



Original Contribution

# Comparison of the clinical performances of Air-Qsp and i-Gel for airway management under general anesthesia with a muscle relaxant



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## Abstract

**Study objectives:** Recently, i-Gel intubating laryngeal airway (ILA) has been frequently used because of the ease for airway insertion by residents and young anesthesiologists. However, it sometimes fails to fit or ventilate sufficiently in Japanese patients. Use of Air-Qsp, which is a new non-inflatable cuffed ILA, in a clinical setting has become possible. The purpose of this study was to compare the clinical performance of Air-Qsp with that of i-Gel for airway management in Japanese adult patients.

**Design:** A randomized, single-blinded, prospective study was conducted after approval from the institutional review board.

**Setting:** Operating rooms at hospitals.

**Patients:** Thirty-seven adult patients aged 20 to 69 years, with ASA physical status I or II, and scheduled for elective surgery under general anesthesia in the supine position.

**Interventions:** Patients were randomly assigned to insertion with Air-Qsp (Group A: n = 20) or i-Gel (Group I: n = 17).

**Measurements:** The number of insertions, duration of insertion, changes in systolic blood pressure and heart rate during insertion, delivered tidal volume for setting volume control ventilation, distribution of the tips of the bronchofiberscopes (BFs) on a clock face, and the number of postoperative complications was evaluated.

**Main results:** Two patients in Group A and one patient in Group I were excluded because insertion of the device failed. There were no significant differences in measured parameters between the 2 groups. The distribution of the tips of the bronchofiberscopes tended to be around the center of the glottis in Group A, whereas they were more toward the 6-o'clock position in Group I.

**Conclusions:** Air-Qsp is as useful as i-Gel in Japanese patients and the distributions of the tips of BFs through ILAs are different for Air-Qsp and i-Gel.

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## 1. Introduction

The i-Gel intubating laryngeal airway (ILA) is a single-use device with a non-inflatable cuff made of thermoplastic elastomer [1], that is designed to provide a seal by conforming to

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throats with different shapes and to ensure sufficient seal pressure of 20 to 40 cmH<sub>2</sub>O [2,3]. Recently, this device has been frequently used because of the ease of use by residents and young anesthesiologists. However, we sometimes experienced failure to fit or ventilate sufficiently in Japanese patients. Air-Qsp, which is a new non-inflatable cuffed ILA [4] with a different shape from that of i-Gel, became able to be used in a clinical setting for Japanese patients. The mask cuff of Air-Qsp inflates appropriately upon inhalation with positive pressure ventilation, and decompresses upon exhalation to the level of PEEP [4]. Moreover, the cuff is not overinflated by high positive pressure or nitrous oxide, because it is not a closed cavity.

There has been no study in which the usefulness of the 2 non-cuffed ILA, Air-Qsp and i-Gel for airway management was compared. Therefore, we examined the clinical performance of Air-Qsp and compared it with that of i-Gel for airway management in a clinical setting under general anesthesia with a muscle relaxant.

## 2. Materials and methods

After institutional approval and informed consent had been obtained, 37 adult patients, aged 20 to 69 years, with ASA physical status of I or II who were scheduled for elective surgery under general anesthesia in the supine position were enrolled in this prospective study. Patients who had a body mass index over 35, who had contraindications to insertion of an ILA (eg, gastrointestinal reflux and abnormal airway anatomy), or who refused or were uncooperative to participate were excluded from the study.

The use of Air-Qsp (Group A: n = 20) or i-Gel (Group I: n = 17) was randomized and single-blinded. The device size was selected according to the manufacturer's recommendations. In Group A, sizes of 2.5 and 3.5 were selected for patients weighing 30 to 50 kg and 50 to 70 kg, respectively. In Group I, sizes of 3 and 4 were selected for patients weighing 30 to 60 kg and 50 to 90 kg, respectively.

After admission to the operating room and sufficient preoxygenation, general anesthesia was induced using 2 mg/kg propofol and 0.6 mg/kg rocuronium. After 2 min of inhalation with 3% sevoflurane, either Air-Qsp or i-Gel was inserted. Successful insertion of the ILA was confirmed by a square wave capnometer trace and normal chest movement. Appropriate device placement was judged as being failure in the following cases: insertion into the pharynx more than 3 times, ineffective ventilation shown by inadequate chest raise or abnormal wave by a capnometer, and malposition of the ILA.

As the primary outcomes, we recorded the number of insertion attempts, duration of insertion, changes in systolic blood pressure and heart rate during insertion, delivered tidal volume for setting volume control ventilation of 200, 300 or 400 mL, and number of postoperative complications. Secondly, we observed the distributions of the tips of the bronchofiberscopes

(BFs) through the ILAs and plotted the center of the view using a clock face diagram.

Data were analyzed using the Mann-Whitney *U* test. A value of  $P < .05$  was considered significant.

## 3. Results

Thirty-seven patients participated in this study. Two patients in Group A and one patient in Group I were excluded because insertion was unsuccessful. Therefore, 34 patients were evaluated in this study.

Characteristics of the evaluated patients are shown in Table 1. There were no significant differences in patient characteristics between the 2 groups.

As for the primary outcomes, there were no significant differences in number of insertion attempts ( $P = 1.0$ ), duration of insertion ( $P = .80$ ), changes in systolic blood pressure ( $P = .51$ ) and heart rate ( $P = .89$ ) during insertion, and delivered tidal volume for setting volume control ventilation (VCV of 200 mL:  $P = .34$ , 300 mL:  $P = .71$ , 400 mL:  $P = .77$ ) (Table 2). Although one patient in each group had sore throat, there were no severe complications, including laryngospasm, aspiration, hypoxemia and cardiac arrest, in the 2 groups.

As shown in Fig. 1, however, we found different distributions of the tips of the BFs through ILAs. The tips of the BFs were located around the center of the glottis in Group A, whereas they tended to be more toward the 6 o'clock position in Group I.

## 4. Discussion

We have sometimes experienced insufficient fitting and ventilation when using i-Gel in Japanese patients. In the present study, we compared the clinical performance of i-Gel with that of Air-Qsp, which is a new non-cuffed ILA device and has a different shape from that of i-Gel.

The primary outcomes of our study were similar in the 2 patient groups using Air-Qsp and i-Gel.

**Table 1** Characteristics between the Group A and the Group I.

	Group A	Group I	<i>P</i>
Sex (male/female)	18 [5/13]	16 [10/6]	.05
Age	52 [24-69]	51 [20-68]	.85
Height	158 [150-171]	164 [142-178]	.10
Weight	53 [45-78]	64 [48-79]	.05
BMI	23 [16-28]	24 [29-29]	.10

Values: absolute numbers or medians [min-max].

There were no significant differences in patient characteristics between the 2 groups.

BMI, body mass index.

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