

Current practice patterns of supraglottic airway device usage in paediatric patients amongst anaesthesiologists: A nationwide survey

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ABSTRACT

Background and Aims: Supraglottic airway devices (SGADs) are increasingly being used for airway management in paediatric patients undergoing general anaesthesia. This survey was designed to assess the nationwide practice patterns of SGAD usage in paediatric patients. **Methods:** A questionnaire of 28 questions was circulated amongst 16,532 members of the Indian Society of Anaesthesiologists through online survey engine Google Forms® and served manually to 500 delegates attending the Asian Society of Paediatric Anaesthesiologists conference 2017. Percentage, mean and standard deviation were calculated using Microsoft Excel 2016 (Redmond, WA, USA). **Results:** Four hundred and five (2.3%) valid responses were obtained. The most commonly used device was i-gel® (60.74%). Three hundred and four (75.06%) respondents had access to second-generation SGADs. Second-generation devices (60.74%) were more commonly used than first-generation devices (39.26%). Anaesthesiologists utilised SGADs in various challenging scenarios such as in the difficult airway (53.33%), remote locations (55.47%), ophthalmologic (38.77%) and long-duration surgeries (17.53%). Sixty per cent respondents did not use SGADs in laparoscopic surgery. Disposable SGADs were reused by 77.28% respondents. Oropharyngeal seal and intracuff pressures were not measured by 86.91% and 56.92% respondents, respectively. Difficulty in size selection (84.19%), securing position (82.22%) and maintaining unobstructed ventilation (78.76%) were common problems encountered while using SGADs. **Conclusion:** Although there is a widespread use of second-generation SGADs in Indian paediatric anaesthesia, safe practices such as using capnography, measurement of oropharyngeal seal pressure, cuff pressure and appropriate disinfection are lacking.

Key words: Airway management, disinfection, laryngeal masks, paediatric anaesthesia, supraglottic airway device, survey

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INTRODUCTION

Supraglottic airway devices (SGADs) are routinely used for airway management in paediatric patients undergoing general anaesthesia for various surgeries. SGADs have changed the practice of paediatric anaesthesia.^[1-3] The newer SGADs have improved features such as the gastric drain tube, better ventilation and seal pressures, and an ability to perform an endotracheal intubation through them. SGADs with a gastric drain tube are classified as second-generation SGADs and are promoted for routine use by Royal College of Anaesthetists in the National Audit Project 4.^[4]

Although newer SGADs are freely available for commercial use, there is a dearth of high-quality studies to establish their safety in children.^[5] There are studies and case reports in literature describing SGAD

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use in uncommon and unconventional situations such as laparoscopy and prone position in paediatric patients.^[6,7] It would be worthwhile to know if these practices are being applied in clinical use. In the absence of high-quality evidence, there could be a possibility of bias for or against newer devices. A good quality survey may shed some more light on the practices associated with SGADs, identify problems which may have not been reported and bridge the lacunae in the existing literature.

The aim of this survey was to get an overview of SGAD usage in paediatric patients in terms of knowledge, attitudes and practice patterns of anaesthesiologists in India. The objectives were to find out (1) the choice of SGAD in routine use and reasoning behind the choice; (2) anaesthesia practices associated with SGAD use; (3) use of SGAD in complicated and uncommon situations; (4) use of SGAD in difficult airway; (5) safety measures followed while using SGADs and (6) desirable newer design features involving SGADs in paediatric patients.

METHODS

The instrumentation type of survey methodology was used. A questionnaire was prepared by doing a thorough literature search on web-based electronic databases such as PubMed, Google Scholar and Embase. The keywords used were paediatric, practice patterns, SGADs, laryngeal mask airways and extraglottic airway devices. Forty questions were prepared. In addition, 20 questions were added by the investigators based on their experience and problems encountered in clinical practice. All the questions were thoroughly analysed and 49 questions were shortlisted. The first version of the questionnaire was then mailed to thirty expert paediatric anaesthesiologists. Ten experts responded. They were asked to rate the relevance of every question on a 4-point scale (1 = not relevant, 2 = somewhat relevant, 3 = relevant and 4 = highly relevant). Item content validity index (ICVI) for each question was calculated (ICVI = number of experts rating questions as 3–4 divided by a total number of experts). The questions with ICVI >0.78 were retained in the second version ($n = 35$).^[8] Scale content validity index (SCVI) (SCVI = Total of ICVI scores divided by the total number of included questions) of second version of questionnaire was 0.97 which was within acceptable limits.^[8] This second questionnaire with 35 questions was circulated amongst anaesthesiologists of our teaching institute for checking feasibility. In

the final version, 28 questions were retained. Ethics Committee approval was obtained. The survey was registered with Clinical Trials Registry of India (CTRI REF/2018/02/017539).

The questionnaire [Appendix 1], prepared in English, included basic demographic data such as age, state of residence, qualification, current affiliation, position in institute, years of experience, type of practice and average number of paediatric cases in a month. Twenty-seven questions had multiple choice answers and participants could tick one or more answers depending on the question. The participants had to rate design features on a scale of 1–5 in the last question. The questionnaire had six parts. Question numbers 1–6 included overview and choice of SGAD, questions 7–9 covered current anaesthesia practices associated with SGAD use, questions 10–16 comprised the use of SGAD in uncommon and complicated situations, questions 17 and 18 enquired about the usage of SGADs in difficult airway, questions 19–27 included safety measures associated with their use and question 28 sought personal opinion on design of SGAD.

The questionnaire was manually distributed to the 500 delegates of the Asian Society of Paediatric Anaesthesiologists Conference 2017, at Mumbai. E-mails were also sent to 16,532 members of the Indian Society of Anaesthesiologists from 15/7/17 to 15/9/17. E-mails were not sent to those who had manually filled the forms. Two E-mail reminders were sent to those who did not respond. Participants were requested to fill the questionnaire only once. Completion and submission of questionnaire by the respondents implied consent. Responses received till 30/09/17 were analysed.

All analyses were performed using Microsoft Excel 2016 (Redmond, WA, USA). Sample size was calculated using online calculator from 'The survey system 2016, Creative research systems, Sebastopol, California'. For an estimated population of 17,000, the sample size was calculated to be 376 for a margin of error of 5% and 95% confidence interval.

RESULTS

Five hundred and seven anaesthesiologists responded to the survey. We excluded the responses of postgraduate students (59), of those who practiced outside India (15) and of those who did not use SGADs in paediatric patients (34). Six responses fit two or more above-mentioned exclusion criteria, so they

were excluded only once. Four hundred and five valid responses (370 online and 35 manual) were analysed. The demographic details of the respondents are presented in Table 1. In question numbers 3, 6, 8 and 18, multiple responses were allowed and the sum of responses does not add up to 405 and the percentages do not add up to 100.

The various SGADs used by respondents are summarised in Table 2. The most commonly used device was i-gel® (*n* = 246, 60.74%) followed by LMA classic® (cLMA) reusable (*n* = 240, 59.26%). Three hundred and four (75.06%) respondents had access to second-generation SGADs. Second-generation devices (*n* = 246, 60.74%) were more commonly used than first-generation devices (*n* = 159, 39.26%). The order of preference of first-generation devices (*n* = 159) was: cLMA® reusable – 111 (69.8%), cLMA® disposable – 30 (18.87%), Ambu Aura i® – 12 (7.54%), Soft Seal Laryngeal Mask® – 3 (1.89%), LMA Flex® – 2 (1.26%) and Ambu Aura 40® – 1 (0.63%). The order of preference of second-generation devices (*n* = 246) was i-gel® – 149 (60.57%), LMA ProSeal® – 60 (24.39%), LMA Supreme® – 24 (9.76%), Ambu AuraGain® – 12 (4.88%) and Laryngeal Tube Suction® (LTS) – 1 (0.40%). Past experience – 277 (68.4%), evidence from research – 133 (32.8%), cost – 120 (29.6%), hospital or department recommendation – 80 (19.75%) and reusability – 64 (15.80%), whatever is given to them – 48 (11.85%), availability – 9 (2.22%) and others – 4 (0.98%) were the factors which influenced the choice of respondents while using any SGAD.

The maximum duration of surgery for which respondents would use SGAD was < 30 min – 37 (9.14%), 30–60 min – 175 (43.21%), >60–90 min – 122 (30.12%) and >90 min – 71 (17.53%). Spontaneous ventilation was used by 274 (67.65%) respondents. Manual ventilation using the Jackson Rees circuit or Bain’s circuit was the next most common practice (*n* = 183, 45.19%). Pressure control (*n* = 127, 31.36%), volume control (*n* = 107, 26.42%) and pressure support ventilation (*n* = 87, 21.48%) were the other modes of ventilation used. Similar number of respondents preferred removing the SGAD in deep plane of anaesthesia (*n* = 202) and awake state (*n* = 203).

The responses about the use of SGAD in uncommon and complicated clinical situations are summarised in Table 3. Of the 400 respondents who do paediatric laparoscopic surgical cases, 243 (60.75%) never used,

Table 1: Demographic profile of survey respondents

Characteristic	Value
Age (years) mean (SD)	40 (9.5)
Years of practice, mean (SD)	12.36 (9.36)
Area of practice (zone wise), <i>n</i> (%)	
North zone	83 (20.49)
South zone	137 (33.82)
East zone	30 (7.4)
West zone	137 (33.82)
Central zone	4 (0.98)
Union territory	14 (3.45)
Area of practice, <i>n</i> (%)	
Urban	349 (86.17)
Semi-urban	47 (11.60)
Rural	5 (1.23)
Not mentioned	4 (0.9)
Qualification, <i>n</i> (%)	
MD/DNB	331 (81.7)
Fellowship/DM in paediatric anaesthesia	39 (9.6)
DA	35 (8.6)
Type of institute, <i>n</i> (%)	
Medical college	169 (41.73)
Corporate hospital	125 (30.86)
Autonomous institute	46 (11.36)
Nursing home	39 (9.63)
Government nonteaching hospital	14 (3.46)
Others	12 (2.96)
Position in institute, <i>n</i> (%)	
Consultant	206 (50.86)
Faculty	140 (34.57)
Senior resident	59 (14.57)
Years of experience in paediatric anaesthesiology, <i>n</i> (%)	
<1	37 (9.14)
1-5	244 (60.25)
>5	124 (30.62)
Average number of paediatric cases (<12 years) in a month, <i>n</i> (%)	
1-5	82 (20.25)
6-10	85 (20.99)
>10	238 (58.76)

Zones – North zone (Jammu and Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Uttar Pradesh and Haryana), South zone (Andhra Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu), East zone (Bihar, Orissa, Jharkhand, West Bengal, Assam, Sikkim, Nagaland, Meghalaya, Manipur, Mizoram, Tripura, Arunachal Pradesh), West zone (Rajasthan, Gujarat, Goa, Maharashtra), Central zone (Madhya Pradesh, Chhattisgarh). SD – Standard deviation

whereas 66 (16.5%) used sometimes, 62 (15.5%) rarely, 26 (6.5%) almost always and 3 (0.75%) always used SGAD for laparoscopic surgeries. Amongst those who do cases in remote locations (*n* = 323), 179 (55.42%) used SGADs. All respondents were comfortable while using SGAD in supine position but fewer used it in lithotomy (*n* = 209, 51.60%), lateral (*n* = 198, 48.89%) and prone position (*n* = 9, 2.22%).

Two hundred and sixteen (53.33%) respondents had used a SGAD in a known difficult airway. The devices

used by respondents in a known difficult airway were i-gel[®] – 83 (38.43%), cLMA[®] – 66 (30.56%), LMA ProSeal[®] – 32 (14.81%), Ambu AuraGain[®] – 11 (5.09%), LMA Supreme[®] – 10 (4.63%), Ambu Aura-i[®] – 16 (7.41%), LMA Flex[®] – 6 (2.78%), air-Q[®] – 4 (1.85%), Intubating LMA[®] – 3 (1.39%), LTS[®] – 2 (0.93%) and Ambu Aura 40[®] – 1 (0.46%). Eighty-six respondents (21.23%) had intubated through a SGAD at least once. SGAD was used as an intubation conduit by 33 (8.15%) in normal airways, 67 (16.54%) in a known difficult airway and 24 (5.92%) in unanticipated difficult airway. Fibre-optic bronchoscope (FOB), bougie/introducer-guided and blind technique were used by 33 (8.14%), 39 (9.62%) and 28 (6.91%), respectively.

Table 2: Types of various supraglottic airway devices used by respondents

SGADs used by respondents	n (%)
i-gel	246 (60.74)
LMA classic reusable	240 (59.26)
LMA ProSeal	140 (34.57)
LMA classic disposable	73 (18.02)
Laryngeal tube	61 (15.06)
Ambu Aura-i	57 (14.07)
Ambu AuraGain	33 (8.15)
LMA flex	18 (4.44)
Air-Q intubating laryngeal airway	14 (3.46)
Soft seal laryngeal mask	13 (3.21)
Cobra PLA	5 (1.23)
Laryngeal tube suction	1 (0.25)
Ambu Aura 40	1 (0.25)

SGADs – Supraglottic airway devices; LMA – Laryngeal mask airway; PLA – Perilaryngeal airway

Table 3: Supraglottic airway device use in different situations

Clinical situation	Response, n (%)			
	Yes	No	Sometimes	Not my area of practice
Infants <5 kg	170 (41.98)	114 (28.15)	121 (29.88)	-
Neonates	75 (18.52)	242 (59.75)	88 (21.73)	-
Ophthalmological surgery	157 (38.77)	87 (21.48)	53 (13.08)	108 (26.67)
Tonsillectomy	11 (2.72)	352 (86.91)	9 (2.22)	33 (8.15)

The complications faced by respondents are mentioned in Table 4. Capnometer was used always by 316 (78.02%) respondents, while it was used sometimes or never by 70 (17.28%) and 12 (2.96%), respectively. The rest (7 [1.73%]) did not have access to capnometer.

When a cuffed SGAD was used (n = 390), 43 (11.03%) measured the intracuff pressure always, 125 (32.05%) measured it sometimes and 116 (29.74%) did not measure it at all. Equipment needed to measure intracuff pressures was not available to 106 (27.18%). Gradual inflation of the cuff till there is no leak, but up to the maximum recommended volume, was practiced by 234 (60%) respondents, while 97 (24.87%) inflated with the maximum and 24 (6.15%) with half the recommended volume. Cuff pressure monitor to guide the inflation of the cuff was used by 35 (8.98%) respondents. The vast majority of the respondents (n = 352, 86.91%) did not measure seal pressures. Seal pressure was measured for every case by 53 (13.09%) of respondents only. Only 33 (8.15%) respondents measured it again after change in position of patients.

Disposable and reusable devices were preferred by 46 (11.36%) and 132 (32.59%), respectively, while 227 (56.05%) respondents have no such preference. Disposable SGADs were reused by 313 (77.28%) respondents. Amongst these, 157 (50.16%) reused the SGAD till it is no longer usable while rest reused it up to 10 times. Various techniques of disinfection used are mentioned in Table 5. The ratings given for various desirable design features in SGADs are highlighted in Table 6.

DISCUSSION

This survey provides an insight into the practice patterns of anaesthesiologists working in India, while using SGADs in paediatric patients. Surveys have been conducted by the Society of Pediatric Anesthesia (SPA) and Association of Paediatric Anaesthetists of Great

Table 4: Frequency of complications faced by respondents

Complication	Frequency				
	Frequent (1 in 10 cases)	Occasional (1 in 20 cases)	Rare (1 in 50 cases)	Never	Not mentioned
Laryngospasm	9	67	201	108	20
Aspiration	3	11	102	267	22
Problems in size selection	29	153	159	45	19
Difficulty in securing position	20	138	175	52	20
Difficulty in maintaining unobstructed ventilation	14	89	216	64	22

Table 5: Various methods of disinfection of disposable supraglottic airway devices

Techniques of disinfection	Polyvinylchloride SGAD (n=291), n (%)	i-gel (n=268), n (%)
EtO	158 (54.30)	116 (43.38)
Only soap and water	99 (34.02)	122 (45.52)
Glutaraldehyde	22 (7.56)	19 (7.09)
Plasma sterilisation	6 (2.06)	5 (1.87)
Autoclaving	4 (1.37)	1 (0.37)
Chlorhexidine	1 (0.34)	1 (0.37)
Alcohol rub	1 (0.34)	2 (0.75)
Povidone iodine	-	1 (0.37)

EtO – Ethylene oxide; SGAD – Supraglottic airway device

Table 6: Rating given to various design features in supraglottic airway devices

Design feature	Rating: Median (25 th -75 th percentile)
Gastric drain channel	4 (3-5)
SGADs allowing higher peak pressures for ventilation	3 (3-4)
Inflatable cuff to form proper seal	4 (3-5)
Inbuilt cuff pressure monitor	3 (2-4)
Easy conduit for intubation	4 (3-5)

SGADs – Supraglottic airway devices

Britain and Ireland (AAGBI).^[5,9] However, there is a dearth of comprehensive large-scale pan-Indian data.^[10] AAGBI survey focussed mainly on the choice of SGADs and their use in difficult airway. SPA survey concentrated mainly on practice patterns pertaining to LMA family. Unlike SPA survey, we asked ‘have you used’ instead of ‘would you use’ to elicit practice patterns and eliminate theoretical responses. The only survey conducted in India focussed on few practice patterns.^[10] We aimed to develop a comprehensive validated questionnaire covering choice, practice patterns in a variety of situations, safety measures employed and desirable newer design features involving SGADs in paediatric patients.

A wide variety of second-generation SGADs are now available in paediatric sizes^[1,11] making their use quite common in India. This is significantly different from the findings of older surveys where first-generation devices were used more often.^[5,10] The extensive use of i-gel[®] and cLMA[®] is perhaps due to ease of use and low rate of serious complications.^[3,11] A single point survey involving delegates of national paediatric conference in 2016 found cLMA[®] to be most popular.^[10] Our nationwide survey conducted 1½ years later has shown i-gel[®] as the most commonly used device. This may represent a shift in the preference of Indian anaesthesiologists. Past experience, rather than evidence from research, guides the choice while

selecting a particular SGAD, which is similar to survey conducted by AAGBI.^[5]

Controlled ventilation and pressure support ventilation have been shown to be superior to spontaneous ventilation with ProSeal LMA[®].^[12-14] Spontaneous ventilation or controlled ventilation using Bain’s or Jackson Rees circuit was the most commonly used method of ventilation while using SGAD amongst our respondents. This is in contrast to the SPA survey where pressure support ventilation was used by a large number of respondents.^[9] Lack of sophisticated anaesthesia ventilators, knowledge and experience in using advanced modes could explain this difference. Advanced modes improve ventilation parameters, thereby enabling anaesthesiologists to use SGADs for prolonged duration.^[10] This also explains the reluctance that our respondents had in using SGADs in surgeries lasting for >90 min, unlike the SPA survey.

A greater percentage (28.15%) of our respondents and those from previous Indian survey (38%) do not use SGADs in infants which is in contrast to SPA survey where 9% respondents would not use at all.^[9,10] This could be attributed to the late introduction of very small SGADs in the Indian market. Majority of our respondents also did not use SGADs in neonates or used them only sometimes. This reluctance to use SGADs in younger patients could be due to the differences in airway anatomy of such patients causing suboptimal placement, thereby requiring frequent repositioning.^[15]

The use of SGAD in ophthalmological surgery is high like previous survey.^[9] Although the efficacy of second-generation SGADs in paediatric laparoscopic surgeries is reported,^[6,16] majority of our respondents were uncomfortable with their use. However, SGADs have made an inroad into practice with around 7.25% respondents using it almost always or always during laparoscopy like the respondents of SPA survey.^[9] SGADs do not appear to be a choice of airway management for tonsillectomies for most respondents. Small studies have shown SGADs to be a suitable alternative to endotracheal intubation,^[17,18] but a larger study reveals higher incidence of complications, mainly airway obstruction.^[19] Appropriate patient selection, careful insertion, spontaneous ventilation and experience may decrease the incidence of complications. Very few respondents are comfortable with the use of SGAD in prone position like in the SPA survey.^[9] Prone positioning limits access to the

airway and can pose a dangerous situation if SGAD is malpositioned. The demand for anaesthetising paediatric patients in remote locations such as radiology suites is rising, and it is encouraging to know that SGADs are commonly used by our respondents and this is also being reported in literature.^[20,21]

SGADs are now an integral part of paediatric difficult airway algorithms and guidelines^[22,23] and more than half of the respondents have used SGADs in a child with a known difficult airway. *i-gel*® and *cLMA*® were the most commonly used devices. Use of introducers and FOB through a SGAD serve as facilitators for intubation.^[24] SPA and AAGBI surveys have only assessed fibre-optic intubation through SGAD, whereas we incorporated the blind/introducer-guided technique in our questionnaire.^[5,9] More than 50% respondents in AAGBI survey had performed FOB-assisted intubation through SGAD in contrast to India where only 9% had done the same. A significant number of our respondents used the blind technique indicating lack of availability of paediatric size FOB.

Current studies tell us more about efficacy rather than safety of SGADs.^[25] Aspiration is the most common complication reported in the NAP4.^[4] However, in this survey, we found that difficulty in size selection was the most common problem, followed by difficulty in securing position and maintaining unobstructed ventilation. This is similar to previous surveys.^[5,10] Here lies the importance of survey where day-to-day difficulties encountered during routine practice get highlighted. However, surveys have limitations as the incidence of rare complications may not get reflected.

Capnography is essential at all times as per the American Society of Anesthesiologists' minimum monitoring standards.^[26] General anaesthesia causes significant alterations in respiratory mechanics of paediatric patients. This causes a gradual rise in end-tidal carbon dioxide even though the child is breathing spontaneously. However, nearly a quarter of respondents did not always use a capnometer along with SGADs. This could probably be due to a reluctance to attach a heavy mainstream capnometer adapter to a small SGAD, unavailability, or ignorance of its benefit for short duration procedures. This safety issue has not been addressed in previous surveys.

Very few respondents used a cuff pressure manometer while inflating the cuff of SGADs. Lack of equipment or knowledge could be the probable cause. Using clinical

end points to inflate LMA cuffs is associated with significant hyperinflation and may lead to loss of seal between larynx and oesophagus. When cuff pressure exceeds mucosal perfusion pressure, complications such as sore throat and nerve injuries occur.^[1] Very young patients are not able to communicate these problems and they may become irritable in the post-operative period. Therefore, cuff manometers should routinely be used.^[27]

Measurement of oropharyngeal seal pressure quantifies the efficacy of the seal and ensures optimum ventilation. It also reduces leaks into the oesophagus, thereby reducing the risk of regurgitation and aspiration.^[1] Experts have recommended that oropharyngeal seal pressure should be assessed routinely and also rechecked with every change of patient position.^[1] Yet, a majority of respondents did not measure the seal pressure at all. Lack of emphasis given during training could possibly be the reason why these important safety practices are seldom used. Moreover, these important issues have not been covered in the previous surveys.

The current survey found that there is widespread reuse of disposable SGADs. This is similar to a survey conducted on SGADs in adults in India.^[28] This could be due to its initial easy availability at low cost. Rampant reusing indicates a compulsion of keeping costs low in a limited-resource country. The techniques used for disinfection also varied widely amongst respondents and were largely inadequate for semi-critical equipment such as SGADs which require high-level disinfection.^[29] Such practices may predispose the patient to infection, and the oropharyngeal seal of the SGAD may also be lost due to damage caused by repeated reuse.

Novel design features such as in-built cuff pressure monitor and devices allowing higher ventilation pressures have found lower rating in this survey, mainly because of lack of importance given to cuff and oropharyngeal seal pressures in routine practice or an associated increase in cost. It is interesting that the sought-after feature is a design allowing use as an easy conduit for intubation, highlighting the importance of SGAD in a difficult airway.^[23]

The poor response rate of the survey could be due to the highly selective field of study, i.e., supraglottic devices in paediatric patients. Furthermore, the responses of predominantly urban anaesthesiologists

may not necessarily reflect the practice patterns across the country.

CONCLUSION

Second-generation SGADs are increasingly being used by anaesthesiologists across India in varied situations, representing a paradigm shift in the approach towards airway management in paediatric patients. However, techniques to improve safety, i.e., intracuff and seal pressure measurement, use of capnography and appropriate disinfection techniques are lacking which needs to be emphasised during training and continued medical education.

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Conflicts of interest

There are no conflicts of interest.

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APPENDIX 1: SURVEY QUESTIONNAIRE

Dear Doctor,

We are anaesthesiologists working in LTMMC, Sion, Mumbai. We invite you to participate in this survey. We thank you in anticipation for your valuable time. Your feedback is important to us as this data is being collected as part of a comprehensive study on the prevalence of SGAD usage and associated practices in paediatric patients among anaesthesiologists. We understand that practice patterns may differ across states/ types of practice/ institute/ freelance, etc. Whatever is ideal may not be practical for innumerable reasons. We are making a sincere attempt to find the practice pattern across India. Please note that your participation in this survey is optional and the data collected will be used for medical publication. We assure that confidentiality will be maintained.

Age: _____ State: _____ Area of practice: urban/ semi urban/ rural

Email : _____

Qualification: DA / MD / DNB / Fellowship or DM in paediatric anaesthesia

Type of institute where you work:

Medical College Corporate hospital Government non-teaching hospital Nursing home Autonomous institute Others

Position in the institute: PG student Senior resident Faculty Consultant

Years of practice _____

Average number of paediatric cases (<12 years) in a month: 1-5 6-10 > 10

Years of experience in paediatric anaesthesiology: <1years 1-5 years > 5 years

Do you exclusively practice paediatric anaesthesia? Yes No

1. Do you use SGADs in paediatric patients?

Yes No

2. Out of all paediatric cases, in what percentage of cases are you putting SGAD?

< 25% 25-50% > 50%

3. Which SGADs do you use in paediatric patients? (Tick as many as appropriate)

LMA classic reusable

Cobra PLA

LMA classic disposable(unique)

i-gel

LMA Flex

Ambu Aura-i

LMA ProSeal

Ambu AuraGain

LMA Supreme

Laryngeal Tube

Soft Seal Laryngeal mask

Laryngeal Tube Suction

air-Q Intubating Laryngeal Airway

Others(specify) _____

4. Do you have 2nd generation SGAD for paediatric patients in your institute?

Yes No

5. Which SGAD do you commonly use in paediatric patients?(Tick one)

- First Generation
- Second Generation

If first generation, then which is your first choice

- LMA classic reusable LMA classic disposable LMA Flex Soft Seal Laryngeal Mask air- Q Intubating Laryngeal Airway Ambu Aura-i Cobra PLA Laryngeal Tube Others _____

If second generation, then which is your first choice

- LMA ProSeal LMA Supreme i-gel Ambu AuraGain Laryngeal Tube Suction
- Others _____

6. What guides your choice for choosing a particular SGAD?(tick as many as appropriate)

- Past Experience
- Whatever is given to me
- Whatever my hospital or department recommends
- Cost
- Reusability
- Evidence from research
- Type of surgery
- Any other

7. What is the maximum duration of surgery for which you have used a SGAD in a paediatric patient comfortably?

- <30 minutes 30minutes-1hour >1- 1 ½ hours > 1 ½ hours

8. What mode of ventilation do you use while using SGAD in paediatric patients?(tick as many as appropriate)

- Spontaneous
- Controlled ventilation with JR circuit/Bain's circuit

- Manually controlled ventilation with circle absorber
- Volume controlled
- Pressure controlled
- Pressure support ventilation
- Any other (Specify) _____

9. Which is your preferred method for removal of paediatric SGAD?

- Remove when patient is in deep plane of anaesthesia
- Child bringing out SGAD on his own/awake state

10. Are you comfortable in using SGAD in infants < 5kg?

- Yes No Sometimes

11. Do you use SGAD in a paediatric patient undergoing ophthalmological surgery?

- Yes No Sometimes I don't do ophthalmic cases.

12. Do you use SGAD in a paediatric patient who is undergoing laparoscopy?

- Always Almost always Sometimes Rarely Never
- I don't do laparoscopy cases

13. Do you use SGAD in paediatric patients undergoing tonsillectomy?

- Yes No Sometimes I don't do tonsillectomy

14. Do you use SGAD in neonates?

- Yes No Sometimes

15. In which surgical positions are you comfortable in using SGAD in paediatric patients? (tick as many as appropriate)

- Supine Lateral Lithotomy Prone

16. Have you used SGAD in a paediatric patient in a remote location like CT scan, MRI, interventional radiology, etc.?

- Yes No I don't do cases in remote locations

17. Have you ever used SGAD in a child with known difficult airway? Yes No

Which device/devices did you use?

18. Have you ever intubated through paediatric SGAD?
 Yes No

If Yes, then intubation was performed (tick as many as appropriate)

- In a normal airway
- In anticipated Difficult Airway
- In unanticipated difficult airway

If Yes, then intubation through SGAD was (tick as many as appropriate)

- Blind
- Fiberoptic guided
- Introducer/bougie guided
- Other (specify)

19. How often have you faced problems while using SGADs in paediatric patients? (please tick in the appropriate boxes)

Frequent (1in10 cases)	Occasional (1in20 cases)	Rare (1in50 cases)	Never
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- Laryngospasm
- Aspiration
- Problems in size selection
- Difficulty in securing position
- Difficulty in maintaining ventilation

Please mention if any particular device/s has caused problems_____

Any other problem/complication(specify) _____

20. Do you use capnometer when SGAD is used?
 Always Never Sometimes Equipment not available

21. Do you monitor intra-cuff pressure when SGAD with inflatable cuff is used?

Always Never Sometimes Equipment not available

22. After SGAD insertion, with how much volume do you inflate the cuff?

- With maximum recommended volume
- With half the maximum recommended volume
- Gradually till there is no leak but upto the maximum recommended volume.
- Guided by cuff pressure monitor

23. Do you measure seal pressure/ oropharyngeal leak pressure for every case whenever you use a SGAD?

Yes No

If yes, then do you remeasure if there is a change in position like head flexion, extension or supine to lateral position?

Yes No

24. What do you prefer?

Single use/disposable SGAD Resusable SGAD Both

25. Do you reuse disposable SGAD? Yes No

If yes, how often? Upto 10 uses Till it is no longer usable

26. If you are reusing polyvinyl chloride (disposable) SGAD, how do you disinfect it?

Only soap and water Glutaraldehyde ETO sterilisation Any other

Not applicable

27. If you are reusing i-gel, how do you disinfect it?

Only soap and water Glutaraldehyde ETO sterilisation Any other

Not applicable

28. What feature you feel is important in paediatric SGAD? (rate each on a scale of 1-5 where 1 = least important and 5= most important)

Gastric drain channel _____

SGADs allowing higher peak pressures for ventilation _____

Inflatable cuff to form proper seal _____

Non-inflatable cuff to form proper seal _____

Inbuilt cuff pressure monitor _____

Easy conduit for intubation _____

Announcement

Old Issues of IJA

Limited copies of old issues of IJA from 2013 are available in IJA office. Members interested can contact Editor In Chief (editorija@yahoo.in/ijadivatia@gmail.com / 98690 77435)