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Case Report

Combined Off-Pump Coronary Artery Bypass and Total Thyroidectomy in a High-Risk Patient With Triple Vessel Coronary Disease and Retrosternal Goiter: A Case Report

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ABSTRACT

Simultaneous management of complex cardiovascular and endocrine pathology in a single anesthetic exposure presents a significant challenge in high-risk patients. We report a case of a 67-year-old male with severe triple-vessel coronary artery disease and a large retrosternal multinodular goiter causing airway compression. The patient presented with exertional angina (Canadian Cardiovascular Society Class III), dyspnea, progressive neck swelling, hoarseness of voice, and dysphagia. His medical history included hypertension, diabetes mellitus, obesity (body mass index, 32 kg/m^2), poor functional capacity, and residual poliomyelitis with bilateral lower-limb weakness. Computed tomography of the neck demonstrated a large retrosternal goiter with tracheal deviation and compression, while coronary angiography confirmed severe triple-vessel disease. Due to the risk of airway compromise and perioperative cardiac ischemia, a multidisciplinary team planned a single-stage surgical approach. Total thyroidectomy was performed first via median sternotomy, followed by Off-pump Coronary Artery Bypass Grafting (OPCABG) using the left internal mammary artery to the left anterior descending artery and a saphenous vein graft to the first obtuse marginal branch. The procedure was conducted under total intravenous anesthesia with invasive monitoring and hemodynamic support. The patient remained hemodynamically stable intraoperatively. Postoperatively, the patient was electively ventilated overnight and successfully extubated the following day after confirming bilateral vocal cord mobility. He was discharged on postoperative day seven without complications. This case demonstrates the feasibility and benefits of a single-stage thyroidectomy and OPCABG in carefully selected high-risk patients.

Key words: Off-pump CABG, thyroidectomy, retrosternal goiter, triple vessel disease, combined surgery, difficult airway, poliomyelitis

INTRODUCTION

Multisystem disease requiring concurrent surgical intervention presents a significant management challenge in cardiothoracic and endocrine surgery. Retrosternal goiter, defined as thyroid tissue extending below the thoracic inlet into the mediastinum,

can lead to compressive symptoms due to mass effect on surrounding structures. [1] Patients commonly present with progressive neck swelling, dyspnea, dysphagia, hoarseness of voice, and tracheal compression or deviation, which may result in difficult airway management during anesthesia. [2] Imaging modalities such as computed tomography (CT) are crucial for defining the extent of mediastinal extension and airway compromise. Surgical resection, most commonly total thyroidectomy, remains the definitive treatment, particularly in symptomatic patients or those with significant airway compression. [3]

Severe multivessel coronary artery disease, particularly triple vessel disease, significantly increases the risk of myocardial ischemia and adverse cardiac events during non-cardiac surgery. [4] Coronary artery bypass grafting (CABG) remains a standard surgical treatment for patients with complex coronary disease. Conventionally, CABG is performed using cardiopulmonary bypass (on-pump CABG) with the aid of a heart–lung machine, which allows a bloodless and motionless surgical field but may be associated with systemic inflammatory response, coagulopathy, and postoperative organ dysfunction. [5] Alternatively, off-pump coronary artery bypass grafting (OPCABG) is performed on the beating heart without cardiopulmonary bypass, potentially reducing inflammatory complications, bleeding, and recovery time in selected patients. [6]

When both retrosternal goiter and severe coronary artery disease coexist, determining the optimal surgical strategy becomes challenging. Staged procedures may expose the patient to additional risks: performing thyroidectomy first may precipitate perioperative myocardial ischemia due to untreated coronary disease, whereas performing CABG first under systemic anticoagulation may increase the risk of postoperative neck hematoma and airway compromise during subsequent thyroid surgery. In selected cases, a single-stage combined procedure may therefore offer advantages by minimizing repeated anesthesia exposure and reducing overall perioperative risk. [7]

We report a case of simultaneous total thyroidectomy and OPCABG performed in a high-risk elderly male with triple vessel coronary artery disease and a large retrosternal multinodular goiter, with severely limited functional capacity due to post-polio sequelae. This case highlights key considerations in airway management, surgical sequencing, anesthetic control, and multidisciplinary decision-making in the management of complex combined cardiothoracic and endocrine pathology.

CASE REPORT

A 67-year-old male (weight, 96 kg; body mass index, 32 kg/m^2) presented with progressive exertional chest pain radiating to both arms for 6 months, associated with paroxysmal nocturnal dyspnea. He also reported a gradually enlarging neck swelling that had been present for approximately 5 years. Over the preceding year, the patient developed progressive compressive symptoms, including hoarseness of voice and dysphagia. There were no symptoms suggestive of thyroid hormone excess or deficiency, such as palpitations, tremors, weight loss, heat intolerance, cold intolerance, or constipation.

His past medical history included hypertension for 15 years, type 2 diabetes mellitus for 10 years, and residual poliomyelitis causing severe bilateral lower-limb weakness (motor power 1/5), resulting in markedly reduced functional capacity of approximately 2 metabolic equivalents. He was an ex-smoker. Airway evaluation was concerning, as two experienced ENT consultants were unable to visualize the vocal cords on indirect laryngoscopy, raising suspicion of significant airway distortion. Transthoracic echocardiography demonstrated a left ventricular ejection fraction of 50%, mild mitral regurgitation, mild concentric left ventricular hypertrophy, and grade I left ventricular diastolic dysfunction with mild hypokinesia of the anterior and anterolateral wall. Electrocardiography showed anteroseptal ischemic changes.

Coronary angiography revealed severe triple-vessel coronary artery disease, including proximal occlusion of the left anterior descending artery, tight stenosis of the left circumflex artery and its obtuse marginal branch, and proximal occlusion of the right coronary artery. Given the combined risks of airway compromise from the large retrosternal goiter and perioperative myocardial ischemia from severe coronary artery disease, a multidisciplinary team comprising cardiac surgeons, endocrine surgeons, anesthesiologists, and ENT specialists determined that a single-stage procedure consisting of total thyroidectomy followed by OPCABG would provide the safest management strategy. CT of the neck and chest revealed marked multinodular enlargement of the thyroid gland. The right lobe measured 130 × 69 × 86 mm and the left lobe 97 × 44 × 80 mm. The enlarged gland extended retrosternally approximately 3 cm below the manubrium, reaching the level of the T2 vertebra. The mass caused significant tracheal compression with narrowing of the upper thoracic tracheal lumen to 6.5 mm and leftward tracheal deviation (**Figure 1**).

Thyroid scintigraphy demonstrated multinodular uptake with a prominent cold nodule in the lower portion of the right lobe approaching the thoracic inlet. Thyroid function tests showed FT4 14.2 pmol/L, FT3 4.02 pmol/L, and TSH 1.29 mIU/L, consistent with a euthyroid state.

Preoperative Setup

- IV hydrocortisone was administered to prevent airway edema.
- Antibiotic prophylaxis was given.
- An arterial line was inserted under light sedation.
- Difficult airway plan applied.
- Ultrasound-guided left subclavian central venous catheter was placed due to small-caliber femoral veins.

Anesthesia

Total intravenous anesthesia was used (propofol and ketamine for induction; propofol, dexmedetomidine, and atracurium for maintenance). A check video laryngoscopy was performed before advancing to full deep anesthesia, and intubation was confirmed with fiberoptic bronchoscopy. Normothermia was strictly maintained using a warming mattress, warmed fluids, and a warm OR temperature.

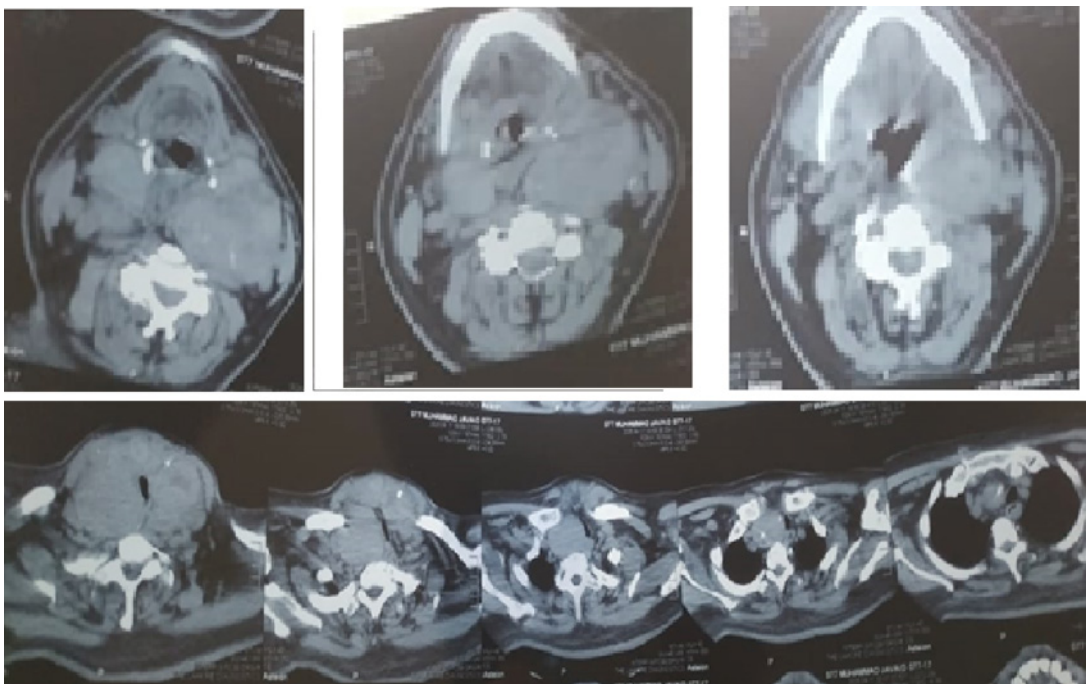

Figure 1: CT scan of the neck and chest. of the neck and chest revealed marked multinodular enlargement of the thyroid gland. The right lobe measured 130 × 69 × 86 mm and the left lobe 97 × 44 × 80 mm. The enlarged gland extended retrosternally approximately 3 cm below the manubrium, reaching the level of the T2 vertebra.

Surgical Sequence

Total thyroidectomy was performed first to avoid neck hematoma risk after systemic heparinization (**Figure 2**).

The neck flap was intentionally left open after thyroidectomy, and then cardiac surgery was performed through the same median sternotomy. OPCABG was done using the left internal mammary artery to the left anterior descending and the saphenous vein graft to the Obtuse Marginal 1 grafts using 150 U/kg heparin (later reversed with protamine).

Average Mean arterial pressure (MAP) was 78 mmHg, heart rate 76 bpm, core temperature ~35.7°C, total urine output 1600 ml. Hemodynamics were supported with dobutamine, norepinephrine, and epinephrine infusions. Surgery lasted 11 hours and 40 minutes. Two units of packed red blood cells (PRBCs) were transfused.

Postoperative Course

The patient was electively ventilated overnight in the cardiac ICU. He was extubated the next morning after confirming bilateral vocal cord mobility. He required minimal inotropic support and had an uneventful recovery. He was discharged home on day 7.

DISCUSSION

The management of airways in patients with massive goiter continues to be a clinical challenge, particularly when combined with obesity and distorted neck anatomy. This patient had long-standing, untreated thyroid enlargement, which had

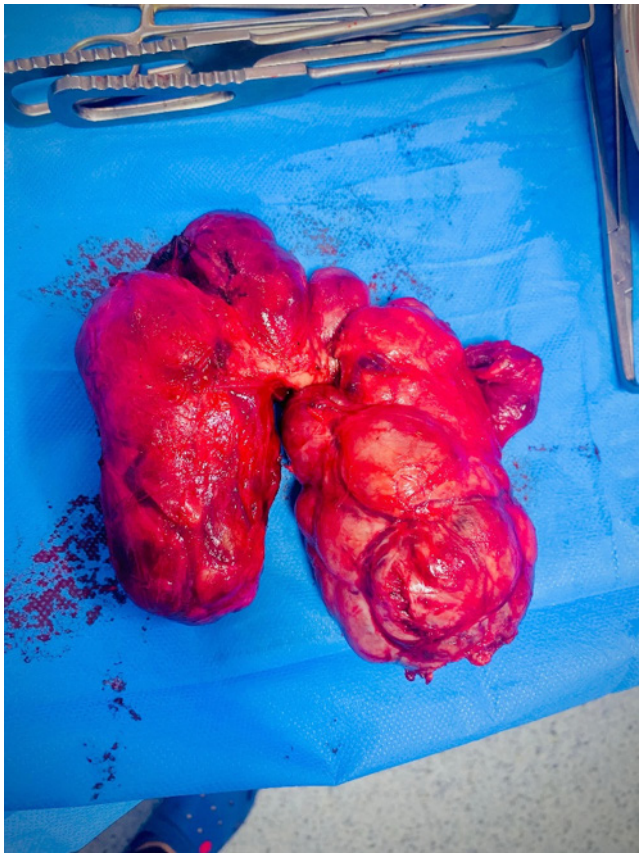

Figure 2: Total thyroidectomy: complete surgical resection of the thyroid gland.

been slowly compressing and narrowing the tracheal lumen for years, creating a chronically adapted airway. Literature has shown that progressively deviating goiters often allow patients to compensate until surgical manipulation or sedation collapses the already compromised airway. [7] This means that an apparently stable and conscious patient may acutely decompensate once muscle tone is lost under general anesthesia. In this case, even the ENT specialists were unable to visualize the glottic opening, which demonstrates that anatomical distortion, chronic inflammation, short neck due to obesity, and previous failed attempts at intubation are strong predictors for difficult intubation, as reported by other studies. [8] Therefore, meticulous pre-operative airway planning, multidisciplinary discussion (anesthesia + ENT + endocrine + ICU), and alternative airway strategies must always be prepared in advance.

Another important discussion point in this case is the importance of communication and psychological reassurance. This patient was extremely anxious because he already had a negative experience with attempted surgery, where the airway could not be secured. Anxiety increases sympathetic stimulation, increases oxygen demand, increases heart rate, increases laryngeal reactivity, and increases the risk of peri-induction respiratory collapse. [9] Good pre-operative communication, use of simple language, and giving time to discuss fears was itself a clinical intervention. In addition, the decision to avoid sudden fasting from the night before and to instead give clear fluids up to 2 hours before was physiologically correct and is supported by modern evidence. [10, 11] This improves gastric emptying and reduces the risk of hypotension in the operating room in obese and high-risk endocrine patients. Pre-warming and active warming are also evidence-based elements of Enhanced Recovery After Surgery (ERAS) pathways and reduce perioperative complications, particularly in prolonged surgeries. [12, 13] In this case, forced-air warming was applied to prevent hypothermia, which is strongly linked to surgical site infections, coagulopathy, and delayed recovery.

Finally, this case underlines that airway management in massive goiter is not only a technical skill but also a structured clinical process. Awake fiberoptic intubation is described in many international guidelines as the gold standard for expected difficult airways, but even that may fail if vocal cord anatomy is severely altered. [14] Surgical tracheostomy may be impossible if the thyroid mass fully covers the trachea. Therefore, the presence of two full teams—anesthesia and ENT—both scrubbed, and the availability of multiple backup devices (fiberoptic scope, video laryngoscope, smaller endotracheal tubes, bougie, jet ventilation) represent best practice. This patient's post-operative care also emphasizes that airway recovery needs ICU availability, full monitoring, and steroid coverage to reduce edema. Multisystem coordination, stepwise planning, and pre-agreed emergency pathways were the real reasons this surgery was completed safely. The case therefore reinforces the principle that a difficult airway is not a one-person skill—it is a team-based, multi-disciplinary preparedness strategy.

CONCLUSIONS

Simultaneous total thyroidectomy and OPCABG can be safely performed in selected high-risk patients with combined severe coronary artery disease (CAD) and retrosternal goiters. Success depends on multidisciplinary planning, tailored airway management, meticulous hemodynamic control, normothermia maintenance, and strategic operative sequencing. This single-stage approach avoids risks associated with delayed treatment and repeated anesthesia exposure.

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CONSENT

Written informed consent was obtained from the patient for publication of this case report.

AUTHORS' CONTRIBUTION

All authors have significantly contributed to the work, whether by following the case at the bedside, conducting literature searches, drafting, revising, or critically reviewing the article. They have given their final approval of the version to be published, have agreed with the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

None.

REFERENCES

1. Koçak H, Becit N, Erkut B, Kaygin M. Combined coronary arterial bypass graft and thyroidectomy in a patient with giant goiter: How reliable is it? Thorac Cardiovasc Surg. 2007;55(01):56-58. https://doi.org/10.1055/s-2006-924105
2. Mali S, Sarebanhassanabadi M. Combined open-heart coronary artery bypass surgery and subtotal thyroidectomy in a 54-year-old patient: A case report. Ethiop J Health Sci. 2016;26(3):285-288. https://doi.org/10.4314/ejhs.v26i3.11
3. Ovassapian A, Tuncbilek M, Weitzel EK, Joshi CW. Airway management in adult patients with deep neck infections: A case series and review of the literature. Anesth Analg. 2005;100(2):585-589. https://doi.org/10.1213/01.ane.0000141526.32741.cf
4. Khan NE, De Souza A, Mister R, Flather M, Clague J, Davies S, et al. A randomized comparison of off-pump and on-pump multivessel coronary-artery bypass surgery. N Engl J Med. 2004;350(1):21-28. https://doi.org/10.1056/nejmoa031282
5. Ascione R, Lloyd CT, Underwood MJ, Gomes WJ, Angelini GD. On-pump versus off-pump coronary revascularization: Evaluation of renal function. Ann Thorac Surg. 1999;68(2):493-498. https://doi.org/10.1016/s0003-4975(99)00566-4
6. Karkouti K, Rose DK, Wigglesworth D, Cohen MM. Predicting difficult intubation: A multivariable analysis.

Can J Anaesth. 2000;47(8):730-739. https://doi.org/10.1007/bf03019474
7. Cheng DC, Bainbridge D, Martin JE, Novick RJ; Evidence-Based Perioperative Clinical Outcomes Research Group. Does off-pump coronary artery bypass reduce mortality, morbidity, and resource utilization when compared with conventional coronary artery bypass? A meta-analysis of randomized trials. Anesthesiology. 2005;102(1):188-203. https://doi.org/10.1097/00000542-200501000-00028
8. Baek SK, Lee MC, Hah JH, Ahn SH, Son YI, Rho YS, et al. Role of surgery in the management of anaplastic thyroid carcinoma: Korean nationwide multicenter study of 329 patients with anaplastic thyroid carcinoma, 2000 to 2012. Head Neck. 2017;39(1):133-139. https://doi.org/10.1002/hed.24559
9. Halkos ME, Vassiliades TA, Douglas JS, Morris DC, Rab ST, Liberman HA, et al. Hybrid coronary revascularization versus off-pump coronary artery bypass grafting for the treatment of multivessel coronary artery disease. Ann Thorac Surg. 2011;92(5):1695-1702. https://doi.org/10.1016/j.athoracsur.2011.05.090
10. Hu S, Li Q, Gao P, Xiong H, Zheng Z, Li L, et al. Simultaneous hybrid revascularization versus off-pump coronary artery bypass for multivessel coronary artery disease. Ann Thorac Surg. 2011;91(2):432-438. https://doi.org/10.1016/j.athoracsur.2010.10.020
11. Choi YS, Shim JK, Song JW, Song Y, Yang SY, Kwak YL. Efficacy of perioperative oral triiodothyronine replacement therapy in patients undergoing off-pump coronary artery bypass grafting. J Cardiothorac Vasc Anesth. 2013;27(6):1218-1223. https://doi.org/10.1053/j.jvca.2013.01.027
12. De Silva RP, Dignan RJ. Does a combined procedure for cardiac surgery and thyroidectomy offer acceptable outcomes? Interact Cardiovasc Thorac Surg. 2015;21(6):787-791. https://doi.org/10.1093/icvts/ivv241
13. Lampridis S, Lau MC, Mhandu P, Parissis H. Concomitant off-pump coronary artery bypass grafting and total thyroidectomy for a large retrosternal goitre: A case report and review of the literature. J Thorac Dis. 2016;8(5):E362-E368. https://doi.org/10.21037/jtd.2016.03.33
14. Ahmad I, El-Boghdadly K, Bhagrath R, Hodzovic I, McNarry AF, Mir F, et al. Difficult Airway Society guidelines for awake tracheal intubation (ATI) in adults. *Anaesthesia*. 2020;75(4):509–28. doi: 10.1111/anae.14904