

Streamlining Thyroidectomy Treatment with a Multidisciplinary Approach: A Case Report

AVILASH MOHAPATRA¹, DEEPANSHI VASHISHTHA², SRIKANTA PADHAN³

ABSTRACT

Multiple Endocrine Neoplasia 2 (MEN2) is a rare genetic disorder that affects the endocrine glands and can lead to the development of tumours in the thyroid gland, parathyroid gland, and adrenal glands. Individuals with all subtypes of MEN2 syndrome {MEN2A, MEN2B, and familial Medullary Thyroid Cancer (MTC)} are at an increased risk of developing MTC. In the present case report, authors present the case of a 26-year-old female who presented to the Department of Surgery for family screening due to her mother's diagnosis of MEN 2A syndrome. During the screening, a swelling was identified in the anterior neck region. The swelling was firm, non tender, and not fixed to the skin. Additionally, the patient had an elevated calcitonin level. Although the patient had no history of voice abnormalities, she occasionally experienced dysphagia. A Contrast-enhanced Computed Tomography (CECT) scan of the neck revealed involvement of both lobes of the thyroid gland. To confirm the diagnosis, a DOTA NOC scan (an imaging procedure involving the injection of a radiotracer dye known as DOTA and NOC, followed by Positron Emission Tomography (PET) or Computed Tomography (CT) scan and ultrasound-guided Fine Needle Aspiration Cytology (FNAC) of the thyroid were conducted. Based on the confirmed diagnosis, the patient underwent surgical management in the form of total thyroidectomy and central compartmental lymph node dissection. However, postoperatively, the patient experienced difficulty in speech and swallowing due to involvement of the Recurrent Laryngeal Nerve (RLN). These issues were managed through physiotherapy and speech therapy as part of a holistic approach, which proved to be crucial in improving the patient's condition and preventing complications. Therefore, the management of thyroidectomy should adopt a patient-centric and multidisciplinary approach to enhance patient outcomes and minimise complications.

Keywords: Physiotherapy, Swallowing strategies, Thyroid cancer, Vocal cord palsy

CASE REPORT

A 26-year-old married female student of Hindu religion underwent family screening in the Department of Surgery to rule out the presence of MEN2 syndrome. She complained of occasional trouble swallowing and headaches. However, during the screening, a swelling was noticed on the front of her neck. Four months ago, the patient appeared to be in good health. However, during a screening examination, it was discovered that her calcitonin levels were elevated to 2000 pg/mL. The patient reported occasional dysphagia, bilateral frontal lobe headaches, and hair loss. She had no history of dyspnoea or hoarseness of voice. The patient did not have a history of diabetes, hypertension, coronary artery disease, or extended hospital stays, but did have a relevant family history. Her mother had been diagnosed with MEN 2A syndrome with pheochromocytoma and medullary thyroid carcinoma and had undergone bilateral adenectomy with total thyroidectomy. The patient's two elder brothers had been screened and ruled out.

Upon examination, the patient appeared comfortable, conscious, and well-oriented to time, place, and person. She had an average build, normal body temperature, and blood pressure of 110/80 mmHg, a pulse rate of 74 beats per minute (bpm), a respiratory rate of 13 bpm, and an SpO₂ level of 97% in room air. The patient reported no history of pallor, icterus, cyanosis, or clubbing. Chest wall auscultation revealed normal bronchovesicular breath sounds. A local examination focused solely on the neck region showed normal skin colour and texture, with no visible lump. Palpation revealed a 3x4 cm nodule on the left side of the anterior aspect of the neck, which was firm in consistency, non tender, and not fixed to the skin. A systemic examination showed a soft and non tender abdomen, with no palpable masses. The patient had no focal neurological deficits, and their higher mental functions were

intact. Routine blood investigations were conducted as shown in [Table/Fig-1].

Blood parameters	Values
Haemoglobin (gm/dL)	12.6
Total serum bilirubin	1.2
SGOT	12
SGPT	21
Creatinine (mg/dL)	0.5

[Table/Fig-1]: Routine blood investigation values.

SGOT: Serum glutamic-oxaloacetic transaminase; SGPT: Serum glutamic pyruvic transaminase

A CECT scan of the neck revealed a large nodule involving the entire left lobe of the thyroid, along with multiple nodules in the right lobe. The CECT scan of the abdomen showed no lesions on the adrenal glands. Additionally, a DOTA NOC scan was performed, suggesting the presence of somatostatin receptor-expressing lesions in both lobes of the thyroid, but no uptake was observed in the adrenal gland. A general neck ultrasound showed a large predominantly solid isoechoic lesion in the left lobe and a small hypoechoic lesion in the right lobe. To confirm the diagnosis, an ultrasound-guided FNAC of the thyroid was conducted, which reported the presence of singly lying and a few small clusters of plasmacytoid cells with abundant cytoplasm and eccentric nuclei showing salt and pepper chromatin, indicative of medullary carcinoma of the thyroid. Therefore, the diagnosis of thyroid cancer with MEN 2 syndrome was established, while parathyroid adenoma and pheochromocytoma were ruled out.

Surgical management was planned for the patient, and necessary clearances were obtained from various departments. Total thyroidectomy was performed, along with dissection of the central

compartmental lymph node, using the anterior approach of Kocher's collar incision [Table/Fig-2]. The surgery was uneventful, and the patient was allowed oral intake after six hours.



[Table/Fig-2]: Anterior neck approach/Kocher's collar incision.

On the first postoperative day, the patient reported hoarseness of voice and cough while consuming liquids. Consequently, she was referred to the Ear, Nose, Throat (ENT) Department for further evaluation. After consultation with an ENT specialist, it was determined that she had right RLN Palsy (RLNP)/praxia and was subsequently referred for speech and physiotherapy treatment. The speech therapist prescribed push-pull exercises as shown in [Table/Fig-3] and advised the patient to avoid sequential swallowing of liquids for three weeks. The physiotherapist recommended compensatory swallowing techniques outlined in [Table/Fig-4], cervical Range of Motion (ROM) exercises within the patient's pain-free range, scar management techniques, early mobilisation, and breathing exercises for four weeks. The patient's condition remained stable, and she was discharged on the sixth postoperative day, with scheduled follow-up appointments every four weeks for the next three months. During the four-week follow-up visit, the patient showed significant improvement in voice and swallowing. She had consistently followed the recommended physiotherapy exercise protocol as outlined in [Table/Fig-5] and received voice therapy without interruption. Her swallowing and speech had improved to preoperative levels. Cervical ROM was full and pain-free in all anatomical movements, and the surgical scar had healed without any adhesions or complications.



[Table/Fig-3]: Push-pull exercise with voice producing 'aaaa'.

Compensatory strategies [1]	Procedure
Chin tuck	The patient lowered her chin, causing an increase in the epiglottic angles and pushing the anterior laryngeal wall backward, resulting in a decrease in the diameter of the airway.
Head rotation (ipsilateral side)	The ipsilateral pharynx closes, causing food particles to move to the contralateral pharynx, while the cricopharyngeal pressure decreases.
Supraglottic swallow	This technique involves a combination of swallowing and breath-holding, which leads to the closure of vocal cords and protection of airways. After this, patients are encouraged to cough in order to clear any residue in the laryngeal vestibule. The valsalva maneuver may also be utilised to further facilitate the closing of vocal cords.
Mendelssohn manoeuvre	This manoeuvre is a type of supraglottic swallow, in which the patient imitates the upward movement of the larynx by intentionally holding the larynx at its maximum height, thereby increasing the duration of the cricopharyngeal opening.

[Table/Fig-4]: Compensatory swallowing techniques.

Name of physiotherapy exercises	Dosimetry
Compensatory swallowing techniques (chin tuck, head rotation, supraglottic swallow, mendelssohn manoeuvre)	10 repetition each exercise two session a day for four weeks.
Cervical ROM (active cervical flexion, extension, each side lateral flexion and rotation)	15 repetitions each exercise two session a day for four weeks.
Scar management techniques (scar massage adjacent to surgical incision)	10 minutes two session a day start after postoperative day five.
Early mobilisation (outside bed mobilisation independently)	4 times a day for postoperative six days.
Breathing exercises (deep breathing exercise, incentive spirometry)	Deep breathing exercise: 10 repetition every two hourly for postoperative six days. Incentive spirometry: 15 repetition every four hourly for postoperative six days.

[Table/Fig-5]: Physiotherapy exercise protocol.

DISCUSSION

An intriguing case of thyroid cancer in adult women with MEN2 syndrome is being reported. Typically, this condition manifests in individuals in their third or fourth decade of life. It is exceptionally rare for it to present in the sixth or seventh decade. Due to the patient's mother having medullary thyroid carcinoma, familial screening was conducted, and the results were found to be abnormal. MEN2 is a rare polyglandular cancer syndrome caused by genetic factors. This condition is distinguished by the presence of MTC in 100% of affected individuals, as well as an elevated likelihood of developing tumours that affect other glands in the multiple endocrine systems [2].

The MEN 2A syndrome is comprised of three distinct clinical subtypes involving MTC, namely MEN2A, MEN2B, and Familial MTC (FMTC). The prevalence of MTC is as follows:

1. MEN 2A syndrome is identified by MTC accompanied by pheochromocytoma and parathyroid hyperplasia. This is the most common form of all MEN2 syndromes [3].
2. MEN 2B syndrome is characterised by MTC, pheochromocytoma, ganglioneuromatosis, and Marfanoid habitus. This is the most aggressive and least common type of MEN2 [4].
3. FMTC has a lower incidence rate than other endocrinopathies. It is the mildest type of MEN 2 [5].

In the present case, the surgical intervention involved total thyroidectomy, as well as dissection of the central compartmental lymph nodes. Numerous recent studies have indicated that surgeons tend to prefer total thyroidectomy over partial thyroidectomy when both lobes are affected. This is due to concerns over leaving behind microscopic thyroid cancer and the difficulty in completely ablating any remaining thyroid tissue [6]. Following the thyroid surgery, on the first postoperative day, the patient experienced hoarseness of voice and difficulty swallowing liquids. An examination by an ENT

consultant revealed that the patient had suffered a partial injury to the right RLN. The RLNP is a recognised potential complication of thyroid surgery and may lead to significant co-morbidities for patients. The severity of the symptoms can vary, depending on whether the palsy is unilateral/bilateral and partial/complete. Unilateral RLNP may cause hoarseness of voice and difficulties in swallowing and chronic coughing during liquid intake, while bilateral RLNP can cause stridor and acute airway obstruction [7]. Permanent RLNP occurs in 1%-3% of thyroid cases, while temporary involvement of the RLN is seen in 5%-8% [8]. In order to minimise the risk of RLN injury during thyroid surgery, several minor modifications have been introduced [9,10].

Assessing vocal cord function is crucial both before and after thyroid surgery, particularly when evaluating patients for RLNP or early iatrogenic RLN injury. In the present case, RLNP was iatrogenic. The British Thyroid Association (BTA) guidelines for managing thyroid cancer recommend direct and/or Indirect Laryngoscopy (IL) to investigate voice dysfunction that persists for more than two weeks after thyroidectomy [11]. The use of energy devices during thyroid surgery is common and may contribute to a small proportion of nerve injuries. Typically, nerve injuries are detected postoperatively as they cannot be visualised during the operation. However, these injuries can be detected intraoperatively through advanced neuromonitoring techniques [12].

The patient presented with swallowing difficulties and hoarseness of voice and was consequently started on speech therapy consisting of push and pull exercises. The physiotherapist also recommended compensatory swallowing strategies as shown in [Table/Fig-6] to prevent aspiration. Additionally, cervical ROM exercises were prescribed to prevent neck contracture and deformities and improve cervical ROM. Breathing exercises were implemented

to prevent and improve postoperative respiratory complications resulting from anaesthesia effects, and scar management strategies were recommended to promote inelastic and healthy scars without adhesion to underlying soft tissues. The physiotherapist employed early mobilisation strategies to reduce the patient's hospital stay and plan for an early discharge without cardiopulmonary and musculoskeletal complications. Research has demonstrated that a specific programme of vocal cord exercises can improve vocal fold mobility and, as a result, speech and swallowing in cases of unilateral RLNP [13].

CONCLUSION(S)

Although rare, RLNP can occur during thyroidectomy despite the advanced surgical equipment and highly skilled surgeons involved. In cases where the RLN is affected or postoperatively, the role of physiotherapy and speech therapy is crucial in managing the patient's condition conservatively. To ensure effective management of these cases, a patient-centric and multidisciplinary approach is essential to improve the patient's condition and prevent complications.

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[Table/Fig-6]: Right-side (ipsilateral) head rotation with liquid swallowing slowly.

PARTICULARS OF CONTRIBUTORS:

1. Physiotherapist, Department of Surgical Discipline, All India Institute of Medical Sciences, New Delhi, Delhi, India.
2. Physiotherapist, Department of Surgical Discipline, All India Institute of Medical Sciences, New Delhi, Delhi, India.
3. PhD Research Scholar, Department of Community and Family Medicine, All India Institute of Medical Sciences, Raipur, Chhattishgarh, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Avilash Mohapatra,
Room No. 253, Basement 1, Physiotherapy Staff Room, Surgery Block, AIIMS,
New Delhi-110029, India.
E-mail: physioavilash09@gmail.com

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