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Brief Communication

A novel minimally invasive intubation technique

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Abstract: In clinical practice, tracheal intubation entails flexing a tracheal tube with a stylet and inserting it into the glottis under the guidance of videolaryngoscopy. Nevertheless, this approach may trigger intense sympathetic responses and elevate the risk of intubation failure. To address these issues, our research team put forward a minimally invasive intubation technique by using SEE-VL and SEEK^{flex}, which is anticipated to enhance the first-pass success rate of intubation and mitigate stress reactions. This novel technology is expected to minimize the trauma associated with intubation and improve patients' comfort during medical treatment.

Keywords: Tracheal intubation, minimally invasive, slim exquisite easy-exposing video laryngoscope, safe easy endotracheal kit-flexible

Introduction

In clinical practice, tracheal intubation generally entails bending a tracheal tube with a stylet into a fish-hook shape and inserting it into the glottis under the guidance of videolaryngoscopy. This conventional approach presents several limitations: 1) The stimulation of the pharyngeal and tracheal mucosa may induce intense sympathetic reactions, such as sudden rise of blood pressure, tachycardia, and arrhythmias, which are especially harmful to patients with cardiovascular comorbidities; 2) The success rate of procedure highly depends on operator's expertise, and repeated attempts may aggravate airway damage and hemodynamic instability; 3) Glottal exposure varies among individuals (e.g., in obese patients, those with short necks, small jaws, or restricted mouth opening). Obstruction of glottal visualization elevates the rate of unsuccessful intubation and may result in accidental esophageal intubation [1]; 4) For patients with limited cervical spine mobility and restricted mouth opening, laryngoscope insertion into the oral cavity may be difficult. Moreover, the reduced operating space for endotracheal intubation further increases the difficulty of intubation [2].

To address these limitations, our team proposed the concept of minimally invasive intubation. This technology characterized by the introduction of slimmer laryngoscope blades (SEE-VL, Slim Exquisite Easy-exposing Video Laryngoscope) and flexible bougies (SEEK^{flex}, Safe Easy Endotracheal Kit-flexible), is expected to substantially increase the first-pass success rate of intubation and reduce stress responses during the intubation process (**Figure 1**).

Both tools employed in this technology have been approved by local regulatory authorities (SEE-VL No.: Su Xie Zhun 20252082044; SEEK^{flex} No.: Zhe Xie Zhun 20232081322).

SEE-VL is characterized by a clinically optimized slim-blade design, which facilitates oral insertion and provides ample operating space within the oral cavity for endotracheal intubation. In addition, SEE-VL achieves optimal exposure of laryngeal structures while minimizing additional trauma to the oral cavity and larynx through optimized blade cross-sectional design. The higher-resolution screen display of SEE-VL enables clearer visualization of laryngeal structures and glottis, thereby enhancing intubation procedure precision (**Figure 2**).

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Figure 1. Clinical application of minimally invasive intubation technique.

Research findings have indicated that SEEK^{flex} is capable of reducing complications during intubation [3, 4]. Its advantage lies in the capacity to diminish the force necessary for laryngoscope elevation, facilitating the precise insertion of a tracheal catheter into the glottis, even when glottal exposure is suboptimal. The application of this novel technology is expected to minimize trauma during intubation, providing an approach for patient comfort in medical care.

Disclosure of conflict of interest

None.

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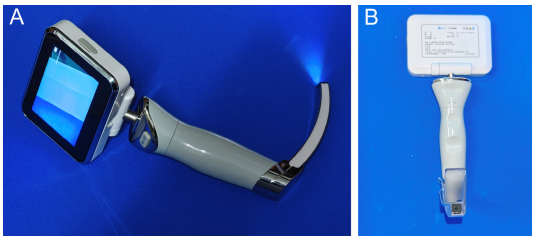

Figure 2. Photographs of SEE-VL. A: overall view, B: rear view, with disposable laryngoscope lens.

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