

# Ultrasonic Scissors-Assisted 'Open-Book' Thyroidectomy in Massive Goiter Compressing Airway and Causing Unilateral Vocal Cord Paralysis

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## SUMMARY

**A massive goiter may constrict the trachea resulting in shortness of breath. Recurrent laryngeal nerve compression may cause vocal cord paralysis. We highlight a case of a 62-year-old female with a 30 year history of an anterior neck swelling gradually increasing in size. She presented with acute symptoms of upper airway obstruction and voice changes. Emergency thyroidectomy was performed by dividing the middle part of the gland using ultrasonic scissors. The recovery was uneventful and the patient regained normal vocal cord function post operatively.**

## KEY WORDS:

*Thyroid, massive, compression, airway, vocal cord paralysis*

## INTRODUCTION

Massive goiters impose extra challenges on the surgeon. In rare circumstances, involvement of the adjacent structures such as the airway, the great vessels and nerves may increase morbidity. Compression of the airway may lead to shortness of breath and recurrent laryngeal nerve (RLN) involvement can complicate the condition. Surgical removal requires modification to the conventional techniques especially when the lateral access and exposure is limited. The gland can be divided in the midline (open-book) as in this case, with ultrasonic scissors.

## CASE REPORT

A 62-year-old Malay lady presented with 30 years history of an anterior neck swelling which was gradually increasing in size. She was referred to our center due to difficulty in breathing associated with noisy breathing and hoarseness of one month duration. There was no history of hyperthyroid or hypothyroid symptoms. She was initially managed for pneumonia with intravenous antibiotic. However she showed no improvement. Our patient had a background history of bronchial asthma for the past 10 years and diabetes mellitus and hyperlipidaemia for the last 3 years.

Examination revealed a woman in mild respiratory distress and inspiratory stridor. The anterior neck mass was very prominent measuring, 23 X 10 cm, with a well-defined

margin. It was firm, non-tender and fixed to underlying structures. No bruit and retrosternal extension were appreciated. Chest auscultation revealed some rhonchi. Flexible nasopharyngoscopy showed mobile false cords which were flabby. Left vocal cord was immobile. Computed tomography (CT) scan revealed multiple thyroid nodules with no normal thyroid tissue. The trachea was compressed and the internal jugular veins (IJV) as well as common carotid arteries (CCA) were displaced laterally. There was no neck nodes, retrosternal extension and no destruction of hyoid bone and thyroid cartilage. Fine needle aspiration for cytology (FNAC) suggested it was a colloid goiter. Blood investigations including thyroid function test (TFT) were within normal limits.

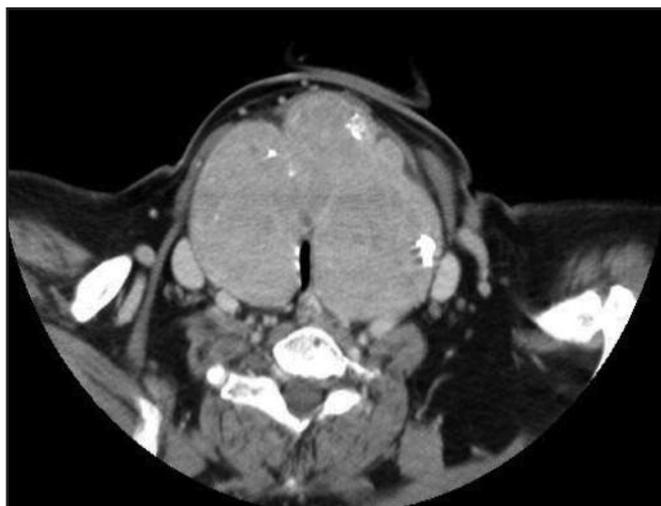
In the ward, she was continued on the antibiotics for the chest infection. She was also commenced on dexamethasone and nebulizer. While in ward on the 4th day of admission she developed difficulty in swallowing with increased difficulty in breathing associated with increasing dysphonia and stridor. An emergency total thyroidectomy was performed.

Intraoperative neuromonitoring (IONM) for the recurrent laryngeal and superior laryngeal nerves identification was used. A huge multinodular goiter was noted, compressing the trachea and extending deep to sternocleidomastoid muscles and pushing the IJV and CCA laterally. Due to inaccessibility from the lateral side of the thyroid lobes, it was approached by first separating the thick middle part of the gland. Ultrasonic scissors were used for the division. Both lobes were separated without significant bleeding. The trachea was exposed by separating the thyroid lobes (open-book). Dissection of each lobe was performed from midline to lateral under IONM guidance. Meticulous dissection near cricothyroid muscles and cricothyroid joints was done in order to identify and save the RLN. The trachea was noted to be severely compressed.

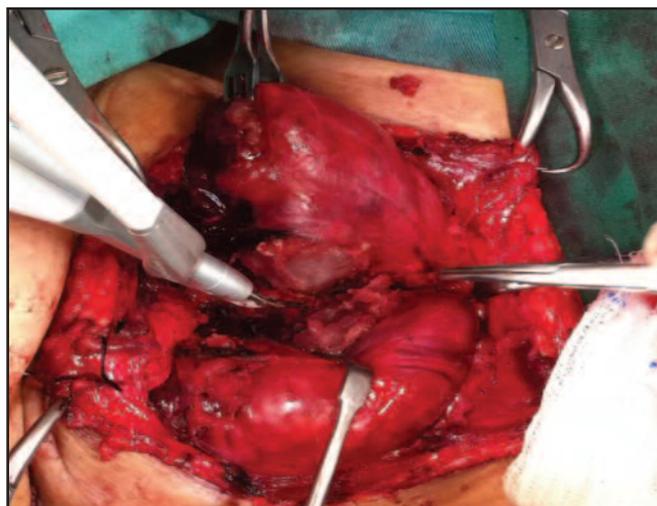
A prophylactic tracheostomy tube was inserted. The gross specimen weighed 450 g. Postoperative recovery was uneventful and tracheostomy tube was removed on day 14 post operatively. There was no stridor. She was able to talk with good voice. Flexible laryngoscopy done before discharge showed mobility of both vocal cords with satisfactory

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**Fig. 1 :** Multinodular goiter compressing the trachea, with thick midline tissue.



**Fig. 2 :** The middle part of the gland was divided.



**Fig. 3 :** Multilobulated gland gross specimen weighted 450 g.

tracheal lumen. She was discharged with thyroxine replacement therapy. Histopathological examination of the thyroid gland confirmed the pathology as colloid goiter.

**DISCUSSION**

Thyroidectomy is performed by exposing lateral part of the gland, in searching for the supplying vessels and recurrent laryngeal nerves (RLN). The nerve which consistently ascends in the tracheoesophageal groove is at risk of injury if it is not earlier identified prior to the ligation of the vessels, particularly the inferior thyroid artery.

The goiter is considered large in size if the weight is more than 100g<sup>1</sup>. The weight of a normal thyroid gland is around 30g. In our case it was 450g and difficult surgery was expected. Massive goiters require modifications to usual technique of thyroidectomy. Usually a large goiter will extend

far laterally which make the exposure of the lateral side of the gland is impossible. Division of midline tissue may be required in such mega-sized goiters<sup>2</sup>. For a benign thyroid lesion, the isthmus can be divided in order to create more space for dissection of the posterior thyroid surface off the trachea. However isthmus division should be avoided in proven or potential malignant condition<sup>3</sup>.

The division can be achieved by using monopolar diathermy. However, some amount of bleeding should be expected as it involves cutting through the lesion which has undergone neovascularization. Ultrasonic scissors has been used for cutting small vessels in conventional thyroidectomy. Time for ligations can be saved and blood loss can be minimized. We extended the use of this instrument for division of thick midline tissue as well.

Cautiously, midline division and further dissection of the lobes should be governed with good anatomical identification of the course of the RLN. We have the opportunity to use the intraoperative neuromonitoring (IONM) to reduce the risk of RLNs injury. However, surgeons must recognize that approaching from medial to lateral has the higher risk of RLN injury even with IONM. The lateral to medial approach is still possible even for large goiters. It is by dividing the sternohyoid and sternothyroid muscles. The access also can be achieved by approaching in the groove between these muscles and the sternomastoid muscle.

Besides used for RLN confirmation, IONM is proven to improve significantly the identification rate of external branch of superior laryngeal nerve during thyroidectomy<sup>4,5</sup>. However, overstimulation and false negative may jeopardize surgical outcome, thus IONM should be used with caution<sup>6</sup>. Tracheomalacia should be expected in long standing goiter and clinically stridorous patient. Tracheostomy is not an absolute necessity. The trachea should be assessed for tracheomalacia before the decision is made to perform a tracheostomy. More often than not, one does need a tracheostomy. In this case, the trachea was severely

compressed. It was complicated by preoperative paralysis of one vocal cord and the risk of injury to the opposite side was high. A temporary tracheostomy was performed as a prophylactic measures to maintain the airway patency.

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