

Acute upper airway obstruction by a goitre due to Hashimoto's thyroiditis

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DESCRIPTION

An 85-year-old woman who lived in Kanuma, Tochigi prefecture, Japan, presented to the emergency department of a hospital with dyspnoea, which developed 3 hours before the visit. At the time of presentation, she was in respiratory distress, with a blood pressure of 171/88 mm Hg, heart rate of 105 beats per minute, respiratory rate of 40 breaths per minute, body temperature was 35.6°C and oxygen saturation was 82% on ambient air. Her oxygen saturation improved to 100% on oxygen at 10 L/min; however, the patient remained tachypnoeic and became cyanotic. Therefore, the patient was transferred to the intensive care unit of our hospital for intensive care. The patient had hypertension but did not have any history of autoimmune or thyroid diseases. The patient did not take any medication and had no allergy. There was no family history of thyroid disease. The patient never smoked and did not take alcohol and there was no history of excessive iodine intake or radiation exposure during the Fukushima Daiichi Nuclear Power Plant accident.

At the time of the transfer, the patient was alert and oriented to time, place and person. Blood pressure was 130/82 mm Hg, heart rate was 81 beats per minute with an irregular rhythm, respiratory rate was 32 breaths per minute, body temperature was 35.3°C and oxygen saturation was 94% on oxygen at 10 L/min. There was no jugular venous distention. A diffuse goitre was noted. Marked wheezes were heard over the entire chest. There was no oedema on extremities. Laboratory data showed increased white blood cell count, mild anaemia and mild hypothyroidism (free T3 2.10 pg/mL, free T4 0.72 pg/mL and thyrotropin 7.72 IU/mL). Arterial blood gas analysis revealed respiratory acidosis (pH 7.287, PaO₂ 155 mm Hg, PaCO₂ 65.7 mm Hg, HCO₃ 28.4 mmol/L). Chest X-ray revealed no apparent abnormality. An ECG showed atrial fibrillation without specific ST-T segment changes. An echocardiogram showed no abnormal finding in cardiac function.

At the time, severe asthma was suspected. The patient was treated with supplementary oxygen, bronchodilator nebulizer and systemic steroid infusion. However, respiratory condition of the patient progressively deteriorated within the next hours and finally, the patient was intubated. Although the patient had a goitre and hypothyroidism, a contrast-enhanced chest and abdominal CT scan was performed since massive pulmonary thromboembolism was considered. There were no signs of deterioration of hypothyroidism such as coma,

bradycardia, hypotension or hypothermia after the CT scan. A diffusely enlarged thyroid extended to the retrosternal, encircling most of the trachea and possibly compressing the trachea on the CT scan (figure 1A). There was no other abnormal finding. Therefore, upper airway obstruction by the diffusely enlarged thyroid was suspected as a cause of her respiratory failure. Additional laboratory tests revealed highly elevated antithyroglobulin antibody (2040.0 IU/mL) and antithyroperoxidase antibody (322.0 IU/mL) levels. The ultrasound of the thyroid showed no findings suggesting malignancy. The arterial blood gas 30 min after intubation on biphasic positive airway pressure (BIPAP) mode of FIO₂ 1.0, inspiratory positive airway pressure (IPAP) 25 cmH₂O and expiratory positive airway pressure (EPAP) 10 cmH₂O was pH 7.367, PaO₂ 373 mm Hg, PCO₂ 44.3 mm Hg and HCO₃ 28.1 mmol/L and several hours later, the PaO₂/FIO₂ (P/F) ratio became stable around 300 on pressure support ventilation (PSV) mode of mechanical ventilation with FIO₂ 0.3, positive end-expiratory pressure (PEEP) 7 cmH₂O and pressure support 5 cmH₂O.

Total thyroidectomy was conducted to treat the patient. On the operation, the enlarged thyroid in the retrosternal space was observed to severely compress the right bronchus. Since the right lobe of the thyroid gland tightly adhered to the surrounding tissues, it was relatively difficult to identify the right recurrent laryngeal nerve. It took 2 hours and 46 min for the operation and the total blood loss was 59 mL. The resected thyroid mass was diffusely enlarged and there was no apparent nodule or cyst (figure 1B). The pathological study showed the diffuse infiltration of lymphocyte dominant inflammatory cells with lymphoid follicular formation and no malignant findings were detected, which was consistent with the diagnosis of Hashimoto's thyroiditis. The patient was extubated on the second day after the operation. A thorough review of the history after extubation revealed that the patient had developed slight dysphagia since 1 month before the admission; however, she did not see a doctor because she thought it was due to ageing. Otherwise, the patient did not have any symptoms before the presentation. After the operation, there were no symptoms or signs indicating recurrent laryngeal nerve palsy. Since the levels of intact parathyroid hormone (4.8 pg/mL) and corrected calcium (8.1 mg/dL) were low on the seventh day after the operation, the patient began to take calcium lactate 4 g/day and alfacalcidol 1 µg/day. The patient was discharged home without any other complications.



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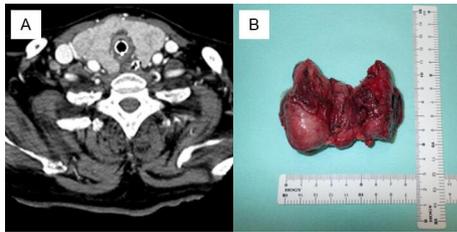


Figure 1 (A) A contrast-enhanced CT scan at the time immediately after intubation. An enlarged thyroidal mass encircling most of the trachea is seen. (B) Macroscopic findings of a resected thyroid. The thyroid is diffusely enlarged and no apparent nodule or cyst is seen.

Goitre is recognised as a possible cause of acute airway obstruction through severe airway compression from masses regardless of malignant or benign as seen in our case.¹⁻³ Patients with goitre are usually asymptomatic even when goitres compress their airway tract¹ and acute respiratory failure secondary to tracheal compression by goitre is infrequent.² Therefore, this condition has a risk that physicians cannot consider as a cause of acute respiratory failure even when recognising a goitre. However, physicians should consider goitre as a cause of acute respiratory failure in patients with goitres which have the characteristics such as diffuse, extending to substernal and encircling most of the trachea.¹⁻³ Physicians should also recognise that not the size of goitres but the anatomy and shape of goitres may play a role developing in critical airway obstruction.¹ Indeed, our patient had a diffuse goitre that extended substernal and encircled most of the trachea. For the treatment, endotracheal intubation and

emergent thyroidectomy have been recommended as the best treatment for patients with life-threatening airway compromise secondary to benign goitres as conducted in our case.^{2,3}

Learning points

- ▶ Acute airway obstruction should be considered in patients with severe progressive dyspnoea or respiratory failure.
- ▶ Goitre can be a cause of critical airway obstruction.
- ▶ Goitres with characteristics such as diffuse, extending to substernal and surrounding almost the entire trachea carry the risks of airway obstruction by goitres.

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