Cannot Intubate–Cannot Ventilate and Difficult Intubation Strategies: Results of a Canadian National Survey

David T. Wong, MD*, Kevin Lai, BSc†, Frances F. Chung, FRCPC*, and Ranee Y. Ho‡

*Department of Anesthesiology, †University of Toronto, Ontario, Canada; and ‡McMaster University, Hamilton, Ontario, Canada

The purpose of this study was to determine the preferences of Canadian anesthesiologists in difficult intubation and cannot intubate–cannot ventilate (CICV) situations. Using a mailed survey, we asked anesthesiologists their preferences for and comfort level in using (a) alternative airway devices in a difficult intubation scenario and (b) infraglottic airway in a CICV scenario. Chi-square analysis and Student's *t*-test were used for categorical and continuous variables. Nine-hundred-seventy-one of 2066 surveys were returned. In the difficult intubation scenario, the preferred alternative airway devices were lighted stylet (45%), fiberoptic bronchoscope (26%), and intubating laryngeal mask airway (20%). Only 57% of respondents had encountered a CICV situation in real life. In the CICV scenario, preferred infraglottic airways were cricothyroidotomy by IV catheter (51%), percutaneous cricothyroidotomy (28%), and tracheostomy by surgeon (14%). Anesthesiologists had little experience and were uncomfortable with open surgical infraglottic airways. Anesthesiologists with experience using infraglottic airways on mannequins were more comfortable using them in patients ($P < 0.001$). In conclusion, in a difficult intubation scenario, the lighted stylet has emerged as the preferred alternative airway device. In a CICV scenario, respondents preferred cricothyroidotomy by IV catheter, followed by percutaneous cricothyroidotomy and tracheostomy by surgeon. Practice on mannequins was associated with improved comfort in using infraglottic airways in patients.

(Anesth Analg 2005;100:1439–46)

Difficult airway scenarios can result in significant morbidity and mortality (1). Although rare, cannot intubate–cannot ventilate (CICV) scenarios are life threatening (2). The American Society of Anesthesiologists (ASA) and the Canadian Airway Focus Group have released recommendations for difficult airway management (3–5). In recent years, new airway instruments have been introduced, such as the intubating laryngeal mask airway (ILMA) and the lighted stylet. Because there are few randomized clinical trials evaluating airway devices, there is little consensus regarding optimal equipment use in various difficult airway situations. Although there have been studies (6–8) that surveyed airway management choices in difficult airway scenarios, there are few data on anesthesiologists' preferences for infraglottic airway techniques when faced with a CICV scenario. Faced with such rarely encountered emergency airway situations, many anesthesiologists do not have the practical skills to proficiently perform infraglottic airway techniques such as cricothyroidotomy (9). This study surveyed the preferences and comfort level of Canadian anesthesiologists in difficult intubation and CICV situations.

Methods

This study was approved by the institutional research ethics board. The survey package contained a cover letter, a two-page survey, and a stamped return envelope. The package was mailed to all residents and active members of the Canadian Anesthesiologists' Society across the country in April 2003. Surveys that were returned blank or with a note that the addressee was retired or out of the country were excluded. Participation was voluntary, with no remuneration. Each survey was coded with a unique identification number to allow for a second mailing to nonrespondents. The identity of respondents remained confidential.

The survey (Appendix 1) contained three sections. The first section described two failed intubation attempts with direct laryngoscopy and bougie after general anesthesia induction in a patient scheduled for elective surgery. Respondents were asked to choose a

Supported in part by the Department of Anesthesiology, Toronto Western Hospital, University Health Network, University of Toronto, Ontario, Canada, and by Vitaid medical products, Canada.

Accepted for publication October 6, 2004.

Address correspondence and reprint requests to David T. Wong, MD, Department of Anesthesiology, Toronto Western Hospital, 399 Bathurst St., Toronto, Ontario, Canada M5T 2S8. Address e-mail to david.wong@uhn.on.ca.

DOI: 10.1213/01.ANE.0000148695.37190.34

0003-2999/05

first- and a second-choice alternative airway device from among the following options: fiberoptic bronchoscope (FOB), ILMA, lighted stylet, rigid fiberoptic scope (Bullard), and other device. Respondents were also asked if they had personally used the following airway devices on mannequins and on patients: FOB, ILMA, lighted stylet, Bullard, and retrograde wire set. Their comfort level in using the airway devices was assessed on a five-point Likert scale. The second section contained questions regarding CICV situations. Anesthesiologists were asked the number of times and in what settings (elective surgery, emergency surgery, obstetrics, trauma, burn, or intensive care unit (ICU)) they encountered CICV situations. Anesthesiologists were presented with a patient who had oxygen desaturation in a CICV situation and were asked to choose a first- and second-choice infraglottic airway. Options were cricothyroidotomy by IV catheter, cricothyroidotomy by Melker percutaneous dilational kit, cricothyroidotomy by open surgical method, tracheostomy by the anesthesiologist, and tracheostomy by a surgeon. On a five-point Likert scale, respondents were asked about their use of and comfort level with the infraglottic airway techniques. They were asked whether they were familiar with the steps of the CICV protocol in the ASA difficult airway algorithm and whether they had attended a difficult airway workshop in the last 5 yr. The third section collected demographic data, including age, sex, years of practice, type of hospital, and province of practice.

The difficult intubation and CICV responses were analyzed according to the anesthesiologists' age, sex, years of practice, type of hospital, and geographic location. Age was converted to a binary variable ($\leq$54 or $\geq$55 yr) after deriving a cutpoint that provided the greatest statistical difference between the age groups for the survey questions (χ^2 analysis). Similarly, cutpoints for years in practice and geographic location were derived. Years in practice was converted to a binary variable (resident or practicing anesthesiologist). Provincial designation was converted to one of four regions: "Western provinces" (British Columbia, Alberta, Saskatchewan, and Manitoba), "Ontario," "Quebec," and the "Maritime provinces" (Newfoundland, Nova Scotia, New Brunswick, and Prince Edward Island). The Northwest Territories, Yukon, and Nunavet were excluded because of limited data points (three surveys returned in total).

Survey responses were entered into a Microsoft Access (Microsoft Corp., Redmond, WA) database. Statistical analysis was conducted with SPSS Version 11.0 for Windows (SPSS Inc., Chicago, IL). Differences in response frequency and means were compared among the demographic groups. Categorical variables were compared by using χ^2 analysis. Likert scale data (Questions 3 and 8; Appendix 1) were converted to a binary variable: comfortable (scores of 4 or 5) or uncomfortable (scores of 1 or 2). Respondents who answered "equivocal" (score of 3) were not included in either the "comfortable" or "uncomfortable" categories. Continuous variables were compared by using Student's *t*-test or analysis of variance. A P value of <0.05 was considered statistically significant.

Results

Of the 2066 surveys sent, 971 (47%) were returned. Returned surveys that were blank or returned to the sender because of change of address, death, or retirement were excluded from analysis. Partially filled-in surveys were included. Blank responses to questions were coded as missing data. Demographic data are shown in Table 1.

The three most commonly chosen first-choice alternative airway devices were the lighted stylet, FOB, and ILMA (Table 2). There was a significant difference among the top three choices when comparing between age groups (age $\leq$54 yr: lighted stylet, 47.1%; FOB, 26.7%; and ILMA, 16.8%, versus age $\geq$55 yr: lighted stylet, 31.0%; FOB, 22.0%; and ILMA, 36.9%; $P = 0.02$) and when comparing years in practice (residents: lighted stylet, 54.4%; FOB, 31.6%; and ILMA, 8.9%, versus practicing anesthesiologists: lighted stylet, 42.2%; FOB, 24.7%; and ILMA, 22.6%; $P < 0.001$). Anesthesiologists at teaching hospitals preferred the lighted stylet (48.1%) and FOB (28.7%) to the ILMA (14.2%). More community hospital anesthesiologists preferred the ILMA (lighted stylet, 39.8%; FOB, 23.0%; ILMA, 27.6%), although it was also not their first choice. The top two second-choice alternative airway devices were the FOB and ILMA.

Most respondents had personally used the FOB, lighted stylet, and ILMA on patients (Tables 3 and 4), whereas few had tried the retrograde wire set or the Bullard scope. The proportion of respondents comfortable with alternative airway devices seemed to parallel their experience in use on patients (Tables 3 and 4): most anesthesiologists were comfortable with FOB, lighted stylet, and ILMA but not with the Bullard or retrograde technique. Residents (Table 3) and younger respondents (Table 4) had more experience with the lighted stylet and FOB and were more comfortable with these devices than their counterparts. Practicing and older anesthesiologists had more experience with the retrograde technique and were more comfortable using it (Tables 3 and 4). Anesthesiologists from teaching institutions had more experience with the FOB and lighted stylet and were more comfortable in using these devices than community anesthesiologists (FOB, 91.5% versus 84.7%; lighted stylet, 92.3% versus 80.8%; $P < 0.001$). Anesthesiologists who had experience

Table 1. Demographics of Respondents

Variable	*n* (%)
Age (yr)	
25–35	25.8
36–44	25.0
45–54	30.7
55–64	13.0
≥65	4.7
Not specified	0.7
Experience in anesthesia	
Residents	16.5
0–4 yr	13.6
5–9 yr	13.5
10–19 yr	29.0
20 yr and more	26.0
Not specified	1.4
Sex	
Male	72.1
Female	26.1
Not specified	1.9
Type of hospital	
Teaching	54.8
Community	40.5
Not specified	4.7
Geographic region	
Western Provinces	30.5
Ontario	41.4
Quebec	17.2
Maritime Provinces	8.8
Territories	0.3
Not specified	1.9

Table 2. First and Second Alternative Airway Choices After a Failed Intubation Attempt with Direct Laryngoscopy

Variable	First choice	Second choice
Lighted stylet	44.5%	14.7%
FOB	25.8%	40.5%
ILMA	20.3%	32.1%
Bullard scope	5.5%	7.7%
GlideScope	1.3%	1.3%
Retrograde wire set	0.1%	0.5%
Flexible tip (McCoy)	0.4%	0.1%
Other	2.2%	3.0%

FOB = fiberoptic bronchoscopy; ILMA = intubating laryngeal mask airway.

with particular alternative airway devices were significantly more comfortable using such devices compared with those who had no experience with them (FOB, 94.4% versus 12.5%; ILMA, 93.7% versus 29.3%; lighted stylet, 93.1% versus 22%; Bullard laryngoscope, 67% versus 5.3%; and retrograde wire set, 53.5% versus 3.5%; $P < 0.001$ for all comparisons).

Only 56.8% of respondents had ever encountered a CICV situation. Forty-eight percent of respondents had encountered 1 to 2 CICV situations, and 8.7% had experienced CICV 3 or more times. The proportion of anesthesiologists who encountered CICV in the following situations were as follows: elective surgery, 30.4%; emergency surgery, 22.5%; obstetrics, 7.6%; trauma, 11.6%; burns, 2.8%; and ICU, 9.4%. Cricothyroidotomy by IV catheter was the preferred first-choice infraglottic airway (50.5%), followed by cricothyroidotomy by percutaneous dilation (28.4%), tracheostomy by surgeon (14%), open surgical cricothyroidotomy (6.8%), and tracheostomy by anesthesiologist (0.2%). Cricothyroidotomy by percutaneous dilation was the preferred second-choice infraglottic airway (33.3%), followed by tracheostomy by surgeon (30.9%), cricothyroidotomy by IV catheter (21%), open surgical cricothyroidotomy (13.6%), and tracheostomy by anesthesiologist (1.3%). Age, years in practice, type of hospital, and geographic region did not reveal any significant differences in the order of preference of the infraglottic airway choices.

The use in patients and mannequins and the proportion of respondents comfortable with infraglottic airway techniques are shown in Table 5. More residents (81.9%) had infraglottic airway training on mannequins than practicing anesthesiologists (67.0%) ($P < 0.001$). However, more practicing anesthesiologists (32.6%) had experience on actual patients than residents (16.9%) ($P < 0.001$). Overall, most respondents had little experience with cricothyroidotomy or tracheostomy, and <10% had ever performed percutaneous or open surgical cricothyroidotomy or tracheostomy on patients. Approximately half of the respondents were comfortable with cricothyroidotomy by IV catheter or percutaneous cricothyroidotomy, but most were uncomfortable with cricothyroidotomy by open surgical technique or by tracheostomy. Practicing anesthesiologists were more comfortable performing cricothyroidotomy with the three techniques compared with their resident counterparts. Anesthesiologists who had mannequin experience with particular infraglottic airway techniques were significantly more comfortable using such techniques compared with those who had no experience with them (Table 6).

More than half (64.7%) of the respondents had attended a difficult airway workshop within the last 5 years and were familiar with the ASA difficult airway algorithm (75.3%). More community hospital anesthesiologists (72.2%) had attended a difficult airway workshop in the last 5 yr than their teaching-hospital counterparts (60.0%; $P < 0.001$).

Discussion

In difficult airway situations in which alternative airway devices were chosen, the lighted stylet (45%) overtook the FOB (26%) as the first-choice instrument for anesthesiologists. The lighted stylet was the preferred device, especially in residents and younger anesthesiologists as compared with their counterparts. The ILMA was chosen by 20% of the respondents as the first-choice alternative airway device.

Table 3. Percentage Having Used and Percentage Comfortable with Alternative Airway Devices by Practice Level

Variable	Use (%)			Proportion comfortable (%)		
	Overall	Resident	Practicing	Overall	Resident	Practicing
FOB—awake	91.3	90.6	91.5	88.5	84.2	89.3
FOB—asleep	82.6	77.5	83.6	82.0	78.6	82.7
ILMA	75.9	75.6	75.9	82.8	72.1*	84.6*
Lighted stylet	89.8	97.5*	88.5*	87.6	93.5*	86.3*
Bullard	49.3	61.3*	47.4*	34.6	37.9	33.9
Retrograde	17.6	8.1*	19.4*	10.8	3.5*	12.4*

FOB = fiberoptic bronchoscopy; ILMA = intubating laryngeal mask airway.
* Statistically significant ($P < 0.05$) between residents and practicing anesthesiologists.

Table 4. Percentage Having Used and Percentage Comfortable with Alternative Airway Devices by Age Group

Variable	Use (%)			Proportion comfortable (%)		
	Overall	24–54 yr	≥55 yr	Overall	24–54 yr	≥55 yr
FOB—awake	91.3	93.7*	80.8*	88.5	90.5*	78.1*
FOB—asleep	82.6	84.2*	75.6*	82.0	84.0*	71.5*
ILMA	75.9	76.3	74.4	82.8	82.6	83.7
Lighted stylet	89.8	92.4*	77.9*	87.6	90.5*	72.1*
Bullard	49.4	52.4*	36.0*	34.6	36.0	27.2
Retrograde	17.6	17.0	19.8	10.8	9.8*	16.3*

FOB = fiberoptic bronchoscopy; ILMA = intubating laryngeal mask airway.
* Statistically significant ($P < 0.05$) between age groups.

Table 5. Percentage Having Used Infraglottic Airway Techniques on Mannequins and Patients and Percentage Comfortable with Infraglottic Airway Devices Among Residents and Practicing Anesthesiologists

Variable	Use (%)		Comfortable with (%)		
	Patient	Mannequin	Overall	Residents	Practicing
CT by IV catheter	17.7	57.8	57.7	45.0*	60.3*
CT percutaneous dilation	8.3	51.6	40.8	27.6*	43.7*
CT by open surgical method	6.8	18.3	13.8	7.5*	15.1*
Tracheostomy	8.3	8.3	4.5	1.4	5.1

CT = cricothyroidotomy.
* $P < 0.02$ between residents and practicing anesthesiologists.

In contrast, earlier surveys by Jenkins et al. (6) and Rosenblatt et al. (7) showed that the FOB was by far the preferred alternative airway device (34%–37%) over the lighted stylet (4%–7%) and ILMA (4%–7%) in difficult airway situations. Although these percentages were calculated from airway choices that included direct laryngoscopy, the relative proportions of alternative airway devices clearly showed the preference of the FOB over the ILMA and lighted stylet. As compared with previous studies (6,7), our results show that anesthesiologists are now much more willing to use the lighted stylet and ILMA.

There are several potential explanations for the emergence of the lighted stylet and ILMA as alternative instruments of choice in difficult airway situations. First, they are inexpensive and readily available in most Canadian hospitals (6). Second, the ASA and Canadian Airway Focus Group have emphasized the need to be familiar with alternative airway devices and the strategy to switch to alternative airway devices early in difficult intubation situations (3,5). Third, most (72%) anesthesia training programs with

Table 6. Percentage of Anesthesiologists Comfortable with Using Infraglottic Airway Techniques: Those With Versus Those Without Experience Using Such Techniques on Mannequins

Variable	Comfort (%)	
	Mannequin training	No mannequin training
CT by IV catheter	64.6	49.3
CT by percutaneous dilation	56.0	25.0
CT by open surgical method	30.4	10.8
Tracheostomy	9.4	4.0

CT = cricothyroidotomy.
All comparisons $P < 0.001$ between those with and without mannequin training.

airway rotations currently teach the use of the lighted stylet and ILMA (10). Fourth, since the introduction of the lighted stylet in the mid 1990s, most anesthesiologists have now used this instrument (90%) and are comfortable using it (88%). Likewise, most anesthesiologists have used the ILMA (76%) and are comfortable using it (83%). In a recent survey of American-trained anesthesiologists, 64% and 61% expressed that they felt skilled in using the lighted stylet and ILMA, respectively (8). Incorporation of a new technique into clinical practice involves time and a number of steps: acquisition of information about the technique, validation of information, clinical use, satisfaction, and, finally, incorporation into regular clinical practice (6). This may explain why airway devices such as the lighted stylet and ILMA have taken almost a decade to be accepted and incorporated into clinical use by anesthesiologists.

We found that most anesthesiologists have used lighted stylet, FOB, and ILMA and are quite comfortable using these devices. However, less than half the respondents have used the Bullard scope or the retrograde technique and are uncomfortable using them. The comfort level of respondents seems to parallel their clinical use of and familiarity with alternative airway devices. Anesthesiologists who had experience with particular alternative airway devices were significantly more comfortable using such devices compared with those who had no experience with them. Our finding highlights the importance of the anesthesiologist acquiring experience with alternative airway devices in elective situations so that he/she develops the skill and confidence to use them in real-life difficult intubation situations. Younger anesthesiologists use the FOB and lighted stylet more frequently compared with older colleagues and are more comfortable using these techniques.

Although there are no data directly correlating practice with airway instruments and comfort level in their use, many studies have shown that practicing anesthesia techniques on mannequins or simulators and clinical use in patients can improve subsequent performance and success rates. Konrad et al. (11) generated learning curves for first-year anesthesia residents learning to perform five procedures on patients. The learning curves all showed a steep upstroke followed by a gradual plateau effect. They found that 57 and 71 cases were required to achieve 90% success rates for endotracheal intubation and spinal anesthesia, respectively. Kopacz et al. (12) reported that 45 spinal and 60 epidural insertions were required before 90% success rates were reached. Ost et al. (13) studied the effect of simulator training on performance of actual bronchoscopy by new pulmonary fellows on live patients. The group with bronchoscopic simulator experience needed less total bronchoscopy time and had higher quality scores compared with the control group. Our data suggest that experience in using alternative airway techniques is correlated with comfort level in their use and may be associated with improved performance in difficult intubation situations.

Only 57% of respondents had personally experienced a CICV situation. Of these, 80% had encountered it once or twice. In 1991, the incidence of CICV was estimated to be 0.01 to 2 per 10,000 patient cases (14). The LMA has since been shown to be mostly effective in providing rescue ventilation in most CICV situations (15). Therefore, the current incidence of CICV requiring emergency infraglottic airway insertion may be less than 2 in 10,000 patients. The proportion of respondents who had personally experienced CICV situations is consistent with the reported incidence in the literature.

In our study, the first-choice infraglottic airway technique was cricothyroidotomy by IV catheter, whereas the devices most frequently chosen as a second approach were percutaneous cricothyroidotomy and tracheostomy by surgeon. Ezri et al. (8) found that transtracheal jet ventilation was the first-choice infraglottic airway in a cannot-intubate/difficult-to-ventilate scenario. Review of the literature revealed few randomized controlled trials using infraglottic airway techniques and none in actual patients in CICV situations. Studies comparing infraglottic airway techniques did not show whether any of the techniques was superior to the others according to success rates and completion times. Eisenburger et al. (16) and Chan et al. (17) found that times to completion of percutaneous and surgical cricothyroidotomy attempts were similar on cadavers. Success with infraglottic airway techniques perhaps relies more on the operator's experience, practice, and skill than on the tools themselves (5). The authors believe that cricothyroidotomy by IV catheter has become the first-choice infraglottic airway technique primarily because it is readily available and is the least complicated. It is, in fact, a less effective infraglottic airway compared with percutaneous cricothyroidotomy and tracheostomy because it is difficult to fixate, offers no airway protection, provides inadequate ventilation, lacks a conduit to suction, is associated with significant risks of barotraumas, and requires special attachment for jet ventilation (9). Anesthesiologists are generally uncomfortable with infraglottic approaches that require open surgical techniques. The percutaneous cricothyroidotomy technique incorporates many advantages of the tracheostomy while avoiding an open surgical technique. It is more stable, offers airway protection, provides a conduit for suctioning, and can be readily connected to a ventilation bag with a 15-mm connector. The percutaneous technique of insertion is familiar to all anesthesiologists who perform central venous cannulation.

Because of the rarity of the CICV situation, few respondents had ever performed cricothyroidotomy or tracheostomy on patients. However, more than half the respondents had performed a cricothyroidotomy

by IV catheter or by percutaneous technique on mannequins. Few had performed a cricothyroidotomy by surgical cricothyroidotomy or tracheostomy on mannequins. Approximately half of the respondents said that they were comfortable with cricothyroidotomy by IV catheter or percutaneous cricothyroidotomy. Our results confirmed that anesthesiologists who had experience with cricothyroidotomy or tracheostomy on mannequins were significantly more comfortable with these techniques in patients.

We hypothesized that training in, and practice of, infraglottic airway techniques on mannequins and patients will result in increased comfort levels and confidence in using these devices. A number of studies have shown that training in anesthesia techniques improves actual performance and success rates. Bainton (18) reported that the amount of time required to perform cricothyroidotomy on dogs was reduced significantly after practice on cricothyroidotomy simulator models. Wong et al. (9) showed that cricothyroidotomy times and success rates significantly improved in 102 subjects who each performed 10 consecutive cricothyroidotomies on mannequins. From the 1st to the 10th attempt, cricothyroidotomy times improved from 41.2 to 24.4 seconds (41% change), and success rates increased from 62% to 99% (37% change). Our data suggest that experience in using infraglottic techniques on mannequins is correlated with comfort level in use and may be associated with improved performance in CICV situations.

Training on models such as mannequins, cadavers, and simulators has been shown to be an effective teaching method for acquisition of anesthesia manual skills (13,19). Our results and those of Hagberg et al. (10) show that mannequin training in airway instrumentation is still under-used. With advancements in and increased availability of information technology, nontraditional training methods such as computer-aided instruction and simulators should be used more frequently in airway training. Seventy-five percent of our study respondents self-reported familiarity with the steps of the CICV protocol in the ASA difficult airway algorithm. This proportion should be increased, and this may be achievable through education and workshop attendance.

This study has several limitations. First, this survey had a response rate of 47%. This rate is similar to previous airway management surveys of anesthesiologists by Jenkins et al. (6) (49%) and by Rosenblatt et al. (7) (47%). Nonresponders were not pursued with a second mailing because of financial reasons. Second, there is no French-language version of the survey. Seventeen percent of survey respondents were from Quebec; thus, anesthesiologists from Quebec are likely underrepresented. Third, the survey was sent to Canadian Anesthesiologists' Society active and resident members. We do not know whether the respondents are representative of all anesthesiologists across the country.

In summary, in a difficult intubation scenario as described in our survey, the lighted stylet emerged as the preferred alternative airway device. Respondents were familiar with and comfortable using the lighted stylet, FOB, and ILMA. Only half the anesthesiologists had ever encountered CICV situations in their career. Respondents preferred using cricothyroidotomy by IV catheter, followed by percutaneous cricothyroidotomy and tracheostomy by surgeon. Anesthesiologists were uncomfortable using any open surgical infraglottic technique. Prior practice on mannequins was associated with a significantly higher level of comfort in using infraglottic airway techniques and may improve anesthesiologists' performance in real-life CICV situations.

We thank Gloria Wong for her valuable assistance on the survey and database design, and Dr. Adam Law for reviewing and commenting on this manuscript.

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Appendix 1: Survey Questions

SECTION A: Difficult Intubation Scenario

1. You have a 65 year old man for elective colonic resection. After induction, you **fail intubation twice** with direct laryngoscopy and with bougie, due to anterior larynx. Can mask ventilate. SpO2 98%.
You have decided to move to **alternative devices.**
What would be your **first and second choice** devices?

	First	Second
Fiberoptic bronchoscope (FOB)	☐	☐
Intubating laryngeal mask airway (ILMA)	☐	☐
Lighted stylet	☐	☐
Rigid fiberoptic scope (eg. Bullard)	☐	☐
Other; specify_____	☐	☐

2. Have you **personally used** the following intubation devices/techniques?

	On Mannequin	On Patients
a) FOB intubation	☐	☐ Awake ☐ Asleep
b) Intubating laryngeal mask	☐	☐
c) Lighted stylet	☐	☐
d) Bullard scope	☐	☐
e) Retrograde wire set	☐	☐

3. What is your **level of comfort** using these devices/techniques? (circle one)

1 = Not consider using	2 = Somewhat Uncomfortable		3 = Equivocal		
4 = Somewhat Comfortable	5 = Very Comfortable				
a) Awake FOB intubation	1	2	3	4	5
b) Asleep FOB intubation	1	2	3	4	5
c) Intubating laryngeal mask	1	2	3	4	5
d) Lighted stylet	1	2	3	4	5
e) Bullard scope	1	2	3	4	5
f) Retrograde wire set	1	2	3	4	5

SECTION B. Cannot Intubate, Cannot Ventilate (CICV) Situations

4. How many times did you come across CICV

	last 5 years?	Ever?
0	☐	☐
1–2 ×	☐	☐
≥3 ×	☐	☐

5. Please indicate in which of the following **clinical situations** did you come across CICV?
☐ Elective surgery ☐ Trauma
☐ Emergency surgery ☐ Burn
☐ Obstetrics ☐ Intensive care unit

6. In a CICV situation and the patient's SpO2 is ≤ 50%, and you have decided to go for a **"infraglottic airway"**, what will your **first and second choice** devices be?

	First	Second
a) Cricothyroidotomy (CT) by IV catheter	☐	☐
b) Cricothyroidotomy (CT) by percutaneous dilation kit	☐	☐
c) Cricothyroidotomy (CT) by open surgical method	☐	☐
d) Tracheostomy by anesthesiologist	☐	☐
e) Tracheostomy by surgeon	☐	☐

7. Have you **personally used** the following CICV devices/techniques?

	On Mannequin	On Patients
a) CT by IV catheter	☐	☐
b) CT by percutaneous dilation kit	☐	☐
c) CT by open surgical method	☐	☐
d) Tracheostomy	☐	☐

8. What is your **level of comfort** using these devices? (circle one)

1 = Not consider using 2 = Somewhat Uncomfortable 3 = Equivocal
4 = Somewhat Comfortable 5 = Very Comfortable

a) CT by IV catheter	1	2	3	4	5
b) CT by percutaneous dilation kit	1	2	3	4	5
c) CT by open surgical method	1	2	3	4	5
d) Tracheostomy	1	2	3	4	5

9. Are you familiar with the exact steps of CICV protocol in **ASA difficult airway algorithm?**
☐ Yes ☐ No
10. Have you attended any **difficult airway workshop** in last 5 years?
☐ Yes ☐ No

SECTION C: Demographics

11. Age ☐ 25–35 ☐ 36–44 ☐ 45–54 ☐ 55–64 ☐ ≥ 65
12. Gender ☐ Male ☐ Female
13. Years in practice ☐ Resident ☐ 0–4 ☐ 5–9 ☐ 10–19 ☐ ≥ 20
14. Type of hospital ☐ Teaching ☐ Community
15. Province of practice _____