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CLINICAL REPORT

Tracheal intubation using Airway Scope® in two patients with difficult airway during cardiopulmonary resuscitation

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Abstract The Airway Scope AWS-S100® (AWS, Pentax, Tokyo), a rigid video laryngoscope with integrated tube guidance that has recently become commercially available, helped the authors to establish airways in two patients with in-hospital cardiopulmonary arrest, after failed attempts to intubate the patients using the Macintosh laryngoscope (that only commanded the Cormack–Lehane grade 4 glottic views), the laryngeal mask airway, and even surgical cricothyroidotomy for the second case. This showed the utility of the AWS in the management of difficult airway cases even in emergency settings.

Keywords Difficult airway · Intubation · Resuscitation

Introduction

Managing the difficult airway during resuscitation is a real challenge for health-care providers. The Airway Scope AWS-S100® (AWS, Pentax, Tokyo) is a rigid video laryngoscope with integrated tube guidance that has recently become commercially available. Here we report two cases of cardiopulmonary arrest (CPA) that proved to have the Cormack–Lehane grade 4 glottic view with the Macintosh laryngoscope but whose tracheas were successfully intubated with the aid of the AWS.

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Case description

Patient 1

An 80-year-old female inpatient with exacerbating rheumatoid arthritis was scheduled for computed tomography (CT) of the chest. Her neck range of motion was severely limited because she underwent posterior fixation of the axial-atlanto-occipital bones for odontoid fracture 4 years previously (Fig. 1). Immediately after transfer from the bed to the CT scanner, she suddenly suffered bradycardia and pulseless electrical activity (PEA). After immediate initiation of chest compression and drug administration, a size 4 laryngeal mask airway (LMA)-ProSeal® was inserted and positive pressure ventilation was started. Her electrocardiogram changed to ventricular tachycardia that was terminated by direct current cardioversion. Spontaneous breathing efforts recurred but stopped again shortly. Positive pressure ventilation through the LMA-ProSeal® was no longer possible, presumably because the LMA was displaced during chest compression. Attempts to intubate the trachea using the Macintosh laryngoscope revealed that even the back of the epiglottis could not be visualized because of the small mandible, short neck, and limited neck mobility. When we inserted the AWS for the first time we failed to locate the laryngeal structure but found the tip of the AWS in the esophagus because the distance between the mouth and the larynx was short relative to the size of the AWS. On the second attempt, we were able to gain a clear view of the glottis, and the trachea was intubated with no apparent complications. The time between removal of the LMA-ProSeal® and tracheal intubation using the AWS was less than 2 min. The patient was transferred to an intensive care unit (ICU) for further treatment. She stayed in the ICU for 27 days; 10 months later she was

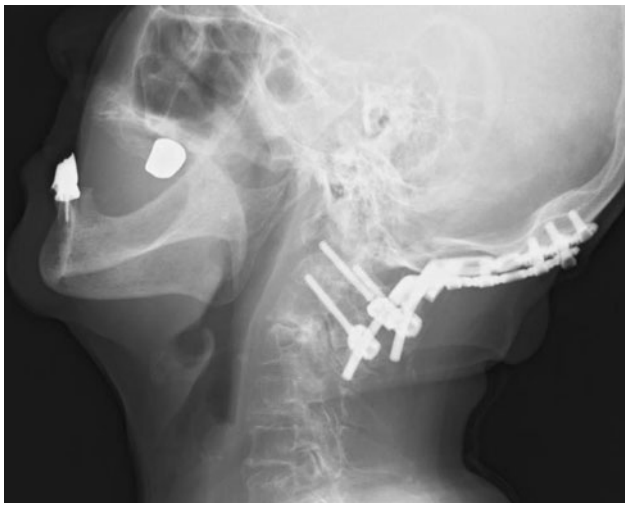

Fig. 1 Patient 1: lateral view of the radiograph of the neck after posterior occipitocervical (O-C2) fusion taken two and a half months before the episode of cardiopulmonary arrest (CPA). Extension and flection of the neck is limited

discharged, on wheel chair, with tracheotomy and percutaneous endoscopic gastrostomy, to a long-term facility.

Patient 2

A 65-year-old male patient was admitted for chemoradiotherapy for a large tongue squamous cell carcinoma. The tumor and bilateral enlarged cervical lymphatic masses occupied nearly the entire oral cavity and displaced the trachea to the right (Fig. 2). He was found in the state of non-witnessed CPA on the ward. Immediately after chest compression was started and drugs were given, an experienced anesthesiologist attempted to secure the airway using a mask, the Macintosh laryngoscope, and the LMA, but none worked. Even surgical cricothyroidotomy was not successful, because the cervical mass was too large and solid to enable the surgeon to palpate the trachea, and also because the vigorous movements associated with chest compression hindered the surgical maneuvers. Meanwhile, the AWS was delivered to the ward and it facilitated intubation after four failed attempts without interrupting the chest compression. The blade had to be inserted much further to the left in the cavity than instructed by the manufacturer. After successful cardiopulmonary resuscitation (CPR), he was transferred to an ICU. It was assumed that it took 25–30 min to intubate him after the non-witnessed CPA event. He never recovered consciousness and died 30 days after the event.

Discussion

Since its introduction and release in 2006 the AWS has gained popularity among anesthesiologists, intensivists,

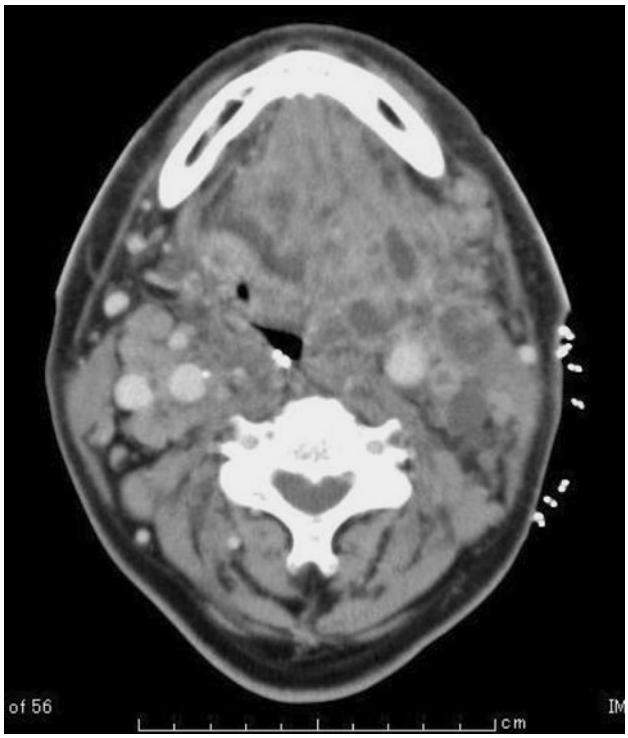

Fig. 2 Patient 2: axial view of the CT image at the level of supraglottis 3 h before the episode of CPA. The tumor and bilateral enlarged cervical lymphatic masses occupy almost the whole oral cavity and displace the trachea to the right

and emergency physicians for management of difficult airways [1]. In both of our patients, the AWS considerably improved the glottic view and made tracheal intubation possible when the Macintosh laryngoscope provided only the Cormack–Lehane grade 4 view. This is consistent with experiences with a larger number of patients [2].

Not all difficult airways are the same, and our cases provide some clues about the etiology the AWS may be useful for. The experience with patient 1 suggests that limited neck mobility may be a good indication for the AWS. This is supported by a previous studies using normal patients with simulated neck immobilization [3, 4]. The AWS does not require alignment of the oral, pharyngeal, and laryngeal axes in one line to visualize the glottis and, therefore, requires less cervical motion than does the Macintosh laryngoscope [5]. The experience with patient 2 suggests that the AWS may be helpful in the presence of a large mass at the base of the tongue. In this patient, the relatively large and rigid blade of the AWS effectively displaced the tongue and created the space to visualize the glottis.

The AWS has been mainly used during anesthesia but its application in emergency settings has been mentioned lately and it has some advantages. For example, tracheal intubation using the AWS does not necessarily require

interruption of chest compressions during CPR [6]. We continued CPR during our attempts to intubate the trachea using the AWS. Furthermore, the AWS requires much less training than does the Macintosh laryngoscope in order to be proficient [7, 8]. Those who performed tracheal intubation in our cases were experienced anesthesiologists but had used the AWS fewer than ten times, only, before. One of them (for Patient 2) had used it twice with a mannequin but never with humans. This novice-friendliness is especially important in CPR, because the providers may not necessarily be experts in tracheal intubation.

Conclusions

In conclusion, the two cases we reported suggest that the AWS may be an attractive addition to our armamentarium of difficult airway management tools during CPR.

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