

Difficult airway management using the Pentax-AWS (Airway Scope) for a patient with bilateral giant thyroid tumors

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To the Editor:

We describe the successful application of the Pentax Airway Scope (AWS) in a sitting patient who presented with severe aortic stenosis (AS) and bilateral giant thyroid tumors.

A 67-year-old woman weighing 63 kg complained of dyspnea at rest and repeated loss of consciousness 3 months prior to her visit. She was diagnosed with severe AS and was scheduled for aortic-valve replacement. Her past medical history was remarkable for diabetes-mellitus and untreated sleep apnea. She also encountered radio-contrast nephropathy after cardiac catheterization and thus venovenous hemodialysis was initiated 2 months before aortic-valve replacement surgery. She also had a history of bilateral benign adenomatous giant thyroid tumors (Fig. 1a). The patient was reluctant to undergo resection of these giant tumors. NYHA functional class was Class IV, and she could not maintain a supine position. She required noninvasive positive pressure ventilation at night. SpO₂ was 85–88% with oxygen at 3 L/min via nasal cannula.

Given that preoperative neck and chest CT revealed airway displacement by these tumors (Fig. 1b), it was speculated that dyspnea was due in part to airway compression by these giant tumors. To assess the glottis and avoid hypertension and tachycardia due to prolonged

laryngoscopy, we decided to use the AWS for awake intubation in the sitting position [1].

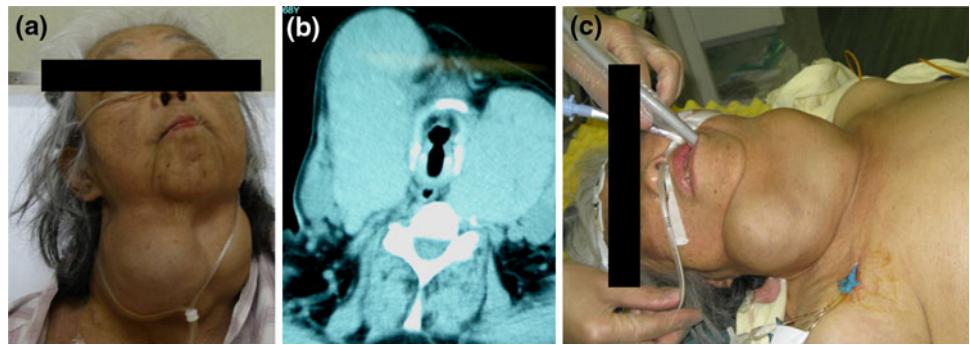
The patient did not receive preoperative medication. She was preoxygenated (5 L/min nasal cannula) in the sitting position. Percutaneous cardiopulmonary support stood by for salvage in the circumstance of “cannot ventilate”. The base of the tongue and the pharyngeal walls were anesthetized with 8% lidocaine spray (total dose 64 mg). Fentanyl (50 µg) and midazolam (1 mg) were intravenously administered. We placed the AWS, observed the glottis and airway, and confirmed that the glottis was not displaced. We also applied 4 mL 4% lidocaine for laryngotracheal topical anesthesia (LTA) under AWS observation. At this point, there was a sudden decrease in SpO₂ to 49% arising from depressed spontaneous breathing. Manual support ventilation in the sitting position was initiated and SpO₂ recovered. Subsequently, we intubated the patient with a single-lumen tube under AWS guidance confirmed by end-tidal CO₂ (Fig. 1c). During this period, we did not observe significant hemodynamic abnormalities (i.e., change of systolic blood pressure was within 10 mmHg).

Thyroid tumors, especially bilateral giant tumors, are potential causes of difficult airways. Tracheostomy using local anesthetics is sometimes impossible in advanced cases because of anatomical distortions of the anterior neck. Given that our patient could not keep a supine position, we performed tracheal intubation in the sitting position so that sufficient spontaneous breathing could be maintained. Rapid and reliable oral intubation in the sitting position is possible using AWS. Recent studies showed that the mobile camera screen of the AWS enables indirect views of the glottis and intubation in several positions, for example sitting, especially for morbidly obese patient [2]. The AWS also enables maintenance of sufficient spontaneous breathing and

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Fig. 1 The bilateral giant thyroid tumor: the frontal sitting view from the lower side (a), cervical CT (b), the supine position after induction of anesthesia (c)



adequate oxygen administration from a nasal cannula while patients are in the sitting position. From the viewpoint of sedation during tracheal intubation, continuous infusion of dexmedetomidine or propofol was considered to be appropriate to avoid respiratory depression. Furthermore, oxygen via an endotracheal tube may have been beneficial. When a patient is in the sitting position for intubation, awake flexible fiberoptic bronchoscopy (FOB) intubation has been the standard technique [3]. However, in this case, such a method was contraindicated because the patient's nasal cavity was too narrow to place an intubation tube of sufficient size, increasing the risk of intubation-induced nasal bleeding, especially in the setting of heparin administration.

The AWS is also beneficial for minimizing laryngoscope-induced stress. A non-line-of-sight view of the glottis limits the need for excessive force during intubation and causes less stress to the patient [4]. Hemodynamically, our patient suffered from severe AS and had very low cardiac function (ejection fraction 28%), placing her at high risk of hemodynamic deterioration due to prolonged laryngoscopy or bronchofiberscopy [5]. Precise LTA under

AWS observation was also considered to have been effective for the hemodynamic stability.

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