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Case report

## Post-thyroidectomy laryngeal recurrent nerve rehabilitation

### Recurrent laryngeal nerve rehabilitation after thyroidectomy

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## SUMMARY

Papillary thyroid carcinoma is the most common type of thyroid cancer, and the treatment of choice is thyroidectomy. Associated complications include vocal cord paralysis, which occurs due to direct injury to the recurrent laryngeal nerve during surgery. We present a 22-year-old patient with this diagnosis, who underwent total thyroidectomy; in the immediate postoperative period the patient began with severe laryngeal stridor requiring emergency tracheostomy. Physical examination revealed bilateral vocal cord paralysis and it was decided to start rehabilitation treatment of the recurrent laryngeal nerve with laser therapy and HIVAMAT-200

as combined modalities. The results achieved with physiotherapy were satisfactory and the patient was quickly reintegrated into her family, school and social environment.

**DeCS:** recurrent laryngeal nerve trauma; papillary thyroid cancer; vocal fold paralysis; thyroidectomy; tracheostomy.

## **ABSTRACT**

Papillary thyroid carcinoma is the most common type of cancer of this gland, and its treatment of choice is thyroidectomy. Vocal cord paralysis stands out among the associated complications, in which a direct injury to the recurrent laryngeal nerve occurs during surgery. We present a 22-year-old female patient with this diagnosis, who underwent a total thyroidectomy; in the immediate postoperative period the patient began with intense laryngeal stridor requiring an emergency tracheotomy. Physical examination revealed bilateral vocal cord paralysis and it was decided to begin rehabilitation treatment of the recurrent laryngeal nerve with laser therapy and HIVAMAT-200 as combined modalities. The results achieved with physiotherapy were satisfactory and the patient was quickly reintegrated into her family, school and social environment.

**MeSH:** recurrent laryngeal nerve injuries; thyroid cancer, papillary vocal cord paralysis; thyroidectomy; tracheotomy.

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Recurrent paralysis is a condition caused by a reduction or suppression of the motor action of the laryngeal muscles as a result of the pathway of the vagus nerve that supplies these muscles.

There are several types of recurrent paralysis, ranging from simple unilateral paralysis to bilateral involvement associated with paralysis of other neighbouring nerves. This means a wide range of clinical repercussions and therefore great variability in terms of therapeutic action. For this reason, it is



makes it necessary to proceed to a classification in order to compartmentalise the different clinical pictures that can be found in motor deficits of the larynx, such as the following:

- 1- Unilateral recurrent palsy: if one vocal cord is affected.
- 2- Bilateral recurrent paralysis: if both vocal folds are affected.
- 3- Associated paralysis: when, in addition to paralysis of one or both vocal cords, there are neurological deficits in other organs such as the pharynx, shoulder, tongue, among others.<sup>(1)</sup>

Bilateral vocal cord paralysis represents a rare but potentially lethal condition that often requires emergency surgical intervention. The most common symptom is dyspnoea of varying degrees of intensity and may even lead to death in patients with reduced pulmonary reserve. It may appear as an abrupt onset of dyspnoea (in the immediate postoperative period following postthyroidectomy), but most commonly presents as dyspnoea on small or moderate exertion, accompanied by hoarse and breathy voice, dysphonia, aphonia, inability to speak loudly, coughing when eating or drinking, and noisy breathing. The bibliography consulted states that one of the most effective treatments for this condition is physiotherapy; within this, there are several modalities such as: magnetotherapy, electrotherapy, phototherapy, lasertherapy and HIVAMAT-200, among others.<sup>(2,3)</sup>

### **Patient presentation**

We present a 22-year-old female patient diagnosed with papillary thyroid carcinoma; she underwent total thyroidectomy and in the immediate postoperative period began with intense laryngeal stridor requiring emergency tracheotomy. She was referred to the Otolaryngology department and the physical examination revealed bilateral vocal cord paralysis (Figure 1), so tracheostomy was maintained to permeabilise the airway.



**Figure 1.** Bilateral vocal cord paralysis at the start of treatment.

After one month of surgical treatment, the paralysis was still present and it was decided to start rehabilitation of the recurrent laryngeal nerve at the Department of Physical Medicine and Rehabilitation of the University Clinical-Surgical Hospital "Arnaldo Milián Castro", the removal of the entire tumour in surgery and the suspicion of a compressive process of the nerve were taken into account as background. Rehabilitation treatment was started with laser therapy at 6 j/cm<sup>2</sup> punctually in both lateral regions of the neck, for 15 sessions. After this period, the patient was evaluated and a left unilateral paralysis was observed, so it was decided to decannulate and continue treatment with laser therapy. In addition to adding the HIVAMAT-200 (vibrator) at a frequency of 50 Hz, intermediate mode, intensity 80%, a small manual applicator was used for 15 more sessions for 10 minutes. After one month, the patient was evaluated and the recovery of the mobility of both vocal cords was confirmed (Figure 2).



**Figure 2.** Vocal cords with normal mobility after treatment

## Comment

Thyroid cancer most commonly affects women aged 25-65 years. The incidence of this malignancy has increased over the last decade and the cell type is an important determinant of prognosis, as papillary thyroid carcinoma is the most common cancer of this gland, which can be diagnosed in childhood, but is almost always seen in adults.<sup>(4)</sup> The affected patient was only 22 years old at the time of diagnosis.

Most patients are treated with removal of the thyroid gland (thyroidectomy). Complications associated with this surgery include vocal cord paralysis, with increased morbidity and mortality.<sup>(5)</sup>

Solarana Ortiz<sup>(6)</sup> models a typology of 27 clinico-surgical complications related to thyroid surgery and considers bilateral vocal cord paralysis as one of the most frequent.

Bilateral vocal fold paralysis is characterised by immobility of the vocal folds in adduction or full abduction or in the paramedian position. Most adduction palsies are due to direct injury to the recurrent laryngeal nerve during thyroid surgery. The most important sequela is airway obstruction as a result of reduced glottic area and manifests with varying degrees of stridor and dyspnoea, for which various treatments have been proposed.<sup>(7)</sup>

Authors Martínez Oropeza, González Ojeda, Govea Camacho, Macías Amezcua and Fuentes Orozco,<sup>(8)</sup> in a study carried out in the Otorhinolaryngology service of the Hospital de Especialidades, Centro Médico Nacional de Occidente in Mexico, with patients diagnosed with bilateral vocal cord paralysis, used laser cordectomy; this study showed that the average gain of the glottic span was 40 %, reduced dyspnoea and allowed the decannulation of patients who had required tracheotomy.

The safety and efficacy of the laser in this type of treatment has also been confirmed in various research studies. The overall benefits of the laser are related to its photochemical effect, as the photons emitted during the laser's

The application stimulates specific receptors and promotes a series of responses that include deflation and acceleration of the healing process, accompanied by reduction of pain, laryngeal tension, as well as the perception of tightness of voice during phonation.<sup>(9,10)</sup>

In the case presented, its novelty consisted in the combined use of laser and HIVAMAT-200 vibrations as therapeutic procedures, which acted as coadjuvants in the recovery of the laryngeal tissues, with an increased possibility of re-establishing the airway and the rapid reintegration of the patient into her family, school and social environment.

## BIBLIOGRAPHICAL REFERENCES

1. González Herranz R, Torrico Román P. Postoperative laryngeal paralysis in thyroid and parathyroid surgery. Rev ORL [internet]. 2022 [cited 23 May 2022];11(2):[approx. 8 p.]. Available from: <https://scielo.isciii.es/pdf/orl/v11n2/2444-7986-orl-11-02-195.pdf>.
2. Márquez Alfonso A, Domínguez Morales A, Hernández Lorenzo M, Águila Moya O, Pérez Contreras, Montes de Oca Bruno A. Recurrent paralysis in patients seen at the Phoniatics Clinic. Acta Med Centro [Internet]. 2020 [cited May 10, 2022];14(2):[approx. 5 p.]. Available from: <https://www.medigraphic.com/pdfs/medicadelcentro/mec-2020/mec202d.pdf>
3. Calvache Mora CA, Ríos Ramírez MA. Early vocal rehabilitation of unilateral chordal paralysis: applying sensorimotor learning principles. Rev Areté [internet]. 2019 [cited 21 Jun. 2022];18(2 Sup):[approx. 6 p.]. Available from: <https://arete.iberro.edu.co/article/view/art.182S03>
4. Prieto Matos P, Martín Hernández D, Martín Alonso M, Bajo Delgado AF, Riesco Riesco S, Prieto Matos C. Thyroid cancer in paediatrics. Rev ORL [internet]. 2021 [cited 21 Jun. 2022];12(4):[approx. 2 p.]. Available en: [https://scielo.isciii.es/scielo.php?script=sci\\_arttext&pid=S2444-79862021000400003](https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S2444-79862021000400003)



5. Arias Ortiz NE, Guzmán Gallego EA. Clinical characteristics of thyroid cancer in Manizales, Colombia, 2008-2015. Rev Peru Med Exp Salud Publica [Internet]. 2020 [cited 20 May 2022];37(2):[approx. 5 p.]. Available from: [http://www.scielo.org.pe/scielo.php?pid=S1726-46342020000200287&script=sci\\_arttext](http://www.scielo.org.pe/scielo.php?pid=S1726-46342020000200287&script=sci_arttext)
6. Solarana Ortiz JA. Complications of thyroid surgery [Internet]. Havana: Editorial Ciencias Médicas; 2021. Available at: <http://www.bvscuba.sld.cu/libro/complicaciones-de-la-cirugia-tiroidea/>
7. Morales Angulo C, Corriols Noval P. Isolated vocal cord paralysis as the onset of skull base tumour disease. An Orl Mex [internet]. 2019 [cited 12 Jun 2022];36(1):[approx. 4 p.]. Available from: <https://www.medigraphic.com/pdfs/anaotomex/aom-2019/aom191e.pdf>
8. Martínez Oropeza LC, González Ojeda A, Govea Camacho LH, Macias Amezcua MD, Fuentes Orozco C. Management of bilateral vocal cord paralysis by laser cordectomy. Rev Med Inst Mex Seg [Internet]. 2014 [cited 21 Jun. 2022];52(2):[approx. 10 p.]. Available from: <https://www.stanfordchildrens.org/es/service/ear-nose-throat/conditions/vocal-cord-paralysis>
9. Fuentes Aracena C. Role of physical agents in vocal rehabilitation: a review of the literature. Rev Investig Logop [internet]. 2020 [cited 5 Jun. 2022];10(2):[approx. 6 p.]. Available from: <https://dialnet.unirioja.es/descarga/articulo/7969390.pdf>
10. Maldonado Hernández IG, Rodríguez Alaniz JS, Villegas Quintero P, NacudBezies YA, Gómez Arenas SR. Voice recovery after recurrent laryngeal nerve reconstruction. Case report and review of the literature. Rev Elect Port Med [internet]. 2020 [cited Mar. 30, 2022];15(15):[approx. 3 p.]. Available from: <https://www.revista-portalesmedicos.com/revista-medica/recuperacion-de-la-voz-after-reconstruction-of-the-laryngeal-nerve-recurrent-case-report-and-review-of-the-literature/>



### **Conflict of interest**

The authors declare that they have no conflicts of interest.

