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Tapia Syndrome Following Total Thyroidectomy: Challenges in Diagnosis and Management

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Abstract

Tapia syndrome is a rare neurological condition characterized by concomitant unilateral paralysis of the hypoglossal (XII) and recurrent laryngeal (X) nerves. Patients typically present dysphonia, dysphagia, and tongue deviation toward the affected side. It is most often iatrogenic, resulting from orotracheal intubation or intraoperative cervical positioning. This case report aims to describe a rare case of Tapia syndrome following total thyroidectomy and to highlight the associated diagnostic, therapeutic, and preventive considerations.

A 31-year-old woman with Graves' disease refractory to medical therapy underwent total thyroidectomy with intraoperative neuromonitoring. On the first postoperative day, she developed dysphagia accompanied by moderate dysphonia. Fibroscopic evaluation revealed bilateral recurrent laryngeal nerve involvement, with right paramedian vocal fold paralysis and left vocal fold paresis. Neurological examination demonstrated left-sided paresis of the glossopharyngeal (IX) and hypoglossal (XII) nerves. Imaging studies excluded a central etiology. The patient was treated with corticosteroid therapy, vitamin B complex supplementation, and early speech therapy. Complete neurological and functional recovery was achieved within two months.

This case highlights the rarity of Tapia syndrome following total thyroidectomy, even in an atypical presentation such as ours. Early and targeted speech therapy may have contributed to faster functional recovery, emphasizing the value of a multidisciplinary approach. Increased awareness of this complication is essential to optimize both prevention and patient outcomes.

Categories: Otolaryngology
Keywords: cervical hyperextension, hypoglossal nerve palsy, recurrent laryngeal nerve palsy, tapia syndrome, total thyroidectomy, vocal fold paralysis

Introduction

Tapia syndrome is a rare neurological condition characterized by concurrent paralysis of the hypoglossal nerve (cranial nerve XII) and the recurrent laryngeal branch of the vagus nerve (cranial nerve X) [1]. Fewer than 100 cases have been reported in the literature to date. Clinically, patients typically present dysphonia, dysphagia, and ipsilateral deviation of the tongue towards the affected side [2].

This condition is most commonly iatrogenic and is predominantly described following airway manipulation [1,2]. It may occur after a wide range of surgical procedures under general anesthesia, irrespective of the surgical site [2]. The underlying mechanism is thought to involve stretching or compression of the affected cranial nerves within the cervical region, most often during orotracheal intubation or after prolonged or inappropriate surgical head positioning [1,3]. Although central causes occur, they remain relatively uncommon [1]. We report a case of Tapia syndrome occurring after total thyroidectomy.

This article was previously presented as a poster at the B-ORL Spring Meeting 2026, on March 14, 2026.

Case Presentation

A 31-year-old woman with no significant past medical history was referred to the Department of Otorhinolaryngology and Head and Neck Surgery, Saint-Pierre University Hospital, Brussels, Belgium, by her endocrinologist for head and neck surgical evaluation for refractory Graves' disease management. Clinical examination revealed a diffuse, soft, and homogeneous goitre without compressive signs. Laboratory findings demonstrated biochemical hyperthyroidism and positive thyroid-stimulating hormone (TSH) receptor antibodies (TRAb) (Table *1*). Cervical ultrasound showed moderate thyroid enlargement, with a volume of 16 mL for the right lobe and 14 mL for the left lobe. The thyroid parenchyma appeared heterogeneous and hypervascularized, which is consistent with active Graves' disease. Total thyroidectomy was indicated following methimazole intolerance due to cytolysis and neutropenia, with subsequent inadequate disease control on propylthiouracil. The procedure was performed under intermittent

intraoperative recurrent laryngeal nerve neuromonitoring. During patient positioning, after endotracheal intubation, the head support device failed (Maquet Horseshoe Head Rest, 1002.71A0 (MAQUET GmbH, Germany)), resulting in unintended cervical hyperextension for a fraction of a second. As the head was still being held by the surgical team, the position was corrected immediately. The patient's head was repositioned with limited cervical extension. No additional difficulties with airway management were encountered. The remainder of the procedure was completed without further complications or loss of neuromonitoring signal. No apparent stretching or direct mechanical injury of the recurrent laryngeal nerves was observed. At the end of the procedure, bilateral recurrent laryngeal nerve stimulation was repeated, confirming preserved responses on both sides.

Laboratory parameter	Patient value	Reference range	Unit
TSH	< 0.01	0.27-4.2	mU/L
fT3	17.5	3.10-6.8	pmol/L
fT4	27.5	11.9-21.6	pmol/L
TRAb	2.68	< 0.55	U/L

TABLE 1: Laboratory findings at the time of presentation

TSH: Thyroid-stimulating hormone; fT3: Free triiodothyronine; fT4: Free thyroxine; TRAb: TSH receptor antibodies

On the first postoperative day, the patient developed moderate dysphonia (scored G3R0B2A3S0I1 using the GRBASI scale by the speech-language pathologist [4]) and dysphagia, predominantly affecting liquids, without signs of respiratory distress. Flexible laryngoscopy examination revealed salivary stasis in both piriform sinuses, with no evidence of intubation-related trauma (Figure *1*). Vocal fold examination demonstrated bilateral recurrent laryngeal nerve involvement, with right paramedian vocal fold paralysis and left vocal fold paresis. A video recording of the flexible laryngoscopy examination is provided in Appendix 1. Neurological examination revealed additional left-sided hypoglossal (XII) nerve paresis, manifested by tongue deviation to the left upon protrusion, as well as left-sided glossopharyngeal (IX) nerve involvement, manifested by ipsilateral soft palate hemiparesis and a diminished gag reflex. This clinical presentation differs from expected total thyroidectomy postoperative complications, such as isolated recurrent nerve paralysis or hypocalcemia [5].

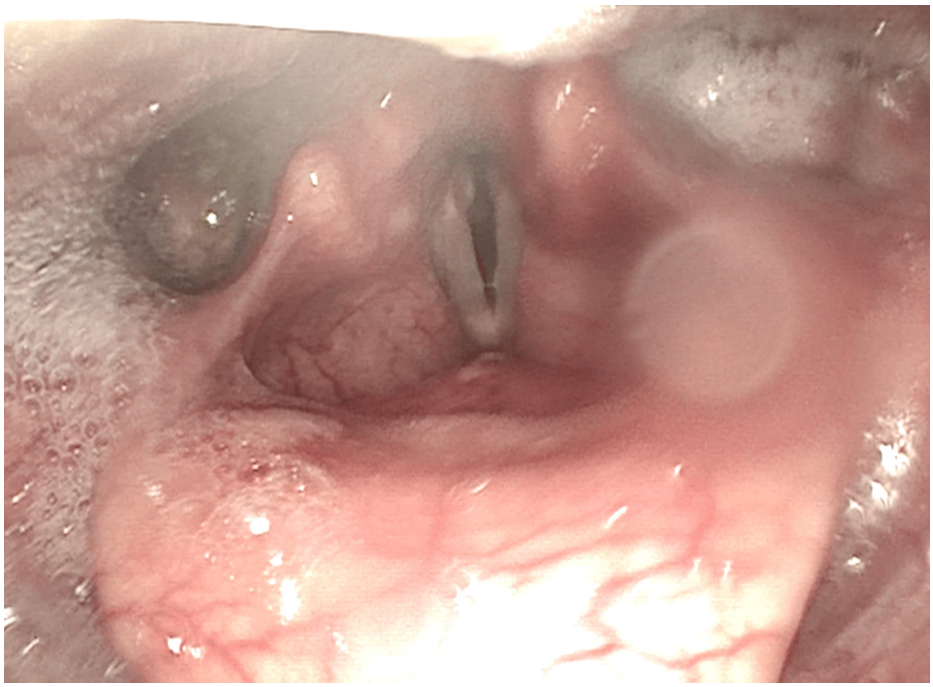


FIGURE 1: Flexible laryngoscopy examination on the first postoperative day

Although classical Tapia syndrome is characterized by ipsilateral hypoglossal and recurrent laryngeal nerve dysfunction, the coexistence of these deficits on the left side supported this diagnosis in our patient. The additional left glossopharyngeal nerve involvement and right vocal fold paralysis represented atypical features extending beyond the classical clinical presentation. The differential diagnosis included vertebral artery dissection, given the reported episode of cervical hyperextension and the risk of posterior circulation ischemia affecting the brainstem. A lesion involving the jugular foramen was also considered, as it could explain the associated glossopharyngeal (IX) and vagal (X) nerve involvement due to their anatomical proximity.

To rule out a central cause, an emergency CT angiography and a magnetic resonance imaging of the brain and neck were performed (Figures *2*, *3*, *4*). These examinations revealed no structural abnormalities, vascular lesions, or compressive processes. Thus, an atypical Tapia syndrome diagnosis was established.

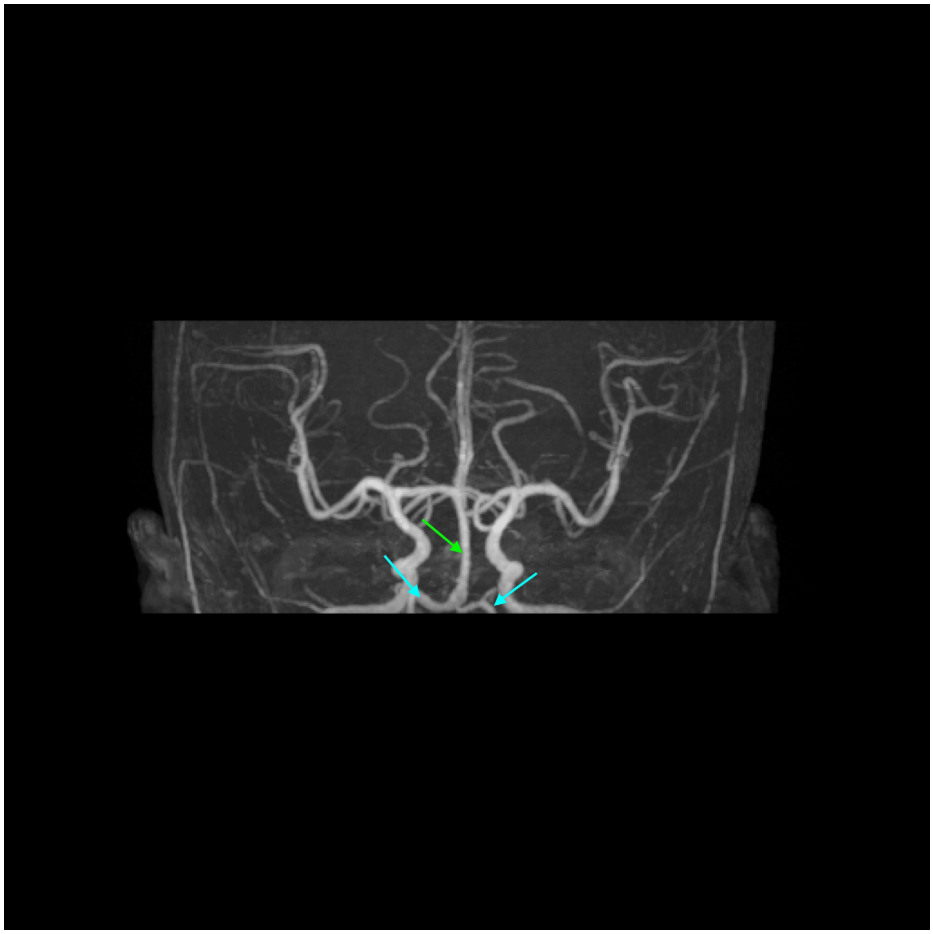


FIGURE 2: Magnetic resonance angiography demonstrating patent vertebral arteries (blue arrows) and basilar artery (green arrow) with no evidence of dissection or vascular abnormality

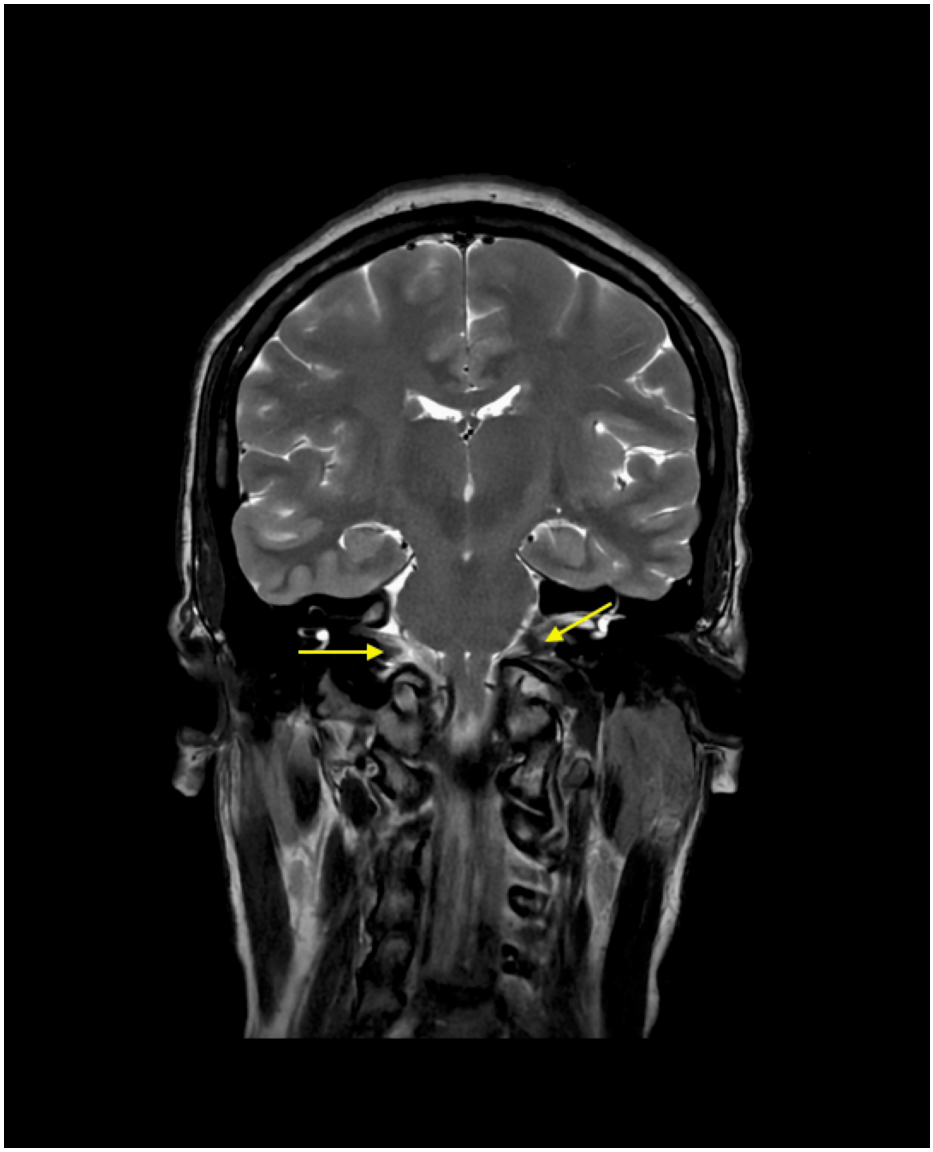


FIGURE 3: T2-weighted MRI, showing cranial nerve IX and X (yellow arrows)

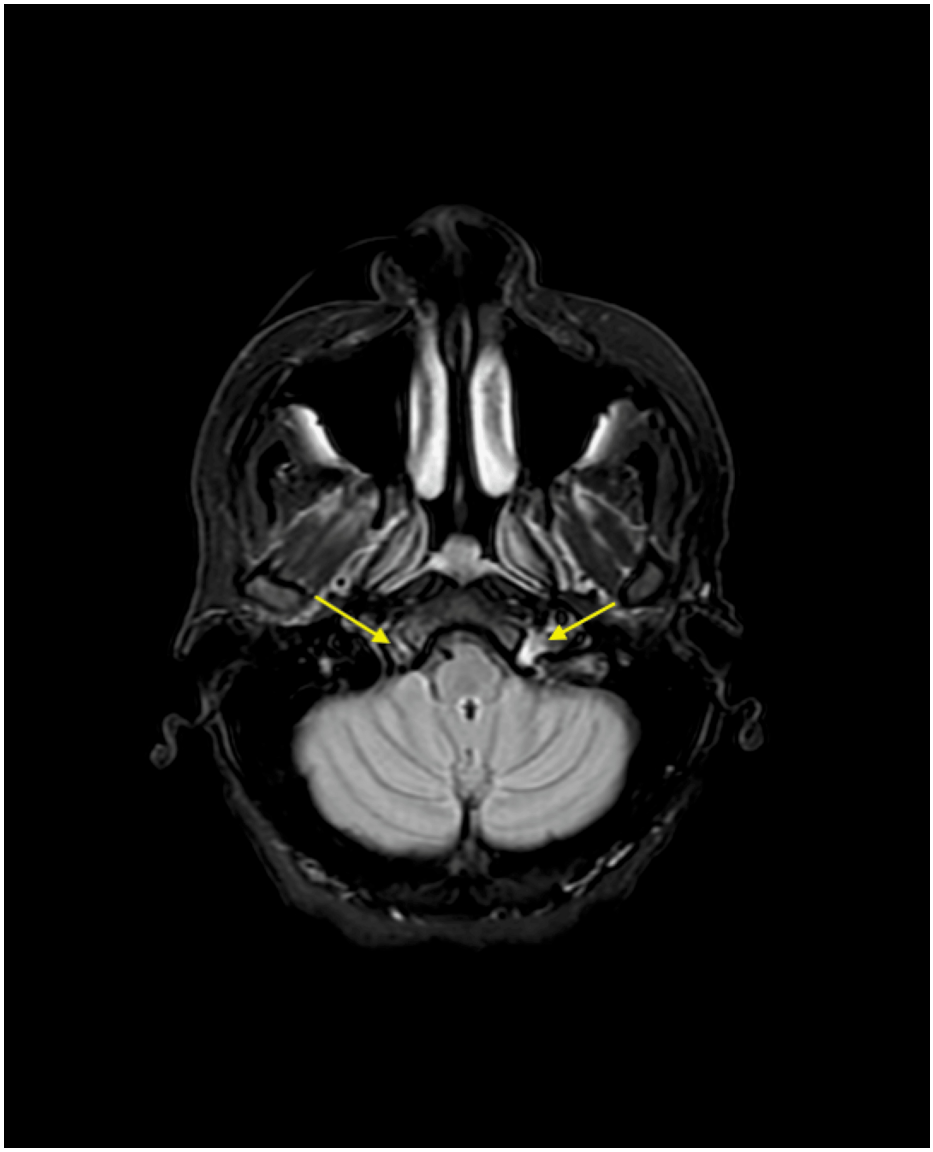


FIGURE 4: T2-weighted FLAIR MRI, showing cranial nerve XII (yellow arrows)

FLAIR: Fluid-attenuated inversion recovery

Fiberoptic endoscopic evaluation of swallowing (FEES), performed jointly by the speech and language therapist and the otolaryngologist, demonstrated laryngeal penetration with all tested consistencies (International Dysphagia Diet Standardisation Initiative (IDDSI) levels 0, 4, and 7 [6]), including saliva. The cough reflex was preserved. The patient was placed on nil per os status. A nasogastric feeding tube was inserted to ensure adequate nutritional intake. Intravenous corticosteroids and vitamin B1, B2, B6, and B12 supplementation were initiated.

On the first postoperative day, speech and language therapy was implemented. Interventions targeting all affected nerve functions were introduced from the initial session. Laryngeal rehabilitation was prioritized (vocal fold adduction, voice and swallowing exercises), followed by velopharyngeal function and finally lingual motor control through praxis and proprioceptive training. The main components of the speech-language rehabilitation program are summarized in Table *2*. During their stay, the patient had daily rehabilitation sessions allowing progressive training. Supervised oral trials were initiated once the patient could understand and correctly apply the recommended swallowing strategies. Oral intake was gradually reintroduced with consistencies considered safe on clinical assessment, without evidence of primary, secondary, or silent aspiration. IDDSI levels 0-2 and mixed-texture foods were initially excluded because they triggered coughing or caused difficulties with bolus management. Additional precautions included oral hygiene before meals, supervision by nursing staff during meals, an upright seated position (90°), and anterior head flexion during swallowing. Nutritional intake was monitored in collaboration with the

dietetics team. The nasogastric tube was removed after five days, once oral intake was sufficient to meet the patient's nutritional requirements. Flexible laryngoscopy examinations were performed every two days for close monitoring. Dysphonia improved within two days. She was discharged on postoperative day six and resumed a regular diet of solid foods. Liquids remained thickened to prevent aspiration and nasal regurgitation due to velopharyngeal insufficiency (IDDSI level 2).

Domain	Therapeutic goals	Proposed techniques / exercises	Progression and functional transfer
Breathing and laryngeal motor control	Promote glottic abduction, improve inspiratory control, and reduce respiratory discomfort	Controlled nasal inspiration with the mouth closed; Karlsen's manoeuvre and sniff; yawn-like inspiration; alternating sniff with voiceless productions (/s/, /f/, /i/); alternating breath-holding and coughing followed by inspiration; proprioceptive training of laryngeal adduction and abduction	Progression from voluntary control of laryngeal movements to their spontaneous reproduction; gradual transfer to respiratory control during speech and physical effort
Swallowing and airway protection	Restore safe and effective swallowing and promote glottic airway protection	Saliva swallowing; super-supraglottic swallow manoeuvre; effortful swallowing; initial postural adaptation with cervical flexion; voluntary cough training using breath-holding-relaxation sequences and glottic attacks on /a/ and /i/; oral hygiene	Initially no oral intake with enteral nutrition; gradual resumption of oral intake according to clinical tolerance; progressive reduction and discontinuation of compensatory strategies and liquid thickening
Texture modification	Ensure safe resumption of oral intake and minimize high-risk situations	Gradual introduction of food textures according to the IDDSI framework; initially, foods ranging from IDDSI levels 3 to 7 according to tolerance; IDDSI level 2 - Mildly Thick (MT2) liquids; temporary avoidance of mixed consistencies and particulate/crumbly foods	Progression towards a full oral diet; gradual discontinuation of liquid thickening and texture restrictions as swallowing function improves
Lingual motor function	Improve lingual mobility, symmetry, and proprioception; promote functional recovery of the hypoglossal nerve (CN XII)	Lingual praxis exercises with visual feedback using a mirror; practising symmetry without visual control; elevation of the tongue tip and base; varied lingual movements; progressive integration into speech	Progressive reduction of lingual deviation; transfer of trained movements to articulation and spontaneous speech
Velopharyngeal function	Improve proprioception and control of velopharyngeal closure and reduce hypernasality	Mirror-based visual feedback; yawn-like maneuvers for proprioceptive training; differentiation of nasal and oral expiratory airflow; production of pressure consonants /p, t, k/ followed by oral vowels; associated lingual mobility exercises	Progression from voluntary sensorimotor control to integration into speech; progressive improvement in velopharyngeal symmetry and reduction of hypernasality
Phonation and glottic closure	Promote glottic contact, improve phonatory efficiency, and increase vocal intensity	Sustained oral vowels for ≥ 5 seconds followed by /k/; phonation initially at a lower fundamental frequency; glottic attacks on oral vowels combined with /k/; reading and speaking aloud; alternation of voiceless and voiced fricatives; sirens and "rockets" on vowels; vocal exercises at different pitches	Progressive increase in vocal intensity; projection exercises with decibel monitoring; vocal exercises followed by singing; transfer to spontaneous communication
Endurance and generalization	Consolidate therapeutic gains and promote their use in daily activities	Repetition of acquired mechanisms, with progressive increases in difficulty and vocal/respiratory demands; reading, projected speech, and singing	Transition from explicit therapeutic control to spontaneous use of acquired strategies; progressive reduction and resolution of functional complaints

TABLE 2: Therapeutic plan and speech-language therapy program

IDDSI: International Dysphagia Diet Standardisation Initiative

Outpatient speech therapy was continued with targeted exercises for dysphagia and dysphonia, including two daily 10-minute home-based sessions. Follow-up evaluations were performed at three days, one week, and three weeks after discharge, demonstrating a favorable clinical course, with near-complete recovery of phonatory function, complete resolution of dysphagia and restoration of tongue symmetry. The patient

reported a subjective vocal satisfaction score of 99%, while the speech-language pathologist's assessment using the GRBASI scale was G0R0B0A0S0I0. Full recovery was achieved two months after the initial diagnosis.

Discussion

Although rare, Tapia syndrome should be considered in any patient presenting with dysphonia and dysphagia following thyroidectomy. To our knowledge, only one other case occurring after total thyroidectomy has been previously reported [7]. In our case, the patient not only presented with the typical features but also had glossopharyngeal nerve involvement and right vocal fold paralysis, suggesting a possible atypical form of Tapia syndrome.

Most reported cases arise in iatrogenic contexts, particularly following orotracheal intubation or procedures with significant cervical stress (e.g., shoulder arthroscopy, cervical spine surgery) or prolonged intensive care unit stays with mechanical ventilation [1,3,8]. In these situations, factors such as the duration and difficulty of intubation, neck positioning, and intraoperative manipulation of the head and upper limbs are frequently implicated [1,3].

Thyroid surgery may constitute a risk factor for Tapia syndrome. The cervical hyperextension required for adequate surgical exposure may cause traction or transient compression of the adjacent cranial nerves. Excessive cuff pressure or mucosal trauma from the endotracheal tube may also lead to pharyngeal wall oedema and secondary compression of cranial nerves X and XII [7,9]. In our case, unintended cervical hyperextension at the beginning of the procedure may have contributed to nerve stretching. The additional glossopharyngeal nerve involvement may be explained by stretching along its trajectory at the level of the jugular foramen or further below in the cervical region.

Postoperative vocal fold paralysis is often first attributed to recurrent laryngeal nerve injury, a well-recognized complication of thyroidectomy [5]. This may delay the Tapia syndrome diagnosis. Diagnosis relies on clinical evaluation and imaging studies (CT scanning and MRI) to rule out a central cause [1]. Management is primarily supportive and symptomatic. Although no standardized treatment has been validated, initial medical therapy often includes corticosteroid therapy, sometimes combined with vitamin supplementation (B6, B9, and B12) [8]. Speech therapy plays a central role in the management of both dysphonia and dysphagia, highlighting the importance of a multidisciplinary approach to optimize functional recovery. Consistent with the protocol described by De Luca et al., our management involved targeted rehabilitation of swallowing, phonation, and lingual mobility [10]. However, our strategy focused on restoration of critical functions by addressing the most disabling deficits first. Early glottic sphincter training was emphasized to ensure safe swallowing, whereas the referenced protocol initially focused on safety strategies (e.g., education on swallowing phases, optimal positioning) and praxis exercises. In our case, therapy was initiated immediately after diagnosis in contrast to their delayed initiation of therapy (one month after diagnosis) resulting in significant improvement with fewer sessions compared to the intensive 47-session program reported in their study. Our patient received daily rehabilitation sessions during the six-day hospital stay, followed by three outpatient rehabilitation sessions, during which near-complete recovery was achieved. She subsequently attended one additional outpatient follow-up session to assess long-term progress and reinforce functional gains through a home exercise program.

Most published cases describe complete recovery within approximately six months [11]. In our case, the patient achieved complete recovery in only two. In line with previous reports, these findings suggest that early recognition, corticosteroid therapy, and early speech rehabilitation may contribute to faster recovery.

Prevention of Tapia syndrome relies on atraumatic airway management during both intubation and extubation, as well as careful head and neck positioning from patient positioning and throughout the procedure. Care should be taken to minimize laryngoscope pressure, ensure secure yet non-traumatic endotracheal tube fixation, monitor cuff pressure, and avoid excessive cervical hyperextension [8,12].

Conclusions

This case highlights the rarity of Tapia syndrome following total thyroidectomy, even in an atypical presentation such as ours. Early recognition and targeted speech therapy may have contributed to faster functional recovery, emphasizing the importance of a multidisciplinary approach. Increased awareness of this potential complication is essential to improve prevention and optimize patient outcomes.

Appendices

Appendix 1



VIDEO 1: Flexible laryngoscopy examination on the first postoperative day

View video here: https://youtu.be/RVen7sKs770

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Laura Sanchez Leone, Marie Verhasselt, Didier Dequanter

Acquisition, analysis, or interpretation of data: Laura Sanchez Leone, Marie Verhasselt, Nina-Sophie Louvet, Alejandra Rodriguez

Drafting of the manuscript: Laura Sanchez Leone, Marie Verhasselt, Nina-Sophie Louvet

Critical review of the manuscript for important intellectual content: Laura Sanchez Leone, Marie Verhasselt, Nina-Sophie Louvet, Didier Dequanter, Alejandra Rodriguez

Supervision: Marie Verhasselt, Alejandra Rodriguez

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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M. Verhasselt and A. Rodriguez contributed equally and share senior authorship.

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