Airway management approaches following failed intubation during caesarean deliveries

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Introduction

Over the past three decades, anaesthetic management for caesarean section (CS) has undergone significant changes. Neuraxial techniques are increasingly preferred, and general anaesthesia (GA) is typically reserved for the most time-critical cases or for patients with contraindications to regional techniques (1).

Despite the introduction of specific guidelines, maternal mortality from failed intubation during CS remains significant. There is one death per 90 failed intubations, most commonly due to aspiration, or hypoxaemia secondary to airway obstruction or inadvertent oesophageal intubation (2).

Anatomical and physiological changes associated with pregnancy significantly increase the risk of airway difficulty in both elective and emergency situations (1,3,4). Difficult airway management in obstetrics remains a high-risk scenario that necessitates structured decision-making and clearly defined rescue strategies (5).

Endotracheal intubation with rapid sequence induction (RSI) remains the gold standard for airway management during obstetric general anaesthesia. This is primarily because of its perceived effectiveness in reducing the risk of pulmonary aspiration (3).

Historically, patients experiencing failed intubation were awakened. Since the late 1990s, however, there has been a transition toward the use of supraglottic airway devices (SGAs) to maintain anaesthesia. There is now a growing preference for second-generation SGAs (2). Several large observational studies report high insertion success rates and a low incidence of aspiration when second-generation SGAs are used for CS (6,7).

Against this background of evolving airway practice presented above, the survey aims to explore contemporary anaesthetic airway management following failed endotracheal intubation in obstetric patients.

Methodology

An electronic survey was developed and submitted through the Obstetric Anaesthetists' Association (OAA) survey portal. Prior to dissemination, the survey underwent peer review coordinated by the OAA Survey Subcommittee.

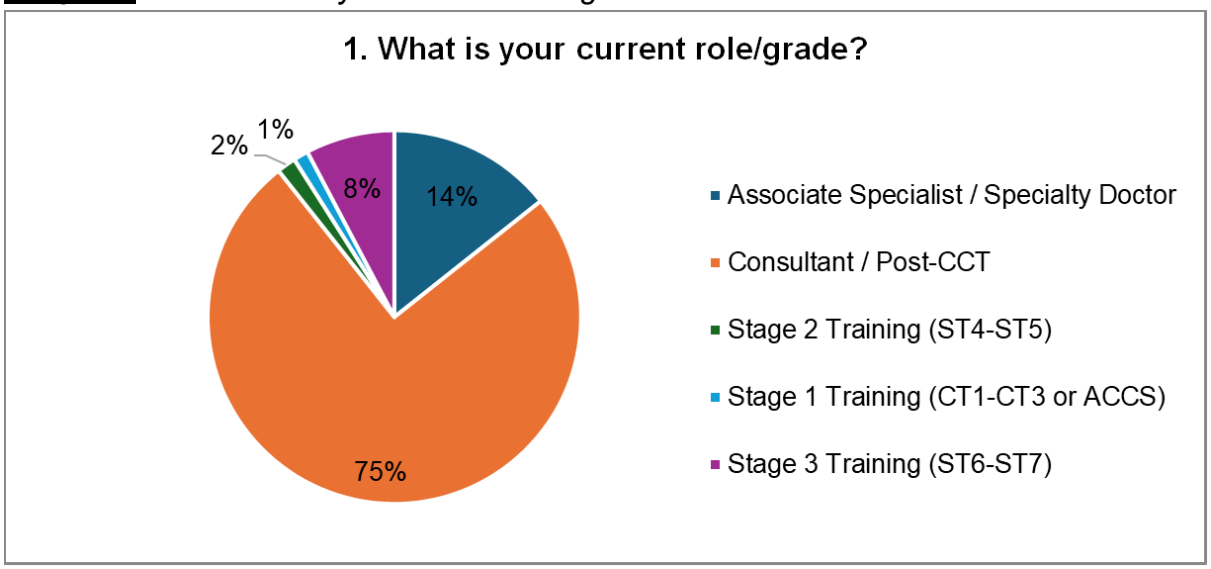
The survey was distributed by email to 2,362 OAA members, with responses collected from October 2025 to November 2025. The survey questions were designed to evaluate airway management practices following failed intubation during caesarean delivery, identify clinical factors prompting the establishment of a definitive airway, and explore the use of perioperative ultrasound for gastric content assessment as a decision-making tool.

The data were collected and analysed using Microsoft Excel software. Outcome data were summarised using descriptive statistics and expressed as percentages. Free-text responses marked as "Other" were reviewed and recoded. Variants of existing options were reassigned to predefined categories. Rare or non-thematic responses were retained as "Other."

Results

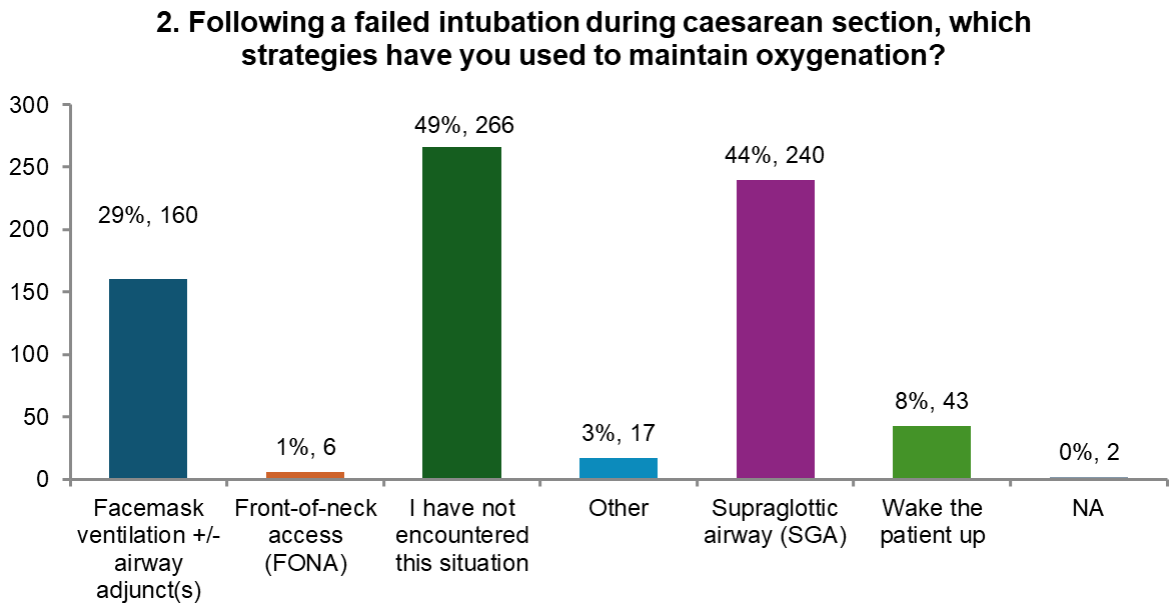
A total of 544 responses were collected, resulting in a response rate of 23%. Most respondents identified as consultant anaesthetists (n = 408, 75%). The next largest group consisted of Associate Specialists and Speciality Doctors (n = 78, 14%). The remaining respondents were anaesthetists in training, as detailed in Graph 1.

Graph 1: Q1 – *What is your current role/grade?*



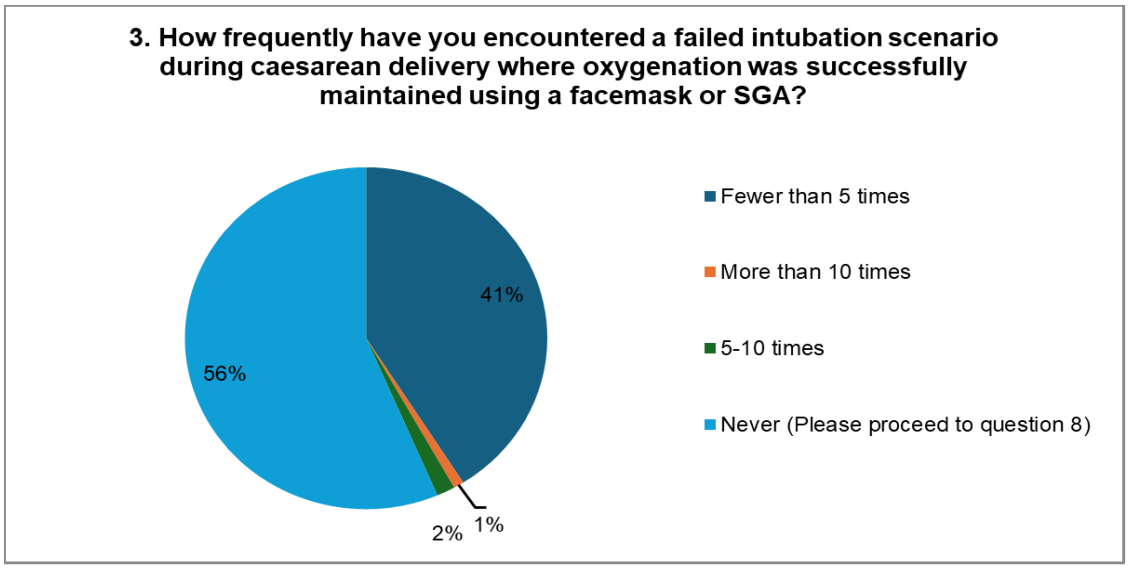
A substantial proportion of respondents reported not having encountered a failed intubation during caesarean section (n = 266, 49%). Among those who had experienced a failed intubation, 44% used a supraglottic airway to maintain oxygenation, whereas facemask ventilation with or without airway adjuncts was used in 29% of cases. A decision to awaken the patient was reported by 8% of respondents (Table 2).

Graph 2: Q2 - *Following a failed intubation during caesarean section, which strategies have you used to maintain oxygenation? (Multiple answers allowed)*



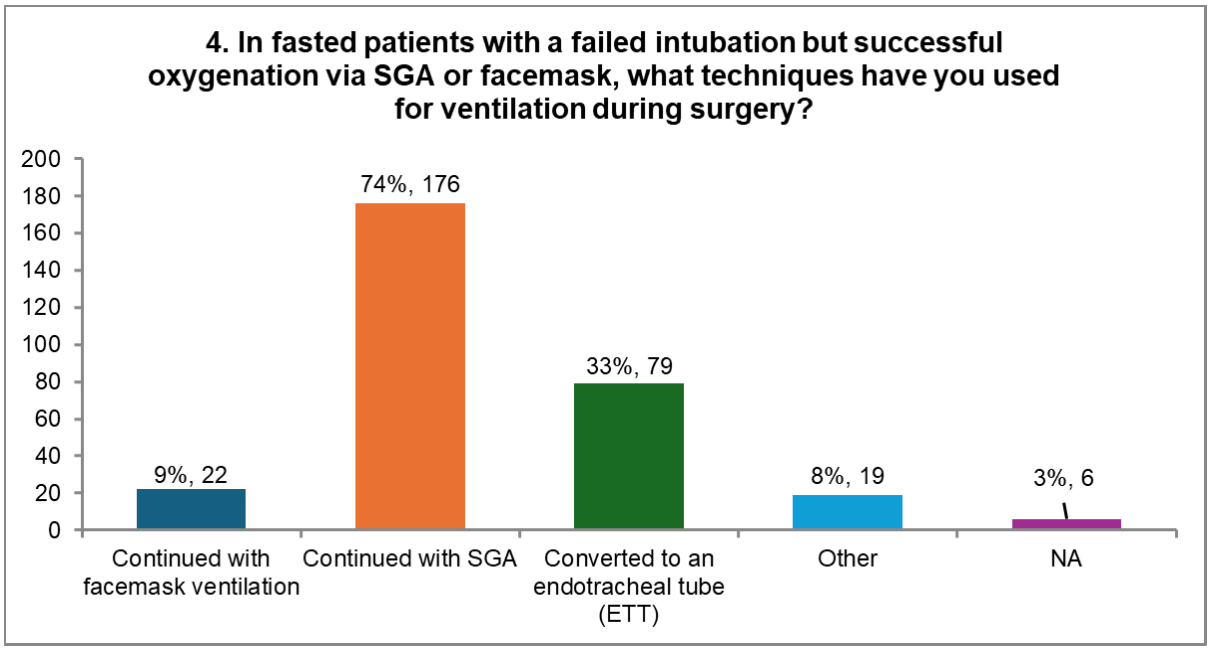
Question 3 asked anaesthetists how often they encountered failed intubation during caesarean delivery, with oxygenation successfully maintained using a facemask or supraglottic airway (SGA). Of all respondents, 237 anaesthetists reported such an experience, while most (n = 307, 56%) had never encountered it and were instructed not to answer Questions 4–7. These questions were intended only for those with prior experience of failed intubation and successful oxygenation via facemask or SGA, and any responses from others were excluded. Among the 237 remaining respondents, most (n = 223, 41%) had encountered this scenario fewer than five times (Graph 3).

Graph 3: Q3 - *How frequently have you encountered a failed intubation scenario during caesarean delivery where oxygenation was successfully maintained using a facemask or SGA?*



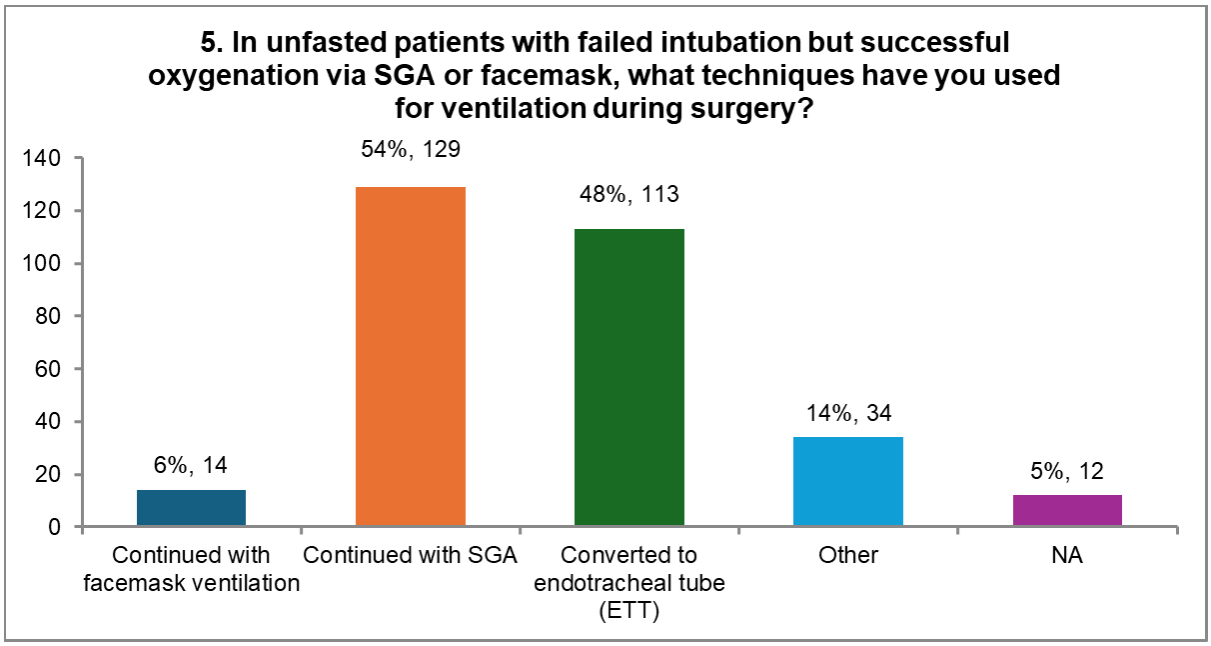
Questions 4 and 5 examined the techniques used to maintain intraoperative ventilation after failed intubation with successful oxygenation and assessed whether these approaches varied by patient fasting status. For the fasted patient scenario (Q4), ventilation with a supraglottic airway (SGA) was selected by 74% of respondents, while 33% reported converting to an endotracheal tube (ETT) (Graph 4).

Graph 4: Q4 - *In fasted patients with a failed intubation but successful oxygenation via SGA or facemask, what techniques have you used for ventilation during surgery? (Multiple answers allowed)*



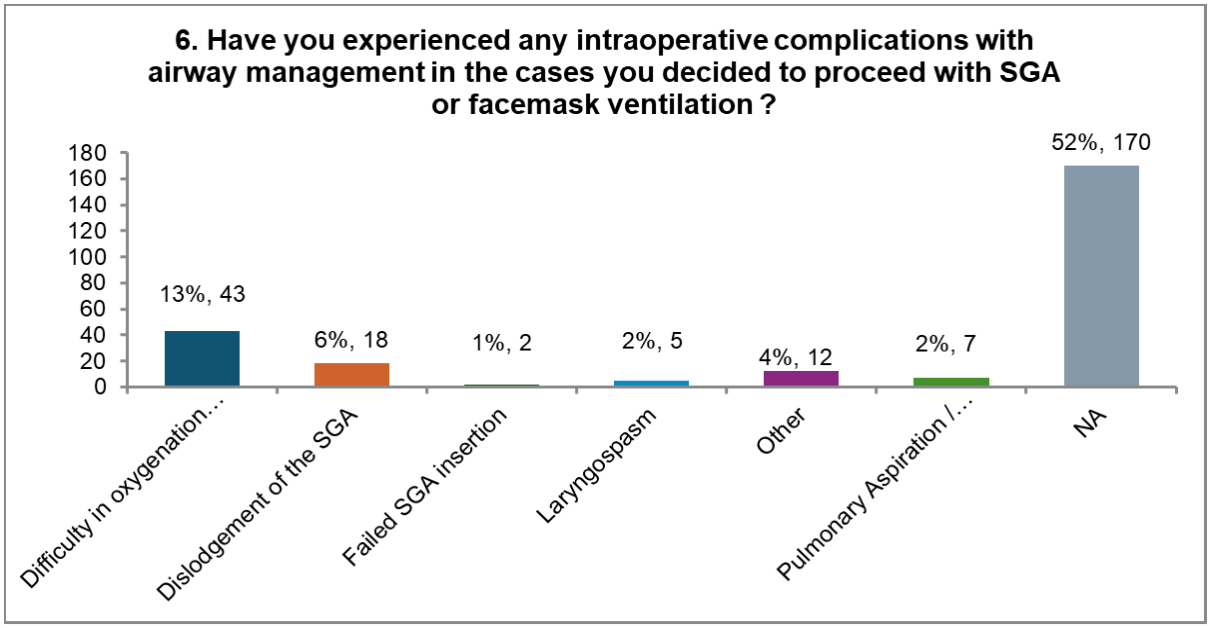
For the unfasted patient scenario (Q5) with failed intubation but successful oxygenation via SGA or facemask, 54% continued with SGA, while 48% converted to ETT (Graph 5).

Graph 5: Q5 - *In unfasted patients with failed intubation but successful oxygenation via SGA or facemask, what techniques have you used for ventilation during surgery? (Multiple answers allowed)*



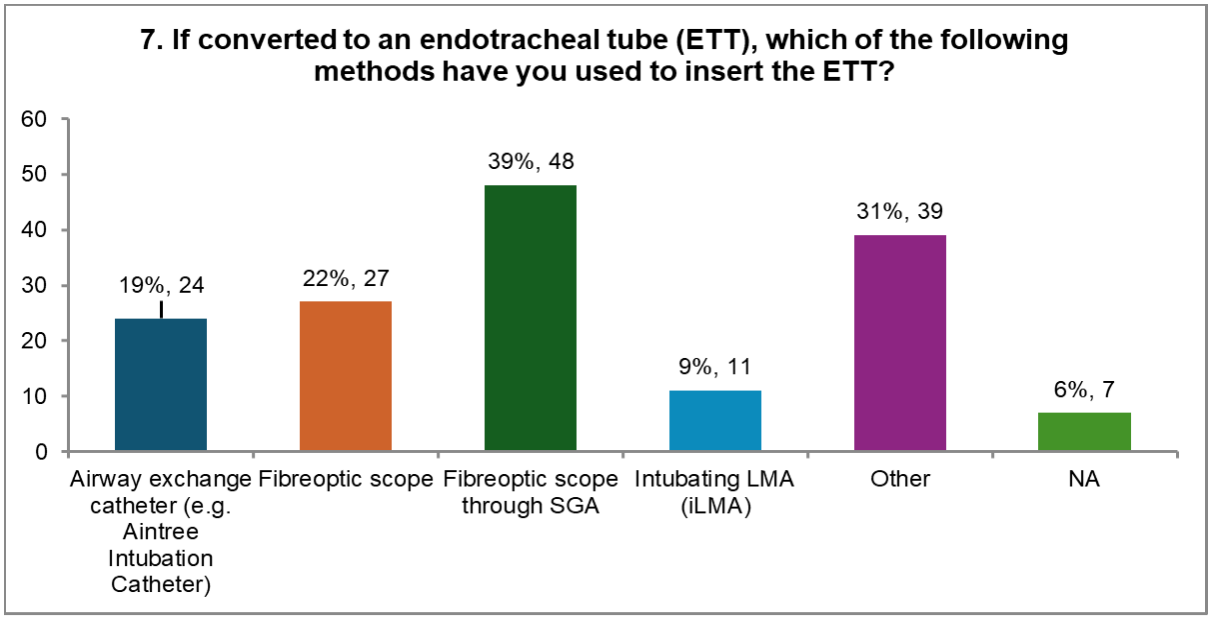
From the anaesthetists who proceeded with SGA or facemask ventilation, the most frequently reported complication was difficulty with oxygenation or ventilation (13%), followed by dislodgement of the supraglottic airway (SGA) device (8%). Pulmonary aspiration occurred in 2% of cases. Most respondents did not observe any intraoperative complications, and responses selecting “N/A” or documented no complications under “Other” were grouped into a single category as “N/A” (Graph 6).

Graph 6: Q6 - *Have you experienced any intraoperative complications with airway management in the cases you decided to proceed with SGA or facemask ventilation? (Multiple answers allowed)*



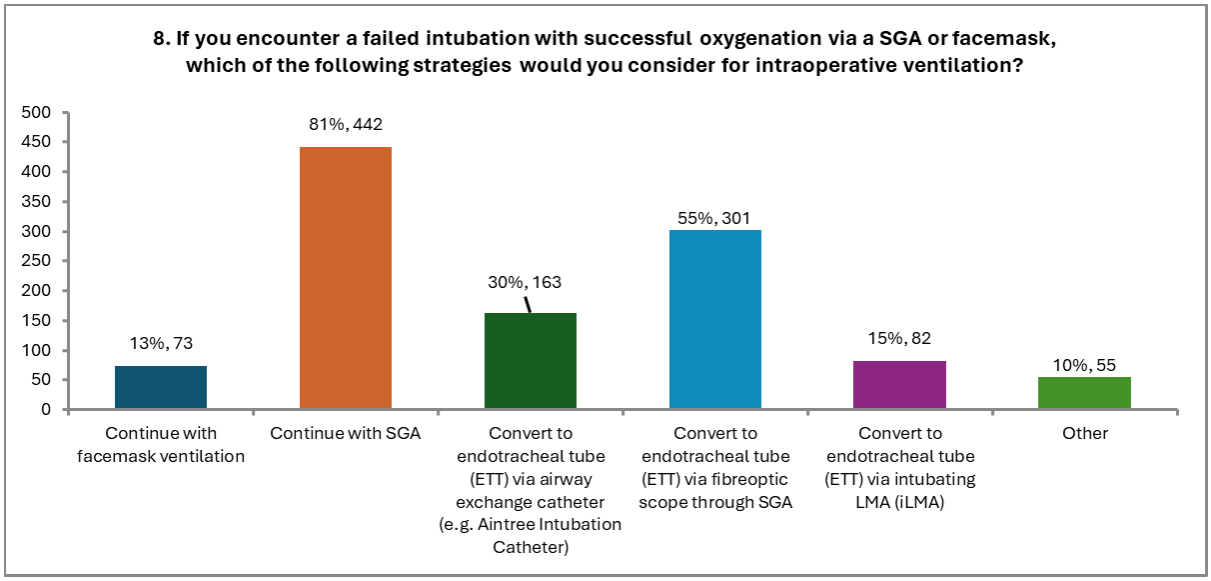
There were 79 respondents in Q4 who converted to an endotracheal tube (ETT). In question 7, they were asked about the methods they used to convert to an ETT. More than one answer was allowed to capture the full range of techniques used. Of these, 39% reported using a fibreoptic scope through the SGA, 22% reported using a fibreoptic scope alone, and 19% reported using an airway exchange catheter (e.g., Aintree Intubation Catheter) (Graph 7).

Graph 7: Q7 - *If converted to an endotracheal tube (ETT), which of the following methods have you used to insert the ETT? (Multiple answers allowed)*



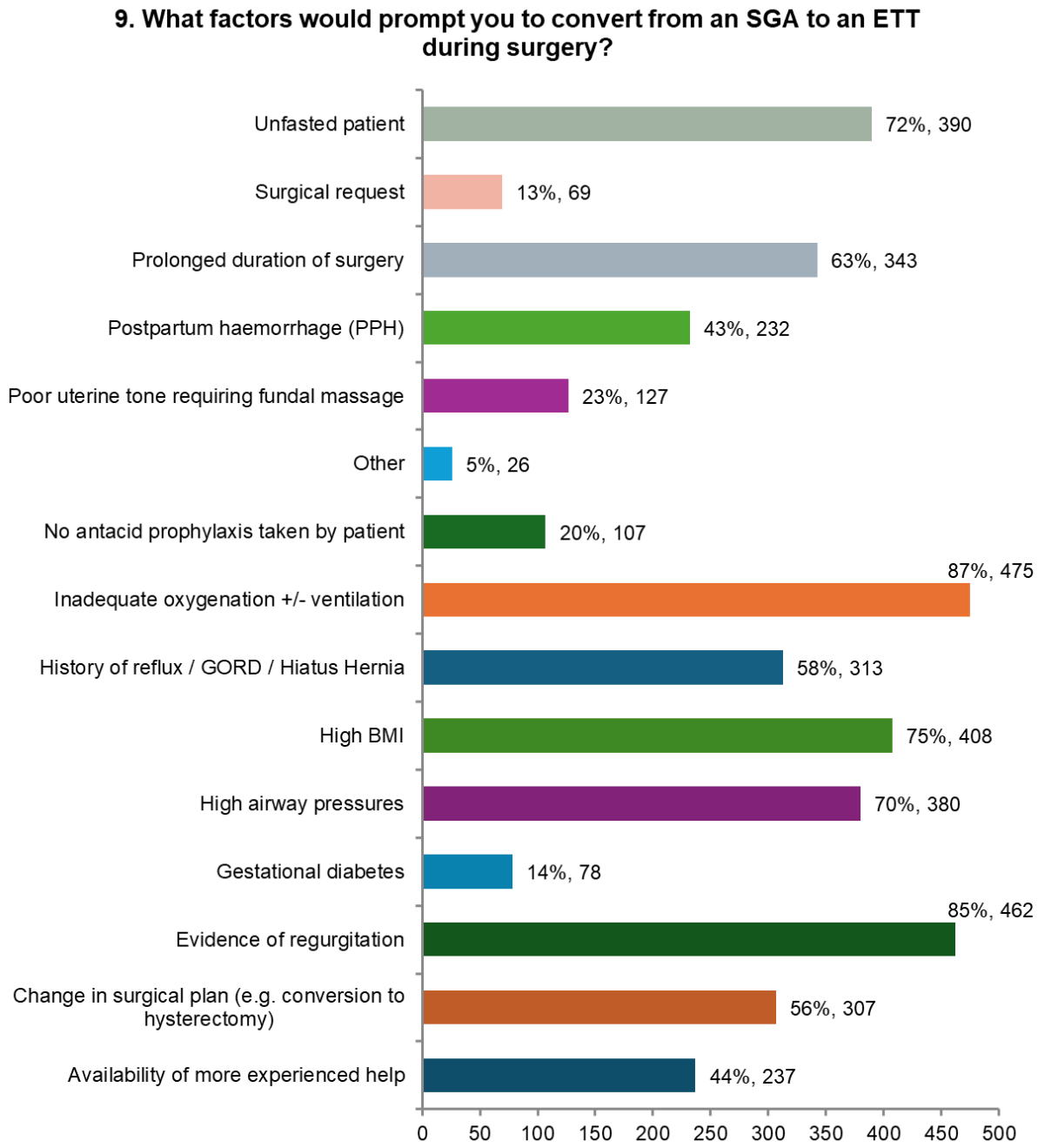
From Question 8 onwards, the entire cohort of 544 respondents participated. Respondents were asked to indicate which intraoperative ventilation techniques they would employ in the hypothetical event of failed intubation with successful oxygenation maintained via a supraglottic airway (SGA) or facemask. The most frequently selected strategies included continuing with the SGA (81%), converting to an endotracheal tube (ETT) via a fibreoptic scope through the SGA (55%), and converting to an ETT using an airway exchange catheter such as the Aintree Intubation Catheter (30%). The remaining responses are summarised in Graph 8.

Graph 8: Q8 - *If you encounter a failed intubation with successful oxygenation via a SGA or facemask, which of the following strategies would you consider for intraoperative ventilation? (Multiple answers allowed)*



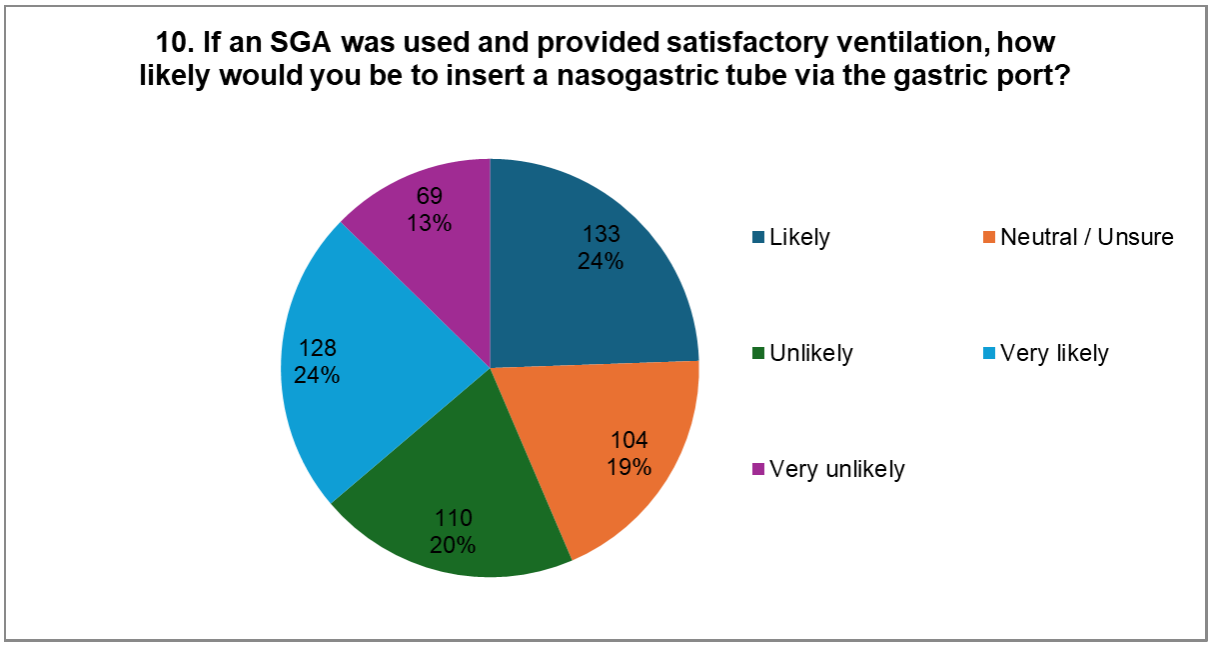
Question 9 examined the factors that would prompt respondents to convert from a supraglottic airway (SGA) to an endotracheal tube (ETT) during surgery. The most frequently reported factors were inadequate oxygenation and/or ventilation (87.32%) and evidence of regurgitation (84.93%). The remaining responses are summarized in Graph 9.

Graph 9: Q9 - *What factors would prompt you to convert from an SGA to an ETT during surgery? (Multiple answers allowed)*



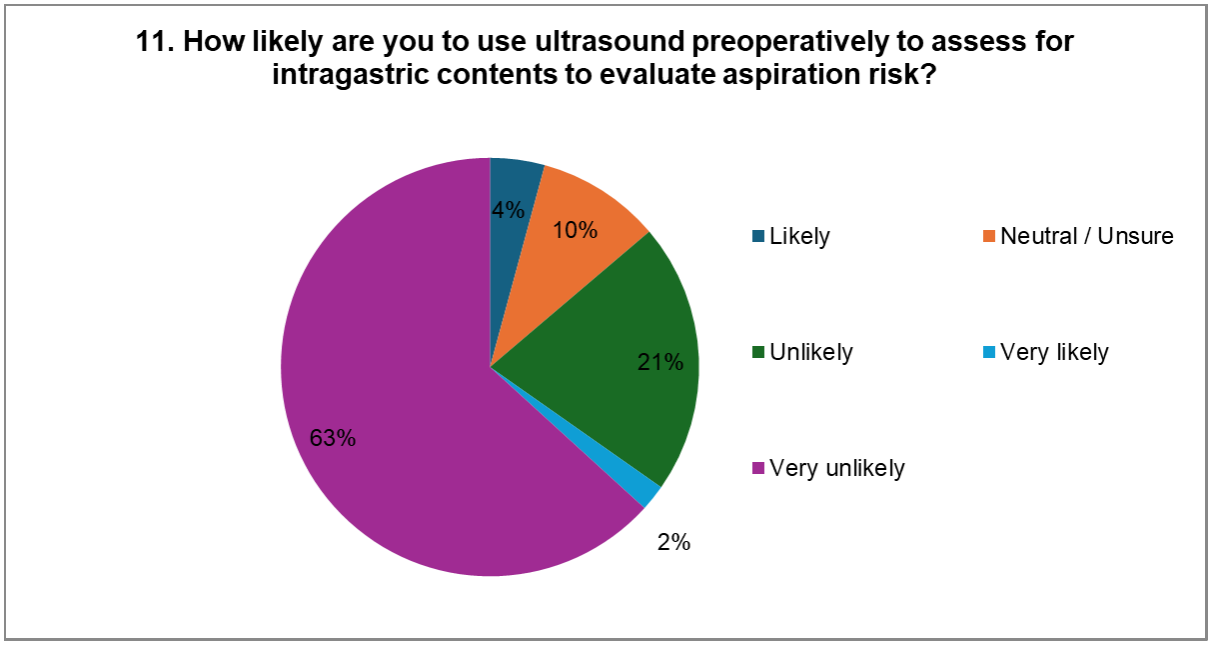
Question 10 asked participants how likely they would be to insert a nasogastric tube via the gastric port if an SGA provided satisfactory ventilation. Most respondents selected “very likely” (24%) or “likely” (24%) when asked about inserting an NG tube. The respondents’ answers are summarised in Graph 10.

Graph 10: Q10 - If an SGA was used and provided satisfactory ventilation, how likely would you be to insert a nasogastric tube via the gastric port?



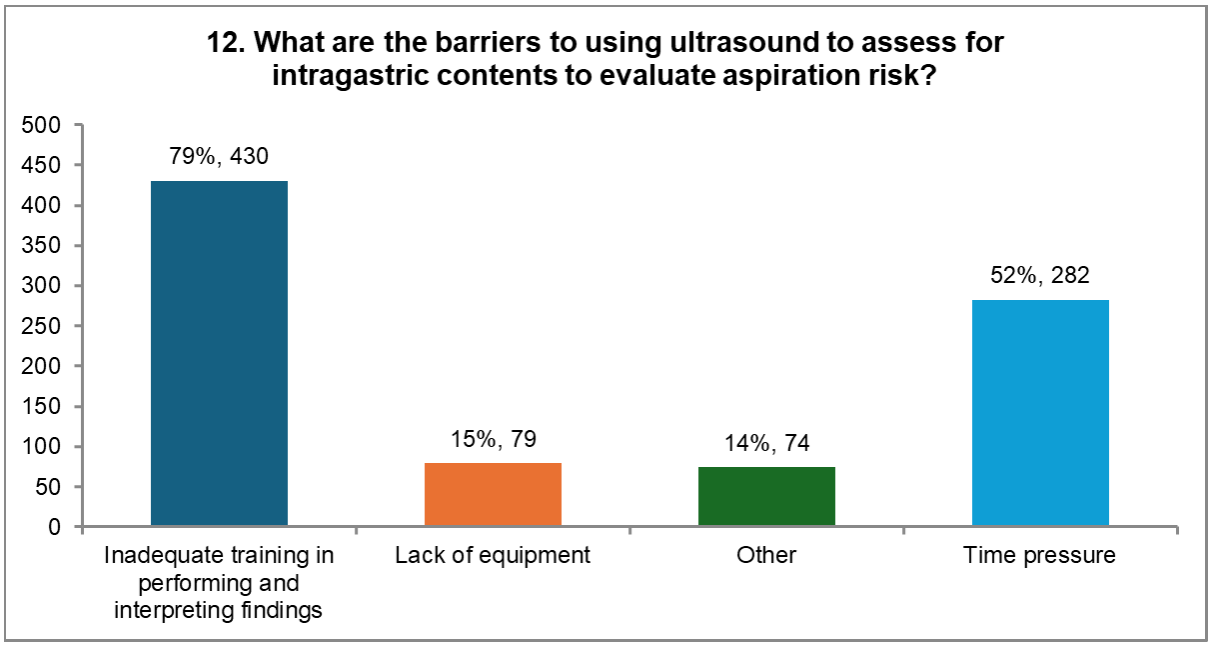
Questions 11 and 12 focused on the use of gastric ultrasound. Question 11 asked participants how likely they were to use ultrasound preoperatively to assess intragastric contents and aspiration risk with 84% responding it is very unlikely or unlikely. The response distribution appears Graph 11.

Graph 11: Q11 - *How likely are you to use ultrasound preoperatively to assess for intragastric contents to evaluate aspiration risk?*



Question 12 explored barriers to the use of ultrasound for intragastric content assessment. The most common barriers were inadequate training in performing and interpreting findings (79%), time constraints (52%), and limited equipment availability (15%) Graph 12.

Graph 12: Q12 - *What are the barriers to using ultrasound to assess for intragastric contents to evaluate aspiration risk? (Multiple answers allowed)*



Discussion

The declaration of a failed intubation remains a significant concern among anaesthetists. Despite reductions in morbidity and mortality due to modern advancements, inadequate management can still result in brain injury or maternal death (8).

Our survey data indicate that at least half of anaesthetists working in obstetric settings will encounter a failed intubation case during their careers. This relatively high rate may be attributed to the survey's distribution among members of the Obstetric Anaesthetists' Association, who are likely to be regularly involved in obstetric anaesthetic care. Furthermore, most respondents were consultant anaesthetists with extensive experience, increasing the likelihood that they had encountered failed intubation during their careers. Variability in respondents' definitions of failed intubation may also contribute to the reported incidence, as some may consider multiple attempts a failure, whereas others define it strictly as the inability to achieve successful intubation under any circumstances.

The survey indicates that in fasted patients with failed intubation but successful ventilation, 77% of respondents preferred supraglottic airway insertion, making it the most reported method. Cuffed devices were preferred in unfasted patients (48%) compared with fasted patients (33%). Supraglottic airway use remained the most popular option in the non-fasted patients as well (54%) as a recue technique. A retrospective study of 723 patients reported that the use of the LMA Supreme did not increase adverse events compared with endotracheal tube placement (9). However, unfasted patients, those with an ASA status greater than 3, or those undergoing Category 1 Caesarean sections were more likely to be intubated (9), findings that may also be reflected in the present survey. Despite this, the incidence of pulmonary aspiration was extremely rare (2%), among surveyed anaesthetists who proceeded with SGA or facemask ventilation.

Difficulty in ventilation and high airway pressures were identified as two of the most common complications associated with laryngeal mask airway placement. The specific type of supraglottic airway used was not specified in this survey; however, second-generation LMAs are designed to tolerate oropharyngeal seal pressures of 30–35 cmH_2O (6). Fundal diaphragmatic displacement may impair ventilation regardless of the airway device used. In urgent surgical situations, suboptimal ventilation may be tolerated until delivery of the baby, as reduced fundal displacement after delivery can improve ventilation–perfusion mismatch and pulmonary compliance (9).

If ventilation was successful and a cuffed airway was required, there was variation in the methodologies employed, with no single approach demonstrating clear superiority. Fibreoptic scope-assisted intubation was most reported, aligning with recommendations from the Difficult Airway Society to minimise airway trauma. Several

techniques have been described (10,11), but these advanced methods require skilled personnel, and removal of an SGA may not be appropriate if such expertise is unavailable.

There is currently no specific guidance on when to convert from a supraglottic device to a definitive airway. A notable finding from this survey is that, despite significant concern regarding aspiration risk during Caesarean section, many anaesthetists would not routinely place a nasogastric tube through the supraglottic device if ventilation was satisfactory. The rationale for this practice was not explored. Some LMA devices used by survey respondents may lack a gastric port, although modern devices typically include this feature. It could be argued that any safe attempt to remove gastric contents should be made to minimise the risk of aspiration, given the potential harm. However, most studies exclude pregnant or unfasted patients. The rarity of aspiration events makes it challenging to design large-scale studies evaluating the likelihood of aspiration with or without gastric tubes in LMAs, particularly in the obstetric population. Further evaluation of both the safety of gastric port use and anaesthetists' reservations regarding gastric tubes is warranted.

Gastric ultrasound is a potentially useful tool for decision-making regarding airway device use and the utilisation of adjuncts such as gastric tubes. Qualitative assessment of gastric contents can be made using the Perlas grading system, which is performed in the semi-recumbent position (12). It is postulated that this correlates to establishing a gastric volume content of > 1.5 ml/kg, which could indicate a higher risk of aspiration (13). However, as the survey shows, this is a skill many anaesthetists may not have acquired.

Conclusion

In summary, although failed intubation in obstetric anaesthesia is rare, its management remains inconsistent and is often shaped by clinicians' individual experiences rather than established guidelines. The present survey demonstrates considerable variability in clinical practice, particularly in the use of supraglottic airways, criteria for proceeding with surgery, and decisions regarding definitive airway management. These results underscore the necessity for targeted research and the development of clearer, evidence-based guidelines to reduce variability and promote safer, more standardised decision-making in this high-risk clinical context.

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