4
O14.	I feel like I have to strain for my voice to come out	0	1	2	3	4
E15.	I think other people do not understand my voice problem.	0	1	2	3	4
F16.	My voice problem limits my professional and personal life	0	1	2	3	4
O17.	I cannot predict when my voice will come out clear	0	1	2	3	4
O18.	I try to change my voice so it comes out different	0	1	2	3	4
F19.	I feel excluded from conversations because of my voice	0	1	2	3	4
O20.	I try very hard to speak	0	1	2	3	4
O21.	My voice is worse at the end of the day.	0	1	2	3	4
F22.	My voice problem causes me financial loss	0	1	2	3	4
E23.	My voice problem bothers me	0	1	2	3	4
E24.	I am less enthusiastic due to my voice problem.	0	1	2	3	4
E25.	My voice makes me feel at a disadvantage.	0	1	2	3	4
O26.	My voice trails off in the middle of speech	0	1	2	3	4
E27.	I feel irritated when people ask me to translate what I said.	0	1	2	3	4
E28.	I feel uncomfortable when people ask me to repeat what I said.	0	1	2	3	4
E29.	My voice makes me feel incompetent.	0	1	2	3	4
E30.	I am ashamed of my voice problem.	0	1	2	3	4

Note: The letter preceding each number corresponds to the subscale of the protocol, as follows: E = emotional, F = functional and O = organic.

TOTAL: _____ **Points**
E = _____ **Points**
F = _____ **Points**
O = _____ **Points**

Desenvolvido por JACOBSON, JOHNSON, GRYWALSKI, SILBERGLEIT JACOBSON, BENNINGER & NEWMAN (1997) e validado por SANTOS, GASPARINI e BEHLAU (2007).

Instruções: “As afirmações abaixo são usadas por muitas pessoas para descrever suas vozes e o efeito de suas vozes na vida. Circule a resposta que indica o quanto você compartilha da mesma experiência”.

0 = Nunca
1 = Quase nunca
2 = Às vezes
3= Quase sempre
4= Sempre

Figure 2 – Protocol of Voice Handicap Index – VHI

"M.D. Anderson Dysphagia Questionnaire"

This questionnaire asks about your ability to swallow. This information will help us understand how you feel regarding your swallowing.
The questions that follow have been prepared by people who have trouble with swallowing. Some of the items may be relevant to you.
Please read each question and select the answer that best reflects your experience in the last week.

My swallowing ability limits my daily activities
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

E2. I am ashamed of my eating habits
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

F1. People have difficulty to cook for me
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

P2. It is harder to swallow at the end of the day
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

E7. I feel insecure when I eat
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

E4. I am sad because of my swallowing problem
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

P6. Swallowing takes a great effort
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

E5. I stopped going out to eat due to my swallowing problem
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

F5. My swallowing problem has caused me a loss of income
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

P7. I take more time to eat because of my swallowing problem
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

P3. People ask me, " Why can´t you eat this?"
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

E3. Other people get irritated because of my swallowing problem
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

P8. I cough when I try to drink fluids
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

F3. My swallowing problems interfere with my personal and social life.
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

F2. I feel the urge to go out to eat with my friends, neighbors and relatives
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

P5. I limit my diet because of my difficulty in swallowing
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

P1. I have lost weight due to my swallowing problem.
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

E6. I have low self-esteem due to my swallowing problem.
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

P4. I feel like I am able to swallow a lot of different foods
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

F4. I feel isolated because of my feeding habits.
( ) Completely agree ( ) Agree ( ) Uncertain ( ) Disagree ( ) Completely disagree

Figure 3 – M.D. Anderson Dysphagia Questionnaire (CHEN *et al*., 2001 and validated by GUEDES *et al*., 2010)

RESULTS

The study sample consisted of mostly female patients (87.5%) and the average age was 46 years, with the minimum and maximum ages 21 and 70 years, respectively.

In relation to clinical variables (Table 1), it was observed that 19% of patients also underwent neck dissection in addition to total thyroidectomy. The predominant histological type was classic papillary in single nodules. Nodules varied from 0.1 to 4.5 cm, obtaining a classification of T1N0M0 in 75% of patients, with ablation as the main treatment. The mean pre-^{131}I TSH was 102.1 µUI/dL. ^{131}I doses ranged between 110.80 and 393 mCi.

Vocal Handicap Index (VHI)

The summary measures for the domain scores of the VHI in the pre- and post-^{131}I (three months) are presented Table 2. The mean scores in the pre-^{131}I in all domains are greater than the mean scores in post-^{131}I, even when not presenting differences above 8 points in the domains or 18 in the total score, which would indicate significant differences in relation to voice handicap[15].

Table 1 – Characterization of clinical variables for the surgery, disease, size, staging, treatment, level of thyroid stimulating hormone and iodine dose administered

Variable	Category	Frequencies or summary measures
Histological type	Follicular	2 (6%)
	Papillary + follicular variant	7 (22%)
	Papillary: classic	18 (56%)
	Papillary: mixed	5 (16%)
Surgery	TT	32 (100%)
	CT	6 (19%)
Nodule	Multifocal	10 (31%)
	Solitary	22 (69%)
Size (cm)	Mean – median	1.14 – 0.75
	Standard deviation	1.05
	Min – max	0.1 – 4.5
TNM	T1N0M0	24 (75%)
	T1N1M0	3 (9.4%)
	T2N0M0	1 (3.1%)
	T2N1M0	1 (3.1%)
	T3N1M0	2 (6.3%)
	T4N0M0	1 (3.1%)
Treatment	Ablation	29 (91%)
	Meta-locoregional	3 (9%)
Time interval: surgery to ^{131}I (days)	Mean – median	64 – 52
	Standard deviation	31.3
	Min – max	34 – 160
TSH pre- ^{131}I (µUI/dL)	Mean – median	51.90 – 136
	Standard deviation	67.6
	Min – max	30 – 338.71
	Mean – median	102.1 – 136

* Measures of central tendency such as mean, median and variability, such as standard deviation, were used to summarize the scores of instruments and VHI and MDADI, in addition to some demographic and clinical variables.

Table 2 – Measures of central tendency and variability related to different domains and final score of the functional, physical and emotional aspects of quality of life questionnaire in voice pre-and post-three months of iodine administration (n = 32)

Domain	Moment	Mean	Standard deviation	Minimum	Median	Maximum
E	Pre-	6.91	7.66	0	5.5	30
	Post-	2.53	4.88	0	0	18
F	Pre-	7.13	6.09	0	6.5	21
	Post-	4.19	4.46	0	2.5	16
O	Pre-	12.97	9.56	0	11	36
	Post-	8.22	7.70	0	5	26
Total	Pre-	27.00	20.87	0	23.5	82
	Post-	14.94	15.30	0	9.5	55

Emotional (E), Physical (P), Functional (F)
Nonparametric Wilcoxon test
Significance level was 5% and the data analysis was performed with the aid of the R statistical software (http://www.r-project.org).

Also in Table 3 the statistically significant differences can be noted in relation to summary measures for the differences between the questionnaire scores of the quality of life in voice at pre- and post- three months of radioiodine therapy in both domains.

It is also possible to evaluate the impact of changes in voice over time (Table 4). Of the 23 patients with mild pre-^{131}I impact, only 1 developed a moderate impact at post-^{131}I, with 22 patients still maintaining mild impact. Of the 7 patients with moderate impact at pre-^{131}I, 5 had mild impact at post-^{131}I and 2 patients remained with moderate impact. The 2 patients at pre-^{131}I classified with severe impact presented moderate voice impact at post-^{131}I.

Table 3 – Summary Measures for the differences between the questionnaire scores of the quality of life in voice pre- and post-three months of iodine administration

Area	Mean	Standard deviation	Minimum	Median	Maximum	*p*
E	4.38	5.91	-6	4	22	0.0004
F	2.94	6.15	-10	2	17	0.01
O	4.75	6.38	-6	7	16	0.0008
Total	12.06	15.69	-19	14.5	41	0.0006

Emotional (E), Physical (P), Functional (F)
Nonparametric Wilcoxon test
Significance level was 5% and the data analysis was performed with the aid of the R statistical software (http://www.r-project.org).

Table 4 – Frequency distribution according to the impact of voice in the quality questionnaire at pre- and post-3 months to iodine administration (n = 32)

Pre- impact	Post- impact			Total
	Mild	Moderate	Serious	
Mild	22	1	0	23
Moderate	5	2	0	7
Serious	0	2	0	2
Total	27	5	0	32

The McNemar test was used for the verification of limitations over time.

Evaluation of quality of life related to swallowing by the MDADI questionnaire

The summary measures for the MDADI domain scores in pre- and post-^{131}I periods are shown in Table 5. The mean scores at post-^{131}I in all domains show greater scores than the mean scores at pre-^{131}I.

Table 6 presents the comparison of the MDADI at pre- and post- (3 months after administration) ^{131}I. Highlighted is the personal domain (P), presenting $p = 0.006$, and the emotional domain (E), presenting $p = 0.02$, as well as the total value of the questionnaire with $p = 0.002$; these being statistical significant values in the quality of life related to swallowing.

It is also possible to evaluate the change in the quality of limitation related to swallowing over time (Table 7). For 25 of the 26 patients with minimal limitation at pre-^{131}I, there was no change in the limitation of quality of life at post-^{131}I. For the 4 patients with mid-level limitation at pre-^{131}I, all presented minimal limitation at post-^{131}I. Of the 2 patients with moderate limitation at pre-^{131}I, 1 presented a change to minimum limitation while the other patient presented mid-level limitation at post-^{131}I.

Table 5 – Measures of central tendency and variability related to the scores of different domains and the final score of the functional, physical and emotional aspects of quality of life questionnaire in swallowing pre-and post-three months of iodine administration (n = 32)

Area	Moment	Mean	Standard deviation	Minimum	Median	Maximum
E	Pre-	92.5	11.2	50	100	100
	Post-	96.7	9.1	56	100	100
F	Pre-	90.6	13.4	48	98	100
	Post-	96.8	9.3	60	100	100
P	Pre-	80.7	12.5	40	82.25	96
	Post-	84.6	12.3	45	90	97
Total	Pre-	87.7	11.1	51	90.5	98
	Post-	92.3	9.8	53	96	99

Emotional (E), Physical (P), Functional (F)
Nonparametric Wilcoxon test
Significance level was 5% and the data analysis was performed with the aid of the R statistical software (http://www.r-project.org).

Table 6 – Summary Measures for the differences between the questionnaire scores of the quality of life in swallowing pre- and post-three months of iodine administration

Area	Mean	Standard deviation	Minimum	Median	Maximum	P
E	4.19	13.77	-44	0	50	0.02
F	6.15	14.53	-40	0	52	0.014
P	3.91	12.07	-45	3	25	0.006
Total	4.53	12.20	-43	4	40	0.002

Emotional (E), Physical (P), Functional (F)
Nonparametric Wilcoxon test
Significance level was 5% and the data analysis was performed with the aid of the R statistical software (http://www.r-project.org)

Table 7 – Frequency distribution according to the limitation of quality of life related to swallowing in the quality of life questionnaire at pre- and post-3 months to iodine administration (n = 32)

	Post- limitation			
Pre- limitation	Minimum	Mean	Moderate	Total
Minimum	25	0	1	26
Mean	4	0	0	4
Moderate	1	1	0	2
Total	30	1	1	32

The McNemar test was used for the verification of limitations over time.

DISCUSSION

Thyroid disease is highly prevalent in the general population, with predominance in females, with thyroidectomy used for the treatment of malignant and benign nodules[19].

Vocal changes are a problem commonly found after thyroid surgery: 25-90% of patients report changes in the first weeks after surgery and 11-15% report persistent voice symptoms between 3 and 6 months after surgery[6].

With the aim to analyze the quality of life related to voice and swallowing in patients undergoing treatment with radioiodine therapy, 32 patients participated in the study, having a mean age of 46 years, with most of the female gender. The epidemiological results of this study are consistent with those found in the literature[1,19,20].

Regarding clinical data (Table 1), the histological classification of higher incidence was classic papillary carcinoma showing a solitary nodule, in agreement with the studies cited, referring to this as the main type in patients who underwent thyroidectomy[20,21].

Of the patients studied, elective neck dissection in addition to total thyroidectomy was performed this being controversial and generally not indicated, but the care and the reliability of the evaluation are essential for determining the best treatment[22-24]. it is necessary to mention that none of them had a diagnosis of paresis or laryngeal paralysis and did not undergo SLP therapy as well as both pre- and post-treatment with radioiodine.

It was observed that many reported good voice quality before surgery and worsening after, but with the disappearance of many symptoms in a few weeks or with the persistence of the complaint for a few months.

The study on the quality of life is of the utmost importance so that we can have parameters of the perception of social, physical and emotional contexts of the individual, an important factor for survival, especially in the long term.

A large setback to studies on the quality of life related to the thyroid has been the limitation of the small sample used, which can elucidate inconsistent data[24]. In this study, the number of subjects presented is reduced, mainly due to the difficulty in continuity and completion of all phases of the study.

Treatment options (thyroidectomy followed by ablation of remnants with ^{131}I), are accompanied with various types of complications during time, as a change of voice after surgery and xerostomia after high doses of ^{131}I [24].

Aspects of voice-related quality of life were verified through the application of the questionnaire on the perception of the Voice Handicap Index (VHI) to assess the degree of vocal handicap at pre- and

after 3 months of treatment with ^{131}I. Improvement in quality of life associated with aspects of voice in emotional (E), physical (F), functional (O) could be seen when comparing pre- and 3 months after treatment periods, with means of 4.38 for the emotional domain, 2.94 for the functional and 4.75 physical, with a total mean of 12.06 presenting significant statistical difference between the two periods analyzed (p <0.05).

In a study in which the periods pre-thyroidectomy, post-thyroidectomy (7-15 days) and 3 months post-surgery were compared, it was shown that to have an impact on the moments under study, a difference of 18 points was needed from the total score, thus inferring an impact on the VHI[25].

As can be discerned, the means found in the study did not achieve margin equal to the studies described, but a trend towards improvement of quality of life can be observed, as we note a difference between the means of the domains: for example, the mean values of emotional, functional and physical domains at pre-^{131}I treatment were 6.91, 7.13 and 12.97, respectively, presenting a total mean of 27.00; post-treatment (after 3 months) presented means of 2.53, 4.19 and 8.22 with a total mean of 14.94, respectively, for the same domains previously described.

Considering that the population of our sample was 32 subjects, it can be assumed that if it were larger, a mean of points may have been observed within the expected difference of 18 points in the total score or 8 points between domains[15].

It can be suggested that the improvement in quality of life was due to a balanced hormonal system after 3 months of treatment with ^{131}I; however, for a better conclusion from these data, it is necessary to compare the control group with the surgical procedure, among other demographic variables[9].

The influence of hormones on voice, particularly estrogen and progesterone, can interfere with the voice quality of patients[11].

At pre-^{131}I treatment, 23 patients had slight impact, 7 moderate impact and 2 patients intense impact; post-^{131}I treatment after 3 months showed 27 patients with slight impact and 5 with moderate impact.

In a study on the analysis of voice quality and swallowing function in patients undergoing total thyroidectomy without laryngeal nerve damage, no statistical significance was observed in the acoustic and perceptual vocal aspects; however, the data from questionnaires applied pre- and postoperative showed significant results at both time points[26].

No studies were found that used this questionnaire in patients who underwent treatment with ^{131}I, only studies with patients treated by surgical treatment.

The questionnaire brought relevant aspects of improving the quality of life in relation to the function of vocal quality.

In the treatment of patients undergoing thyroidectomy, the function of swallowing needs to be investigated with a questionnaire that measures quality of life related to swallowing, such as the M.D. Anderson Dysphagia Questionnaire, at distinct time periods (pre- and post (3 month) ^{131}I treatment periods). Significant statistical differences were observed in the emotional domain (E) and functional (P); It was also found that of the 32 patients at pre-^{131}I, 26 patients showed minimal limitation, 4 with mid-level limitation and 2 patients with moderate limitation; after 3 months, 30 patients showed minimal limitation, 1 mid-level limitation and 1 patient with moderate limitation (Table 7).

A study of the application of the M.D. Anderson Dysphagia Questionnaire to 120 patients demonstrated a good quality of life in relation to swallowing at the three moments of assessment, but lower scores were observed in the recent postoperative period, with progressive improvement over time, and the domain identified as the worst was physical[27].

The vast majority of patients did not report any change in the physical, emotional and personal aspects of the function of eating, but discreet improvement after 3 months can be noted in the physical and personal domains, as well as in regards to its limitation, described above, inferring better quality of life for some patients.

Observed in that study were upper airway symptoms that appeared more clearly in swallowing complaints in the early postoperative period and at the same time, a sequential approach to improvement, demonstrating progressive improvement in the long term, the main symptoms highlighted were: tightness (puckering) of the scar, pharyngeal globe sensation, feeling of tightness, and dry throat and cough[27].

Most general questionnaires to assess quality of life are not sensitive to certain physical and emotional aspects, such as swallowing disorders, suggesting a need for more specific tools[28].

Referred to in some studies, the greater impact on the quality of life in patients with thyroid nodules, during induction for the state of hypothyroidism, is the influence of psychological and physical well-being issues, with low vitality and decreased capacity of their daily activities[29].

We believe that future studies with larger samples and with the use of objective exams for morphofunctional laryngeal assessment are highly important to get a more accurate assessment and evidencing

more concrete data; also the assessment of quality of life over the long term is of great importance for better understanding of the possible signs and symptoms and their maintenance over time.

CONCLUSIONS

Changes can be seen in the quality of life in voice and swallowing following treatment with radioiodine therapy in a short period of 3 months when compared with the pre-iodine period.

Studies with larger samples, with control group, demographic variables and application of the possible assessment instruments (nasal endoscopy and videofluoroscopy) are needed to obtain more objective and relevant data.

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RESUMO

Objetivo: analisar a qualidade de vida relacionada à voz e à deglutição antes e após radioiodoterapia a curto prazo. **Métodos:** indivíduos tireoidectomizados indicados à radioiodoterapia foram submetidos a dois questionários de qualidade de vida,-relacionados à voz e à deglutição no pré e três meses após radioiodoterapia. **Resultados:** foram estudados 32 pacientes, 84% do gênero feminino e 16%, do masculino, com média de idade de 46 anos. O tipo histológico mais encontrado foi o carcinoma papilífero clássico (56%). Os resultados indicaram tendência para melhor qualidade de vida associada à voz após três meses de radioiodoterapia. O protocolo de qualidade de vida relacionado à deglutição também indicou melhor qualidade de vida no segundo momento de avaliação. Observou-se maior predomínio com limitação mínima quanto ao questionário de qualidade de vida em deglutição. **Conclusão:** a qualidade de vida e dos sintomas vocais e de deglutição a curto prazo após radioiodoterapia é melhor em relação ao pré-tratamento. É necessário investigar outros aspectos como metabólicos, cirúrgicos e individuais para definir o real impacto da iodoterapia na qualidade de vida.

DESCRITORES: Deglutição; Neoplasias da Glândula Tireoide; Iodo; Qualidade de Vida

REFERENCES

1. Kulcsar MAV, Friguglietti CUM, Cividanes R, Brandão LG. Análise retrospectiva das tireoidectomias realizadas por residentes de cirurgia geral em hospital universitário. Rev Bras Cir Cabeça Pescoço. 2008;37:67-70.

2. Barbaro D, Boni G, Meucci G, Simi U, Lapi P, Orsini P et al. Radioiodine treatment with 30 mCi after recombinant human thyrotropin stimulation in thyroid cancer: effectiveness for postsurgical remnants ablation and possible role of iodine content in L-thyroxine in the outcome of ablation. J Clin Endocrinol Metab. 2003;88:4110-5.

3. Gonçalves Filho J, Kowalski LP. Complicações pós-operatórias em tireoidectomias com ou sem dreno. Rev Col Bras Cir. 2006;33:350-3.

4. Casal D, Peças A, Sousa D, Rosa-Santos J. A non-recurrent inferior laryngeal nerve in a man undergoing thyroidectomy: a case report. J Med Case Rep. 2010;4:386.

5. Almeida J, Vartanian JG, Kowalski LP. Clinical predictors of quality of life in patients with initial differentiated thyroid cancers. Arch Otolaryngol Head Neck Surg 2009;135:342-6.

6. Henry LR, Helou LB, Solomon NP, et al. Functional voice outcomes after thyroidectomy: an assessment of the Dsyphonia Severity Index (DSI) after thyroidectomy. Surgery. 2010;147:861-70.

7. Jentzen W, Hobbs RF, Stahl A, Knust J, Sgouros G, Bockisch A. Pre-therapeutic (124)I PET(/CT) dosimetry confirms low average absorbed doses per administered (131)I activity to the salivary glands in radioiodine therapy of differentiated thyroid cancer. Eur J Nucl Med Mol Imaging. 2010;37:884-95.

8. Mandel SJ, Mandel L. Radioactive iodine and the salivary glands. Thyroid 2003; 13:265-71.

9. Behlau M, Rehder MI, Valente O. Disfonias endócrinas. In: Behlau M, organizadora. Voz: o livro do especialista. Vol. II. São Paulo: Revinter; 2005. P.51-78.

10. Isolan-Cury RW, Silva MAA, Monte O, Isolan-Cury NA. Caracterização vocal de pacientes com hipertireoidismo e hipotireoidismo. Rev Soc Bras Fonoaudiol. 2007;12:135-40.

11. Netto IP. Laringe, voz e deglutição pré e pós-tireoidectomia. [Dissertação]. São Paulo (SP): Fundação Antonio Prudente; 2005.

12. Carrara-de Angelis E. Disartrofonias: avaliação dos componentes funcionais do mecanismo de produção fonoarticulatória. In: Barros APB, Dedivitis RA, editores. Métodos de avaliação e diagnóstico de laringe e voz. São Paulo: Lovise; 2002. P.223-39.

13. Nguyen NP, Frank C, Moltz CC, et al. Impact of dysphagia on quality of life after treatment of head-and-neck cancer. Int J Radiat Oncol Biol Phys. 2005;61:772-8.

14. Pereira JA, Girvent M, Sancho JJ, Parada C, Sitges-Serra A. Prevalence of long term upper aerodigestive symptoms after umcomplicated bilateral thyroidectomy. Surgery. 2003;133:318-22.

15. Sugueno, LA. Voz e deglutição de pacientes com e sem mobilidade laríngea após tireoidectomia [tese]. São Paulo: Faculdade de Medicina; 2008.

16. Taïeb D, Baumstarck-Barrau K, Sebag F, Fortanier C, De Micco C, Loundou A et al. Heath-related quality of life in thyroid cancer patients following radioiodine ablation. Health Quality Life Outcomes 2011;9:3.

17. Jacobson BH, Johnson A, Grywalski A, Silbergeit A, Jacobson G, Benninger MS et al. The voice handicap index (IDV): development and validation. Am J Speech Lang Pathol. 1997;6:66-70.

18. Guedes RLV. Validação e aplicação do questionário de disfagia M.D. Anderson (MDADI) em pacientes tratados de câncer de cabeça e pescoço. [Dissertação]. São Paulo (SP): Fundação Antônio Prudente; 2010.

19. Pedro Netto I, Fae A, Vartanian JG, Barros AP, Correia LM, Toledo RN et al. Voice and vocal self-assessment after thyroidectomy. Head Neck. 2006;28:1106-14.

20. Nemetz MA, Thomazelli FC, Granero LC, Nemetz AB, Santos MB. [Does chronic lymphocytic thyroiditis influence the staging of differentiated thyroid carcinoma?]. Braz J Otorhinolaryngol. 2011;77:77-83.

21. Sawka AM, Straus S, Brierley JD, Tsang RW, Rotstein L, Rodin G, et al. Decision aid on radioactive iodine treatment for early stage papillary thyroid cancer--a randomized controlled trial. Trials. 2010;11:81.

22. Al-Saif O, Farrar WB, Bloomston M, Porter K, Ringel MD, Kloos RT. Long-term efficacy of lymph node reoperation for persistent papillary thyroid cancer. J Clin Endocrinol Metab. 2010;95:2187-94.

23. Roh JL, Park JY, Park CI. Total thyroidectomy plus neck dissection in differentiated papillary thyroid carcinoma patients: pattern of nodal metastasis, morbidity, recurrence, and postoperative levels of serum parathyroid hormone. Ann Surg. 2007;245:604-10.

24. Lee JI, Kim SH, Tan AH, Kim HK, Jang HW, Hur KY et al. Decreased health-related quality of life in disease-free survivors of differentiated thyroid cancer in Korea. Health Qual Life Outcomes. 2010;15;8:101.

25. Netto IP. Avaliação da laringe, voz e deglutição pós-tireoidectomia relacionado ao uso do neuromonitor intra-operatório. [Tese]. São Paulo (SP): Fundação Antonio Prudente; 2010.

26. Lombardi CP, Raffaelli M, D'Alatri L, Marchese MR, Rigante M, Paludetti G et al. Voice and swallowing changes after thyroidectomy in patients without inferior laryngeal nerve injuries. Surg. 2006;14:1026-32.

27. Montoni NPC. Avaliação eletromiográfica de superfície e nasofibroscópica da deglutição em pacientes submetidos à tireoidectomia e seu impacto na qualidade de vida. [tese]. São Paulo (SP): Fundação Antonio Prudente; 2012.

28. Clark AR, Lee S, Osborne J, Zullo T, Murry T. Development and validation of the voice handcap index-10. Laryngoscope. 2004;14:102-10.

29. Borget I, Corone C, Nocaudie M, Allyn M, Iacobelli S, Schlumberger M, De Pouvourville G. Sick leave for follow-up control in thyroid cancer patients: comparison between stimulation with thyrogen and thyroid hormone withdrawal. Eur J Endocrinol. 2007;156:531-8.

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Mailing address:
José Ribamar do Nascimento Junior
Rua Correia de Lemos, 645 apto 64
São Paulo – SP – Brasil
CEP: 04140-000
E-mail: joseribamarfono@gmail.com