The efficacy of flow and pressure release in self-assembled emergency jet devices

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Introduction: In current anesthesia literature [1,2] self-assembled devices consisting of a three-way stopcock connected to a high pressure oxygen source and a transtracheal catheter, have been proposed for transtracheal jet ventilation (TTJV) in airway emergencies. As a three-way stopcock acts as a “flow splitter”, it will never ensure complete flow and pressure release through its side port when connected to a continuous flow of oxygen. In an obstructed upper airway, this continuous oxygen flow to the patient will inevitably create positive end-expiratory pressure (PEEP), which can lead to barotrauma and hemodynamic instability. The aim of the present study was to measure the efficacy of flow and pressure release of three self-assembled devices for TTJV.

Methods: Three self-assembled jet devices, consisting of a three-way stopcock with an inner diameter of 2.0 mm, 2.5 mm, or 3.0 mm (devices A, B, and C) connected inline to a flowmeter and a 75 mm long, 2 mm ID transtracheal catheter, were tested in a laboratory setup. The generated pressure at the catheter tip (PACT) of each self-assembled jet device with the side port in an open position was measured using the Calibration Analyzer series RT-200 (Timeter Instrument Corp., St. Louis, MO) at oxygen flows of 6, 9, 12, and 15 L/min, respectively. Five measurements were performed and the mean and standard deviation were calculated.

Results: The generated PACT for each device at different oxygen flows is shown (Fig. 1).

Conclusion: By merely connecting the self-assembled three-way stopcock devices A and B to a high-pressure oxygen source set at a continuous oxygen flow of more than 9 and 12 L/min, respectively, dangerously high airway pressures are inevitable in case of upper airway obstruction. Based on our findings, these self-assembled jet devices should not be used in airway emergencies, because upper airway obstruction can never be excluded.


References


References


A prospective fiberoptic evaluation of the Supreme™ Laryngeal Mask Airway

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Background: Since March 2007, a new disposable Laryngeal Mask Airway has become available. The LMA Supreme™ (LMA-S) aims to combine the LMA Fastrach’s™ feature of easy insertion with the gastric access and high oropharyngeal leak pressures (OLP) of the LMA ProSeal™ (PLMA).

Methods: We performed an evaluative study with LMA-S size 4 on 100 female patients to measure the ease of insertion, to determine the laryngeal fit by fiberoptic classification, to evaluate the OLP, and to report adverse events.

Results: Insertion of the LMA-S was possible in 94 (94.0%) patients during the first attempt and in the remaining five (5.0%) during the second attempt. In one small patient, LMA-S could not be inserted due to limited pharyngeal space. This patient was excluded from further analysis. Insertion of a gastric tube was possible in all patients at the first attempt. Mean time for LMA-S insertion was 12.8 (8.30 ±4.7) seconds. Laryngeal fit evaluated by fiberoptic view was rated as optimal in all patients, both immediately after insertion of the LMA-S and at the end of surgery. After equalization to room pressure, mean cuff volume needed to achieve 60 cmH2O cuff pressure was 18.4 (8.31 ±3.8) mL. Mean OLP at the level of 60 cmH2O cuff pressure was 28.1 (21-35 ±3.8) cmH2O. Eight (8.1%) patients complained of a mild sore throat. No patient reported dysphagia or dysphonia.

Conclusions: Clinical evaluation of LMA-S showed easy insertion, optimal laryngeal fit, and low airway morbidity. OLP results were comparable to earlier data from PLMA.


The Airway Scope, a new video laryngoscope: its use in 253 patients with difficult airways

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Background: The Pentax Airway Scope AWS-S100 (Hoya, Tokyo, Japan) is a new video laryngoscope that enables laryngoscopy without alignment of the oral, pharyngeal, and laryngeal axes [1]. We evaluated the Airway Scope in patients with difficult airways.

Materials and Methods: We obtained IRB approval for this work. The Airway Scope handle has a 6 cm LCD screen, and a flexible image tube with camera and LED light source mounted at the tip. The disposable polycarbonate PBlade completely encloses and protects the image tube, and has a groove to hold and guide the insertion of the tracheal tube and a separate channel for a suction catheter. We diagnosed intubation to be difficult when no part of the vocal cords could be seen on conventional direct laryngoscopy, when attempts at intubation had failed, or when the anesthesiologist would have used alternative devices such as a bougie, fiberoptic bronchoscope, or LMA Fastrach had the Airway Scope been unavailable.

Results: There were 175 males and 78 females patients with age 58.5 yrs and mean BMI of 23.5. The causes of difficulty included limited head and neck movement due to cervical spine pathology or trauma, and anatomical variations such as retrognathia, poor Mallampati score, short thick neck, and floppy epiglottis. The Airway Scope enabled full view of the glottis in 245 (96.8%) patients. Tracheal intubation was successful in 251 (99.2%) patients, and successful at the first attempt in 240 (94.9%) patients. In two patients, the PBlade tip could not be positioned posterior to the epiglottis and it was not possible to direct the tracheal tube into the trachea. In one patient, blood in the pharynx obstructed any glottis view.

Discussion: We have found high a success rate of laryngoscopy and intubation with the Airway Scope in a variety of difficult airway situations. With the Airway Scope, we could easily guide the tracheal tube into the trachea, with minimal neck movement. This is an advantage compared to other videoscopes such as the GlideScope, with which intubation is frequently difficult despite good views [2]. The Airway Scope is also lightweight, powered by ordinary AA alkaline batteries, water resistant, and completely portable. Our results suggest that the Airway Scope is a promising device for difficult airway management.


Deceased airway complications after introduction of an airway curriculum in an academic setting

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Introduction: Successful airway management is a critical part of anesthesia practice [1]. Airway-related adverse outcomes account for 14% of malpractice litigation [2] and failed endotracheal intubation caused 20% of our in-OR cancellations. We designed and implemented an airway curriculum to improve our residents’ knowledge and technical skill.