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Thyroid Surgery & Its Complications & Challenges (Case Report)

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Abstract **Case Report**

Thyroid disorders are among the most common endocrine diseases encountered in surgical practice, and thyroidectomy remains a key treatment modality for both benign and malignant lesions of the gland. However, surgical management of long-standing thyroid masses presents complex clinical, anatomical, and perioperative challenges, especially when delayed presentation results in large, compressive, or invasive lesions. This case report discusses a 60-year-old male patient, Mr. Hanif Sorder, who presented with a massive anterior neck swelling of 30 years' duration. The surgical team performed a hemithyroidectomy under general anesthesia, with meticulous dissection to preserve vital structures, including the recurrent laryngeal nerve and parathyroid glands. The case highlights the importance of early diagnosis, surgical planning, anatomical precision, and multidisciplinary coordination in managing advanced thyroid disease. Despite the complexity, the procedure was completed successfully without intraoperative or postoperative complications. This report discusses the operative challenges, strategies to minimize complications, and implications for surgical education and practice.

Keywords: Thyroid surgery, Hemithyroidectomy, Recurrent laryngeal nerve, Parathyroid preservation, Surgical complications, Long-standing goiter.

INTRODUCTION

The thyroid gland, located anteroinferiorly in the neck, plays a vital role in metabolic regulation, growth, and development. Disorders of the thyroid—ranging from goiter to carcinoma—are highly prevalent worldwide. The prevalence of goiter and other thyroid nodules in Bangladesh is notable, often related to dietary iodine deficiency, environmental factors, and lack of early screening (Rahman *et al*., 2020). Thyroid surgery, particularly thyroidectomy, remains the definitive treatment for symptomatic benign or malignant lesions and for large goiters causing airway compression or cosmetic disfigurement.

While thyroidectomy is considered a safe procedure in experienced hands, it presents unique technical challenges. The gland's proximity to vital neurovascular structures—the recurrent laryngeal nerve (RLN), superior laryngeal nerve, parathyroid glands, and carotid sheath—makes surgical precision essential (Hansen *et al*., 2019). The risk of complications such as hemorrhage, recurrent laryngeal nerve palsy, hypocalcemia due to parathyroid injury, and airway compromise remains significant, particularly in long-standing or large goiters.

This report presents the case of a male patient with a massive anterior neck swelling persisting for over three decades. It provides detailed insights into preoperative assessment, intraoperative challenges, surgical strategy, and postoperative management. The case underscores how a multidisciplinary approach and meticulous surgical technique can lead to successful outcomes even in complex scenarios.

CASE PRESENTATION

Patient Profile

The patient, Mr. Hanif Sorder, a 60-year-old male, was referred to the Department of Surgery at a tertiary care hospital in Dhaka, Bangladesh, with a chief complaint of a progressively enlarging anterior neck swelling. The patient was a retired schoolteacher from a

semi-rural community, with a modest socioeconomic background. He had no prior significant medical illnesses apart from occasional seasonal respiratory infections. There was no known history of diabetes mellitus, hypertension, or cardiac disease.

Mr. Sorder reported that he first noticed a small swelling at the lower aspect of his neck approximately 30 years ago, which was initially painless and non-progressive. Over the years, the swelling gradually increased in size but remained asymptomatic, and therefore he did not seek medical advice. Due to a personal fear of surgery and anesthesia, as well as financial constraints, he opted for homeopathic remedies and herbal preparations recommended by local practitioners. These offered no improvement.

Over the last two years, the patient noticed gradual acceleration in growth, with occasional mild discomfort while swallowing and a feeling of heaviness around the neck, particularly when bending forward. There was no associated pain, discharge, or ulceration over the swelling. He denied symptoms of hyperthyroidism (palpitations, tremors, heat intolerance, weight loss) or hypothyroidism (cold intolerance, fatigue, weight gain, constipation). He reported no voice changes, choking, or dyspnea even in the supine position.

Past and Social History

There was no past history of neck irradiation, previous thyroid or parathyroid surgery, or similar swelling among family members. His diet was mixed, and though iodine deficiency was common in his region, he reported regular use of iodized salt for more than two decades.

He was a non-smoker, did not consume alcohol, and had no known drug allergies. His body mass index (BMI) was 23.4 kg/m².

From a psychosocial perspective, the long-standing nature of his swelling had caused progressive emotional distress, social embarrassment, and limited his participation in public gatherings. He reported being nicknamed by community members due to the visible mass, which had psychological implications such as loss of self-confidence and social withdrawal.

Clinical Presentation

At presentation, the patient appeared comfortable, alert, and oriented. He was afebrile and hemodynamically stable. His vital signs were as follows:

- **Pulse:** 78 beats per minute, regular
- **Blood Pressure:** 125/80 mmHg
- **Respiratory Rate:** 18 breaths per minute
- **Temperature:** 98.2°F
- **SpO_2:** 98% on room air

Systemic examination revealed no abnormalities in the cardiovascular, respiratory, or abdominal systems. Local examination of the neck revealed a large, lobulated anterior neck swelling measuring approximately 12 × 10 cm, extending from just below the thyroid cartilage to the suprasternal notch and laterally to the anterior border of the right sternocleidomastoid muscle. The swelling moved upward on deglutition but not on protrusion of the tongue—indicating a thyroid origin rather than a thyroglossal cyst. The surface was smooth with visible stretched skin and prominent veins, but without erythema, ulceration, or sinus formation. The edges were well-defined, and the mass was firm in consistency, non-tender, and mobile in the horizontal plane but restricted vertically due to attachment to the underlying glandular structures. There were no palpable cervical or supraclavicular lymph nodes. The trachea was slightly deviated to the left, and the laryngeal crepitus was preserved. Carotid pulsations were palpable and symmetrical on both sides. There was no bruit over the swelling. A Pemberton's sign (facial congestion upon raising both arms) was negative, suggesting no superior vena cava compression. Examination of the oral cavity and oropharynx was normal, and there was no retrosternal extension on palpation.

Provisional Diagnosis

Based on the clinical findings, a benign multinodular goiter of the right lobe of the thyroid gland was provisionally diagnosed, with differential diagnoses including:

- Colloid goiter
- Cystic degeneration of a thyroid nodule
- Follicular adenoma
- Rarely, low-grade malignancy with benign features (e.g., encapsulated follicular carcinoma)

Diagnostic Investigations

A comprehensive diagnostic workup was conducted to confirm the diagnosis, assess functional status, and rule out malignancy or mediastinal involvement.

Thyroid Function Tests

Laboratory evaluation showed:

- Free T3: 3.4 pg/mL (normal range: 2.0–4.4 pg/mL)
- Free T4: 1.2 ng/dL (normal range: 0.8–1.8 ng/dL)
- Thyroid Stimulating Hormone (TSH): 2.8 µIU/mL (normal range: 0.4–4.0 µIU/mL)

The results indicated a euthyroid state, excluding toxic goiter or hypothyroidism.

Ultrasonography (USG) of Neck

Neck ultrasonography revealed a markedly enlarged right thyroid lobe with multiple coalescent nodules of mixed echogenicity. The largest nodule

measured 6.5 × 4.2 cm and showed areas of cystic degeneration and coarse calcification. The capsule was intact. The left lobe and isthmus appeared normal. No suspicious cervical lymphadenopathy or extrathyroidal extension was seen.

Fine Needle Aspiration Cytology (FNAC)

FNAC performed under aseptic conditions yielded colloid-rich fluid with benign follicular cells, consistent with benign multinodular colloid goiter (Bethesda Category II). No cytologic features of malignancy such as cellular atypia, nuclear grooves, or psammoma bodies were detected.

Radiological Assessment

A CT scan of the neck and upper mediastinum (with contrast) was performed to assess deeper extension and tracheal involvement. The scan showed a large right-lobe thyroid mass displacing the trachea mildly to the left without compression. The carotid sheath was displaced laterally, and the internal jugular vein remained patent. No retrosternal extension, invasion, or suspicious lymph node was noted.

Routine Preoperative Workup

All routine pre-anesthetic investigations were within normal limits:

- **CBC:** Hemoglobin 13.4 g/dL, WBC 7,800/mm³, Platelets 275,000/mm³
- **Liver and Renal Function Tests:** Normal
- **Chest X-ray:** Normal lung fields, tracheal deviation to the left
- **ECG:** Normal sinus rhythm
- **Coagulation Profile:** Within normal range

A preoperative laryngoscopic examination was performed to evaluate vocal cord mobility. Both cords were moving symmetrically, confirming intact recurrent laryngeal nerve (RLN) function prior to surgery. The patient was deemed fit for surgery (ASA Grade II) by the anesthesiology team. He was advised to maintain a soft diet and hydration, and was started on routine preoperative antibiotics. Since the goiter was large and longstanding, potential airway compromise during intubation was anticipated. Therefore, the anesthesia team prepared for awake fiberoptic intubation as a backup plan, although conventional laryngoscopic intubation was expected to be feasible.

An endocrinology consultation confirmed the euthyroid state, negating the need for preoperative thyroxine or beta-blocker therapy. Calcium and vitamin D levels were within normal limits.

Preoperative Counseling and Informed Consent

Given the patient's long history of fear regarding surgical intervention, extensive counseling was conducted by the attending surgeon and nursing team. The counseling covered:

- **Nature of the disease:** benign enlargement with potential for further growth or airway compromise if left untreated.
- **Purpose of surgery:** curative removal of diseased thyroid tissue.
- **Procedure explained:** right hemithyroidectomy under general anesthesia.
- **Potential risks:**
    - Bleeding and hematoma formation
    - Injury to recurrent laryngeal or superior laryngeal nerves (resulting in voice change)
    - Hypocalcemia due to parathyroid damage
    - Infection or wound complications
    - Scar formation or need for revision surgery

The surgeon emphasized that modern surgical techniques and intraoperative nerve identification significantly reduce these risks. The patient and his family were shown photographs of previous similar successful cases to build confidence.

Psychological reassurance was crucial—Mr. Kasem expressed emotional relief and gratitude upon understanding the safety measures and the expertise of the surgical team. In his words, "Sir, I have been carrying this burden for thirty years; I think now is the time to let it go." His consent was obtained both verbally and in writing.

Preoperative Planning and Surgical Strategy

Given the size and chronicity of the mass, the surgical team planned:

1. Hemithyroidectomy (right side) with possible conversion to total thyroidectomy if intraoperative findings indicated contralateral disease.
2. Use of magnifying loupes (×2.5) for enhanced visualization of fine structures.
3. Meticulous dissection with stepwise identification of:
    - External branch of the superior laryngeal nerve
    - Superior and inferior thyroid vessels
    - Recurrent laryngeal nerve
    - Both parathyroid glands
4. Drain placement (closed suction) to prevent postoperative hematoma.
5. Availability of nerve monitoring device (where applicable).

All necessary blood products were cross-matched and kept ready. A multidisciplinary surgical and anesthetic team was briefed regarding airway management, hemodynamic monitoring, and postoperative care protocols.

Summary of Case Presentation

Mr. Abul Kasem's case represented an extreme example of delayed benign thyroid enlargement, extending over three decades, yet presenting with relatively preserved endocrine and airway function. The psychosocial component of surgical fear and resource limitation delayed appropriate management. The preoperative assessment and counseling aimed to mitigate these factors, while comprehensive diagnostic evaluation ensured a safe surgical roadmap.

Surgical Procedure

The patient was admitted to the surgical unit and scheduled for a right hemithyroidectomy under general endotracheal anesthesia. A thorough pre-anesthetic evaluation was performed, including airway assessment, hematological investigations, and thyroid function tests. The surgical field was prepared following standard aseptic protocols, and intravenous antibiotic prophylaxis was administered prior to skin incision. A Kocher's skin crease incision was planned approximately 2 cm above the sternal notch, in a natural neck crease, to ensure both optimal cosmetic outcome and adequate surgical exposure. The incision line was carefully marked with reference to key surface landmarks — the midline of the neck, the sternal heads of the sternocleidomastoid muscles, and the superior border of the clavicle. Preoperative surface marking and anatomical assessment were crucial for anticipating the plane of dissection and minimizing the risk of injury to underlying neurovascular structures. Following induction of anesthesia and endotracheal intubation, the neck was placed in gentle extension using a shoulder roll to optimize surgical access. The surgical site was draped in a sterile fashion. The Kocher incision was deepened through subcutaneous tissue and the platysma muscle, maintaining hemostasis with bipolar cautery. Subplatysmal flaps were elevated superiorly to the thyroid cartilage and inferiorly to the suprasternal notch, providing full exposure of the strap muscles (sternohyoid and sternothyroid). The strap muscles were separated in the midline and retracted laterally to expose the right thyroid lobe. The gland appeared grossly enlarged, firm, and nodular, extending inferiorly toward the thoracic inlet. Dense fibrotic adhesions were noted between the capsule of the gland and the adjacent soft tissue planes, likely secondary to long-standing compressive changes and chronic inflammatory reaction. The capsule of the gland was intact, and no evidence of extracapsular invasion was observed.

Meticulous dissection was performed to identify and preserve key anatomical structures:

- The recurrent laryngeal nerve (RLN) was identified in the tracheoesophageal groove using a capsular dissection technique and traced proximally to its laryngeal entry point. The nerve was preserved in its entirety, with intraoperative visualization confirming intact anatomical continuity.
- The superior thyroid artery and vein were ligated close to the gland's capsule to minimize the risk of injury to the external branch of the superior laryngeal nerve (EBSLN).
- Both superior and inferior parathyroid glands were visualized, carefully mobilized, and preserved with intact vascular pedicles to prevent postoperative hypocalcemia.
- The trachea was noted to be mildly displaced to the contralateral side but without significant compression or deformity.

Intraoperative Challenges

The procedure was technically demanding due to several intraoperative factors:

- Dense fibrotic adhesions and distorted anatomy obscured normal tissue planes, complicating identification of the RLN and parathyroid glands.
- The skin and platysma were markedly thinned due to chronic stretching by the enlarging mass, increasing the risk of flap ischemia and postoperative wound complications.
- The recurrent laryngeal nerve was embedded within fibrotic tissue, necessitating slow, microdissection under magnification to prevent traction or thermal injury.
- Significant vascular congestion of the thyroidal and perithyroidal veins required meticulous bipolar coagulation and ligation to maintain a clear field and prevent postoperative hematoma formation.

Despite these challenges, careful dissection and constant awareness of the altered anatomy ensured preservation of all vital structures.

Completion and Closure

After securing all vascular pedicles, the right thyroid lobe was completely mobilized and excised. Inspection of the operative field confirmed intact recurrent laryngeal nerve and viable parathyroid glands. Hemostasis was meticulously achieved. A closed-suction drain was placed in the thyroid bed to prevent fluid accumulation. The strap muscles and platysma were re-approximated in layers using absorbable sutures, and the skin was closed subcuticularly for optimal cosmetic healing.

The total operative duration was approximately six hours, reflecting the technical complexity and meticulous dissection required. The patient was extubated uneventfully and transferred to the post-anesthesia care unit (PACU) for close monitoring. Early postoperative assessment revealed stable vital signs and spontaneous phonation, confirming preserved vocal cord function.

Postoperative Outcome and Follow-up

The patient was extubated smoothly in the operating room following full recovery from anesthesia and was subsequently transferred to the post-anesthesia care unit (PACU) for close observation. Continuous monitoring of vital parameters — heart rate, blood pressure, oxygen saturation, and respiratory pattern — was maintained. The surgical drain was observed for the first 24 hours, showing minimal serosanguinous output and no evidence of active bleeding.

Neurological assessment revealed intact phonation and cough reflex, indicating preservation of recurrent laryngeal nerve (RLN) function. The patient was able to communicate verbally within hours of recovery, confirming the absence of vocal cord palsy. There were no signs of respiratory distress, wound hematoma, or tracheal compression. Calcium levels were evaluated periodically during the first 24 hours to assess parathyroid gland function. Serum calcium and ionized calcium levels remained within normal limits, and no perioral tingling or carpopedal spasm was noted, confirming preservation of parathyroid vascularity.

Early Postoperative Course

The patient was kept under close in-hospital observation for 48 hours. Analgesics and prophylactic antibiotics were administered as per institutional protocol. Oral fluids were initiated 6 hours postoperatively, progressing to a soft diet on the first postoperative day. The suction drain was removed on the second postoperative day after confirming minimal drainage (<20 mL in 24 h).

The operative wound was clean, dry, and without evidence of infection or subcutaneous emphysema. The voice quality and phonation remained normal throughout the postoperative period. Laryngoscopic evaluation performed on postoperative day two demonstrated bilaterally mobile vocal cords with normal mucosal appearance.

The patient reported mild transient discomfort on swallowing, which resolved spontaneously. There was no hypocalcemic manifestation, hoarseness, or airway compromise. Early mobilization and incentive spirometry were encouraged to prevent postoperative pulmonary complications.

Histopathological Examination

The excised specimen was sent for histopathological evaluation. Gross examination revealed an encapsulated right thyroid lobe measuring approximately 10 × 7 × 6 cm, with smooth outer surface and firm consistency. On sectioning, the cut surface was grayish-white with focal colloid-filled nodules.

Microscopic evaluation demonstrated features consistent with multinodular colloid goiter with areas of fibrosis and cystic degeneration. There was no evidence of malignancy or capsular invasion. These findings confirmed the benign nature of the lesion and correlated with the preoperative diagnosis.

Late Postoperative Follow-up

At one-week follow-up, the patient presented with a well-healed incision and no local or systemic complications. The cosmetic result was satisfactory, with minimal scarring. The patient reported no change in voice or swallowing function.

Follow-up at one month demonstrated normal thyroid function tests, stable calcium levels, and an unremarkable neck ultrasound. The patient resumed normal activities and was counseled regarding periodic surveillance for the contralateral thyroid lobe.

Summary of Outcome

This case represents a successful right hemithyroidectomy performed for a massive benign thyroid enlargement of three-decades' duration. Despite the long-standing nature of the disease and the extensive fibrosis encountered intraoperatively, all vital structures were preserved, and no postoperative complications were observed. The procedure highlights the importance of:

- Careful preoperative planning,
- Stepwise dissection respecting anatomical planes,
- Intraoperative identification of the RLN and parathyroid glands, and
- Postoperative vigilance for airway and calcium homeostasis.

The overall prognosis was excellent, and the surgical outcome was both functionally and cosmetically satisfactory.

Figure 1A: Doctor carefully examining a patient with a large neck swelling during a clinical assessment in the consultation room

Figure 1B: After surgery doctor's brifing

Figure 1C: Post-treatment moment and followup

DISCUSSION

Thyroid surgery remains one of the most frequently performed endocrine procedures worldwide, and hemithyroidectomy is the operation of choice for unilateral benign nodular enlargement or diagnostic uncertainty in thyroid pathology. The present case represents an unusually large, long-standing benign goiter managed successfully through a right hemithyroidectomy, performed under challenging

anatomical and technical circumstances due to chronicity, fibrosis, and displacement of vital structures.

Pathophysiology and Clinical Presentation

Multinodular goiter is a common clinical condition in regions with varying iodine intake and may develop over decades as a result of repeated cycles of hyperplasia, involution, and hemorrhage within the thyroid parenchyma. Progressive nodular enlargement can lead to fibrosis, calcification, and distortion of normal tissue planes, making surgical excision technically demanding. In this case, the patient presented with a 30-year history of progressive neck swelling, reflecting an indolent but persistent disease process. Despite its large size, the mass remained benign in nature, and the absence of compressive or malignant features underscored the slow evolution typical of multinodular goiter.

Surgical Considerations and Anatomical Challenges

The key objectives of hemithyroidectomy are complete removal of the diseased lobe**,** preservation of the recurrent laryngeal nerve (RLN), and maintenance of parathyroid gland function. The distorted anatomy observed intraoperatively, due to dense fibrosis and chronic inflammatory changes, posed significant difficulty in identifying these vital structures. Similar findings have been reported in literature, where long-standing goiters are often associated with periglandular adhesions and fibrotic changes, increasing the risk of iatrogenic injury (Pelizzo *et al*., 2020).

Identification of the RLN within the tracheoesophageal groove remains the gold standard in thyroid surgery. In this case, the nerve was identified early, traced along its course, and preserved with minimal manipulation — a strategy proven to reduce the incidence of postoperative vocal cord paralysis (Henry *et al*., 2019). The superior thyroid vessels were ligated close to the capsule to safeguard the external branch of the superior laryngeal nerve (EBSLN), an approach advocated by Delbridge (2017) for optimal nerve protection.

Preservation of the parathyroid glands and their vascular supply was also achieved successfully, minimizing the risk of transient or permanent hypocalcemia, one of the most feared complications of thyroidectomy. The careful dissection and maintenance of capsular integrity around the inferior thyroid artery branches ensured intact parathyroid perfusion.

Operative Duration and Technical Complexity

The total operative duration of approximately six hours reflected the complexity of the case. Prolonged operating time is often reported in cases of giant or fibrotic goiters, particularly when there is displacement or adherence to surrounding tissues such as the trachea and carotid sheath. Despite these challenges, meticulous technique and adherence to anatomical principles allowed for a complication-free outcome.

Use of magnification and bipolar energy devices has been shown to enhance precision and reduce intraoperative blood loss in complex thyroidectomies (Mihai *et al*., 2021). Although the present operation was conducted in a resource-constrained setting, adherence to fundamental surgical principles and teamwork compensated effectively for the absence of advanced nerve monitoring equipment.

Postoperative Outcomes and Prognosis

The immediate postoperative recovery was uneventful, with the patient demonstrating preserved vocal cord mobility and normal calcium levels. The absence of hoarseness, hypocalcemia, or wound complications corroborated the adequacy of intraoperative nerve and parathyroid preservation. Histopathological confirmation of benign multinodular goiter aligned with preoperative clinical suspicion and underscored the importance of surgical intervention for symptomatic or progressively enlarging benign lesions.

Long-term prognosis following hemithyroidectomy for benign disease is excellent. The risk of recurrence in the contralateral lobe remains low with appropriate follow-up and hormonal evaluation. The cosmetic and functional outcomes in this patient were highly satisfactory, reaffirming that even large, long-standing goiters can be managed successfully with careful planning and surgical expertise.

Lessons Learned

This case highlights several critical lessons relevant to endocrine and head-neck surgeons:

1. Chronic goiters with fibrosis demand deliberate, layer-by-layer dissection to preserve vital neurovascular structures.
2. Preoperative surface marking and intraoperative orientation are indispensable for maintaining anatomical safety in distorted fields.
3. Vigilant postoperative monitoring for airway compromise and calcium balance ensures early detection of complications.
4. Even in resource-limited environments, adherence to sound surgical principles can produce outcomes comparable to those achieved with advanced monitoring technologies.

CONCLUSION

Successful management of this 30-year-old giant thyroid swelling through hemithyroidectomy underscores the value of precise anatomical dissection, surgical patience, and team coordination. The case exemplifies that, with meticulous technique, even complex thyroid surgeries can be performed safely

without postoperative morbidity. It also reinforces the broader message that surgical awareness, patient education, and trust in local healthcare systems can eliminate unnecessary referrals abroad and strengthen institutional surgical capability.

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