



Original contribution

Comparison of a new visual stylet (Discopo)–guided laryngeal mask airway placement vs conventional blind technique: a prospective randomized study[☆]



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Abstract

Study Objective: To compare the ease of laryngeal mask airway (LMA) insertion and fiberoptic view of LMA after placement using the Discopo visual stylet–guided insertion and conventional blind technique.

Design: Prospective, randomized controlled study.

Setting: Operating room in a university hospital.

Patients: One hundred adult patients scheduled for elective surgery under LMA general anesthesia were enrolled.

Interventions: Patients were randomly allocated to 2 groups: GLMA group using a visual stylet–guided technique (n = 50) and BLMA group using standard blind technique (n = 50). Correct placement of the LMA was confirmed using clinical test along with fiberoptic assessment.

Measurements: Unblinded data were collected about the insertion time, the first attempt success rate, the LMA position adjustment rate, fiberoptic view of LMA anatomical position, hemodynamic responses, and the adverse insertion responses (bucking, breathholding, and laryngospasm). Blinded data were recorded about postoperative airway morbidity (visible blood staining on LMA at removal, sore throat, and hoarseness).

Main results: Insertion was more frequently successful at the first attempt in GLMA than that in BLMA group (100% vs 92%; $P = .041$). The time taken for establishing effective airway was shorter in GLMA than that in BLMA (54.8 vs 62.9 seconds; $P = .001$). The patients in BLMA group required more readjustment and reinsertion than those in GLMA group (38% vs 0%; $P = .000$). The fiberoptic view was significantly better in GLMA group ($P < .001$). No difference between the 2 groups existed regarding hemodynamic stress responses, incidences of adverse insertion responses, and postoperative airway morbidity.

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Conclusions: By direct visualizing the whole process of LMA insertion, the Discopo visual stylet increases the success rate and accuracy rate of LMA placement without increasing hemodynamic stress response or incidences of adverse events.

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1. Introduction

The laryngeal mask airway (LMA) is a widely used supra-glottic airway device. The manufacturer recommends inserting the LMA using standard blind insertion technique described by Dr Brain since it was introduced in late 1980s [1]. However, previous studies used fiberoptic bronchoscopy to check the position of LMA and found that approximately 40% to 60% of blindly placed LMA did not reach the ideal or nearly ideal position [2,3], and some needed repositioning to improve the ventilation. During the repositioning, complications such as hypoxia and laryngospasm may occur [4]. Therefore, ideal or nearly ideal anatomical positioning of the LMA is required to minimize the risk of untoward airway events and maximize their intended functionality [5]. Although direct visual laryngoscopy was used to facilitate insertion by several researchers, the results were still controversial [2,3]. Recently, a new visual stylet (Discopo; Shanghai Yongwei Medical Technology Co, Ltd, China) [6] was reported to be an aid to endotracheal intubation, which allows direct observation of the tracheal tube's advancement. This device has a flexible metal main body with a 5.0 mm outside diameter, 37 cm length, a 0.1 million pixels camera embedded within the tip, a light source mounted around the camera for illumination, a handle that can transport signals (wirelessly or wired), and a viewing screen approximately 5.6 in (Fig. 1) [6]. This technique may also visualize the whole process of LMA insertion, but it has not been reported to guide LMA insertion so far. Therefore, we consider it worthwhile to access the ease of insertion and correct placement of LMA using this novel visual stylet and compare it with the traditional blind insertion technique.

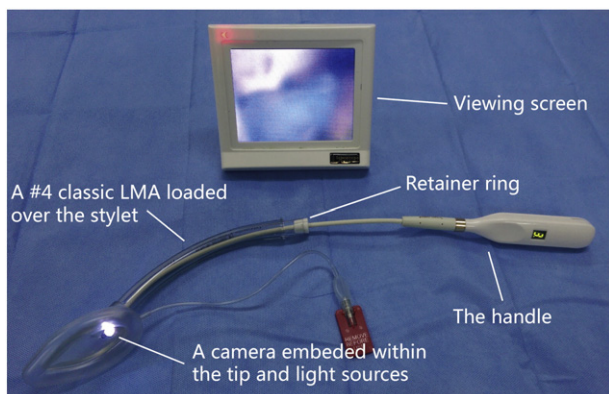


Fig. 1 The Discopo visual stylet with a mounted #4 classic LMA. The components of the Discopo visual stylet include a viewing screen, a malleable metal visual stylet, and a handle.

2. Materials and methods

2.1. Participants

The study protocol was approved by the Institutional Research Ethics Committee of Shanghai Sixth People's Hospital Affiliated to Shanghai Jiaotong University, Shanghai, China, on January 13, 2012. After obtaining informed written consent, 100 adult patients of either sex (American Society of Anesthesiologists physical status grades 1-2, aged between 19 and 84 years, and weight between 42 and 98 kg) undergoing elective short surgical procedures requiring general anesthesia without muscle relaxation were randomly allocated (by opening a sealed opaque envelope) into 2 groups for LMA insertion using either blind technique (BLMA) or visual stylet-guided technique (GLMA). Patients with anticipated difficulty airway (mouth opening <3.0 cm, Mallampati score 3-4, neck mobility <80°, thyromental distance <6.5 cm) and abnormal anatomical structure involving respiratory tract were excluded. Patients at increased risk for aspiration were also excluded from this study.

2.2. Anesthesia

The LMA-unique TM (LMA Corporation, Singapore) was used in both groups, and the appropriate size was selected according to manufacturer's recommendations. Airway management was performed by 1 anesthesiology (LLZ) with experience of using the blind insertion and the new visual stylet-guided insertion technique in more than 100 patients, respectively, before starting this study. A standard anesthesia protocol was followed, and routine monitoring was applied. All patients were preoxygenated with 100% oxygen for 3 minutes. Anesthesia was induced with fentanyl (1-2 $\mu\text{g}/\text{kg}$) and propofol (1.5-2.5 mg/kg) intravenously. Once patient was sufficiently anesthetized by accessing loss of verbal contact and motor response to jaw thrust, the lubricated LMA was inserted using 2 different techniques according to group allocated. In the blind group (BLMA), the traditional blind technique recommended by Dr Brain [1] was performed. In the visual stylet group (GLMA), the stylet was bent slightly into a curvature similar to that of LMA Unique and put inside the shaft of LMA with the tip of the stylet 0.5 cm proximal to the mask aperture (Fig. 1). The operator elevated the mandible with the left hand and inserted the stylet with a mounted LMA into the mouth along the dorsal midline aspect of the tongue with the right hand grasped the shaft of LMA in pen-like fashion. Once the LMA was inside the patient's mouth, the operator began to

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