

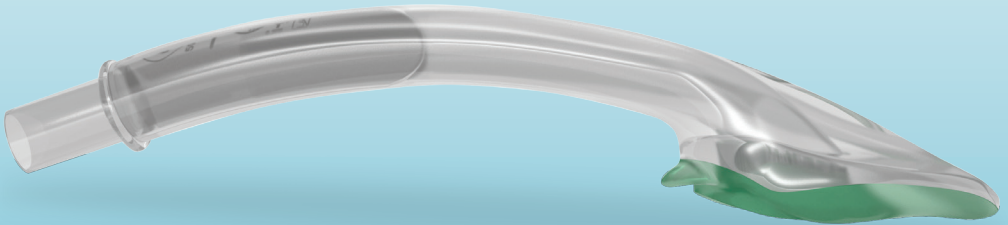


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# BIBLIOGRAPHY

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Published studies, case reports and correspondence



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# Introduction

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Welcome to the third edition of the Intersurgical® i-gel® bibliography, which now features even more studies, case reports and correspondence relating to this innovative airway management device, up to April 2017.

The i-gel® is a second generation supraglottic airway, made of a medical grade thermoplastic elastomer, designed to create a non-inflatable anatomical seal of the pharyngeal, laryngeal and perilaryngeal structures. An integrated gastric channel provides an early warning of regurgitation, facilitates venting of gas from the stomach and allows for the passing of a suction tube to empty the stomach contents. The device also includes a buccal cavity stabiliser to provide vertical strength during insertion and eliminate the potential for rotation.

The first study on i-gel® was conducted by Richard Levitan and his team at the University of Maryland Medical Center in Baltimore, USA. This landmark study on the positioning and mechanics of i-gel® in 65 non-embalmed cadavers was initially presented as a free paper at the UK Difficult Airway Society meeting in Leicester in November 2004 and accepted for publication in *Anaesthesia* in April 2005. i-gel® was subsequently launched in January 2007 at the Association of Anaesthetists of Great Britain and Ireland Winter Meeting in London, UK.

The first independent clinical data on patients was a letter to the editor of *Resuscitation* from David Gabbott and Richard Beringer at Gloucester Royal Hospital in the UK. This correspondence, entitled, 'The i-gel® supraglottic airway: A potential role for resuscitation?' reported

initial findings on the use of i-gel® in 100 patients presenting for elective surgery under general anaesthesia.

Since the publication of this letter, i-gel® has been the subject of numerous, peer reviewed clinical studies, case reports and correspondence. The objective of this bibliography is to provide a comprehensive list of all known published data on i-gel®.

Each study listed includes a brief summary description. These summaries are not intended to provide a comprehensive overview of the study concerned, only to assist the reader in deciding whether a particular paper is relevant to their area of interest, prior to obtaining a copy of the full document for review. The bibliography also provides an index by first author and journal title.

Every attempt has been made to include all known data, irrespective of outcome, so as to allow the reader every opportunity to obtain a balanced overview of the clinical data that exists for i-gel®.

We have not altered any of the study titles, instead leaving them as the authors intended. This includes trademark variations.

Whilst every attempt has been made to provide accurate information, we apologise in advance for any errors or omissions and will be pleased to make any corrections brought to our notice in any following edition. We hope you find this bibliography interesting and useful.

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Each section contains studies, case reports and letters, listed in chronological descending order. Studies felt to be of particular significance, such as meta analyses, are highlighted in blue.

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## Anaesthesia Adult

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### **Sore throat following three adult supraglottic airway devices: A randomised controlled trial**

*L'Hermite J, Dubout E, Bouvet S, Bracoud LH, Cuvillon P, Coussaye JE, Ripart J Eur J Anaesthesiol. 2017 Jul; 34(7): 417-424*

Comparison of the incidence of sore throat in 546 patients following use of LMA Unique®, LMA Supreme® and the i-gel®. Primary outcome was the incidence of sore throat 24 hours postoperatively. Authors concluded that sore throat recordings were not significantly different between the three devices.

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### **I-gel airway for advanced uses: a case of successful utilization of this second-generation supraglottic airway device for controlled ventilation during general anaesthesia in lateral decubitus position**

*Shiraishi Zapata CJ. Minerva Anesthesiol. 2017 Feb; 83(2): 219-220*

Letter to editor reporting the case of successful controlled ventilation in lateral decubitus position on a 39-year-old male. i-gel size 4 chosen after failed tracheal intubation. No evidence of trauma or pharyngeal inflammation.

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### **Calling the patient's own name facilitates recovery from general anaesthesia: a randomised double-blind trial**

*Jung YS, Paik H, Min SH, Choo H, Seo M, Bahk JH, Seo JH. Anaesthesia. 2017 Feb; 72(2): 197-203*

Random allocation of patients into two groups: one with a name-specific verbal command and one using a general term. Time to i-gel removal was quicker in the name group.

### **Comparison of the i-gel and other supraglottic airways in adult manikin studies: systematic review and meta-analysis**

*An J, Nam SB, Lee JS Lee J, Yoo H, Lee HM, Kim MS. Medicine (Baltimore). 2017 Jan; 96(1): e5801*

Authors conducted a specialised search of study databases for eligible randomised controlled trials, setting device insertion time and first-attempts insertion success rate as their primary outcomes. In the 14 RCTs included, i-gel was faster than the majority of other supraglottic airways. Authors concluded that the 'unapparent advantage' of insertion success rate indicated the need for further evidence gathering in this area.

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### **I-Gel is a suitable alternative to endotracheal tubes in the laparoscopic pneumoperitoneum and trendelenburg position**

*Lai CJ, Liu CM, Wu CY, Tsai FF, Tseng PH, Fan SZ. BMC Anesthesiol. 2017 Jan 6; 17(1): 3*

Randomised controlled trial of 40 patients divided equally between i-gel and ETT groups. Leak fraction was the primary outcome, defined as leak volume divided by inspired tidal volume. In the LPT position, no difference was recorded in the leak fraction. In the i-gel group there was 'notably less' leakage in LPT position than in supine - this difference was not observed in the ETT group. Incidence of postoperative sore throat was significantly lower in the i-gel group.

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### **Dexmedetomidine infusion as an anesthetic adjuvant to general anaesthesia for appropriate surgical field visibility during modified radical mastectomy with i-gel: a randomized**

## control study

Gupta K, Rastogi B, Gupta PK, Singh I, Singh VP, Jain M. *Korean J Anesthesiol.* 2016 Dec; 69(6): 573-578

Sixty female patients split in to equal groups, one receiving a dexmedetomidine dose, the other saline as control. Patients receiving the dose infusion showed significantly less bleeding in the surgical field.

## Lingual nerve palsy after i-gel® use

Ueshima H, Okumura N, Otake H. *J Anesth.* 2016 Dec; 30(6): 1095

Case report of a patient who suffered from tongue numbness after use of the i-gel.

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

Watanabe A, Edanaga M, Ichinose H, Yamakage M. *Clin Anesth.* 2016 Nov; 34: 223-6

Randomised study comparing insertion attempts, insertion time and postoperative complications (among other parameters recorded) on 37 adult patients after concerns that the i-gel sometimes fails to fit or ventilate sufficiently in Japanese patients. Results showed that two patients in the Air-Q®sp group failed, compared to one in the i-gel group.

## A comparison of QTc intervals after laryngoscopic intubation and i-gel insertion during propofol-sevoflurane anaesthesia

Byon HJ, Song J, Shinn HK, Song K, Lee C, Lim H. *Minerva Anesthesiol.* 2016 Mar 11

Patients were randomly assigned to either the i-gel or intubation group and induced using propofol or sevoflurane. Peak QTc interval was lower in the i-gel group.

Authors conclude the i-gel 'may be advantageous' to patients at risk of QTc prolongation.

## Comparison of the clinical performance of i-gel, LMA Supreme and LMA ProSeal in elective surgery

Liew GH, Yu ED, Shah SS, Kothandan H. *Singapore Med J.* 2016 Aug; 57(8): 432-7

Comparison trial conducted on 150 patients, with primary outcome - leak pressure - highest in the i-gel group. The device was also faster to insert and recorded lower airway morbidity.

## Comparison between supraglottic airway devices and endotracheal tubes in patients undergoing laparoscopic surgery: A systematic review and meta-analysis

Park SK, Ko G, Choi G, Ahn E, Kang H. *Medicine (Baltimore).* 2016 Aug; 95(33): e4598

In total, 17 randomised controlled trials were identified fitting the parameters outlined. Incidence of postoperative complications including cough at removal, dysphagia, sore throat and laryngospasm were higher in the ETT group. However no differences were shown regarding insertion success at first attempt and insertion time, among others.

## Postoperative sore throat: a systematic review

El-Boghdadly K, Bailer R, Wiles M. *Anaesthesia.* 2016 Jun; 71(6): 706-17

Review into use of supraglottic airway devices against tracheal intubation in general anaesthesia. Authors suggest that, in adults, i-gel results in a lower incidence of post-operative sore throat.

### **A comparison of the I-Gel supraglottic device with endotracheal intubation for bronchoscopic lung volume reduction coil treatment**

*Arevalo-Ludeña J, Arcas-Bellas JJ, Alvarez-Rementería R, Flandes J, Morís L, Muñoz Alameda LE. J Clin Anesth. 2016 Jun; 31: 137-41*

Prospective observational study on 22 patients comparing the use of i-gel against orotracheal intubation. Tidal volume, peak pressure, gas leaks and adverse events were recorded. Authors conclude i-gel is 'an effective and safe alternative' to OTI in this scenario.

### **Comparison of remifentanyl EC50 for facilitating i-gel and laryngeal mask airway insertion with propofol anesthesia**

*Choi JB, Kwak HJ, Lee KC, Lee SR, Lee SY, Kim JY. J Anesth. 2016 Jun; 30(3): 377-83*

Randomised study comparing 41 female patients across two groups: i-gel and LMA®, undergoing anaesthesia. EC50 of remifentanyl concentration for i-gel insertion was significantly lower.

### **Comparison of oropharyngeal leak pressure and clinical performance of LMA ProSeal™ and i-gel® in adults: Meta-analysis and systematic review**

*Shin HW, Yoo HN, Bae GE, Chang JC, Park MK, You HS, Kim HJ, Ahn HS. J Int Med Res. 2016 Jun; 44(3): 405-18*

Online searches of popular databases resulted in 14 randomised controlled trials being included. Overall, leak pressure was higher with ProSeal, but i-gel was faster to insert, had lower incidence of blood staining on removal and sore throat.

### **Pillow height for i-gel® insertion: a randomized clinical trial**

*Fujiwara A, Komazawa N, Minami T. J Anesth. 2016 Jun; 30(3): 542*

Randomised controlled trial of 70 patients divided into two groups by height: low (4cm), and high (12cm). Performed by novice doctors, insertion efficacy difference between groups did not differ.

### **Aphonia after shoulder surgery: case report**

*Moreno CA, Fonseca S. Braz J Anesthesiol. 2016 May-Jun; 66(3): 321-3*  
Report of a 52-year-old female who developed aphonia related to IBPB.

### **Evaluation of pH in the removed i-gel after general anesthesia: a prospective observational study.**

*Deguchi S, Komazawa N, Kido H, Omori M, Minami T. J Clin Anesth. 2016 May; 30: 61-2*

Study to test the pH levels in the i-gel after removal.

### **Abandoning use of 1st generation SAD - Throwing the baby out with the bathwater?**

*Pearson K Anaesthesia Correspondence Website. 2016. Accessed 22 May.*

In the original post, and in response to Cook and Kelly's study on abandoning vintage laryngeal masks (Br J Anaesth. 2015 Oct; 115(4): 497-9), Pearson cautions against the 'universal replacement of 1st generation devices' especially considering sub-group care (paediatrics), versatility, training and cost, and instead suggests there should not be a one-size-fits-all approach. Pearson also comments on the significant move towards the use of i-gel in her hospital.

In response to this, Cook and Kelly suggests clinicians use the best performing

and safest device where available as first choice. Cook and Kelly make mention of the two published meta-analyses on i-gel in children by Choi GJ et al and Maitra S et al.

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### **Pressure support ventilation with the I-gel in intensive care unit: case report**

*Akan B, Erdem D, Albayrak MD, Aksoy E, Akdur F, Gogus N. Braz J Anesthesiol. 2016 Mar-Apr; 66(2): 219-21*

Report of use of i-gel in intensive care unit on 49-year-old female with respiratory distress. Size 3 inserted at first attempt after three failed attempts at tracheal intubation.

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### **Sniffing Position and i-gel Rotation Approach for i-gel Insertion under General Anesthesia**

*Takahashi Y, Murashima K, Kayashima K. Masui. 2016 Apr 65(4): 330-5*

Study on 50 adults to test the efficacy of i-gel insertion assistance techniques - sniffing the morning air position and rotation. Average insertion time was 24 seconds at first attempt. Authors conclude both techniques 'can be used for insertion'.

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### **Male patients require higher optimal effect-site concentrations of propofol during i-gel insertion with dexmedetomidine 0.5 µg/kg**

*Choi JJ, Kim JY, Lee D, Chang YJ, Cho NR, Kwak HJ. BMC Anesthesiol. 2016 Mar 22; 16(1): 20*

40 patients were split into equal gender groups prior to insertion. The EC<sub>50</sub> of propofol in men was approximately 40% higher than in women. Gender should be considered when determining optimal dose of propofol, according to the authors.

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### **Successful airway management with i-gel in the lateral position for a patient combined with sulcus vocalis**

*Ueno T, Komazawa N, Minami T. J Clin Anesth. 2016 Feb; 28: 91-2*

Report of successful airway management of a 62-year-old male with intractable hoarseness. Upon extubation, no increased hoarseness reported. i-gel recommended by authors for patients with sulcus vocalis.

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### **Comparison of a Supraglottic Gel Device and an Endotracheal Tube in Keratoplasty Performed Under General Anesthesia: A Randomized Clinical Trial**

*Guerrier G, Boutboul D, Rondet S, Hallal D, Levy J, Sjögren L, Legeais JM, Nicolau R, Mehanna C, Bourges JL, Samama CM. Cornea. 2016 Jan; 35(1): 37-40*

Study to assess the safety of the i-gel in keratoplasty performed under general anaesthesia, compared to tracheal tube intubation. No surgical complications reported in either group.

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### **Advances and Controversies in Perioperative Airway Management**

*Michalek P, Magboul MM, Tokar K, Donaldson W, Ozaki M. Biomed Res Int. 2016; 2016: 1965623*

A special issue of the journal focusing on the progress, innovations and controversies in perioperative airway management.

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### **Assessment of suitability of i-gel and laryngeal mask airway-supreme for controlled ventilation in anesthetized paralyzed patients: A prospective randomized trial**

*Radhika KS, Sripriya R, Ravishankar M, Hemanth Kumar VR, Jaya V, Parthasarathy S. Anesth Essays Res. 2016 Jan-Apr; 10(1): 88-93*

Patients were split into i-gel and LMA Supreme® groups, with insertion attempts, time and any manoeuvres needed forming outcomes, along with peak inspiratory pressure (PIP). LMA-S was inserted successfully in more patients, but with no significant difference in PIP.

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**Application of the LMA-Supreme™ and i-gel™ laryngeal masks during pelvic operations in adults**

*Wang F, Zhang R. Asian J Surg. 2016 Jan; 39(1): 1-5*

90 patients divided into two groups, i-gel and LMA Supreme®. Latter group required less time to insertion and gastric tube indwelling time, but i-gel group had fewer complications. Authors conclude both devices are safe and effective for this procedure.

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**Role of laryngeal mask airway in laparoscopic cholecystectomy**

*Belena JM, Ochoa EJ, Nunez M, Gilsanz C, Vidal A. World J Gastrointest Surg. 2015 Nov 27; 7(11): 319-25*

Literature search performed on laryngeal mask airway devices with drain tubes to determine efficacy of ventilation and protection against aspiration when compared with tracheal intubation. Results included studies on LMA Supreme, LMA Classic®, LMA ProSeal® and i-gel.

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**Laryngoscopy facilitates successful i-gel insertion by novice doctors: a prospective randomized controlled trial**

*Miyazaki Y, Komazawa N, Matsunami S, Kusaka Y, Minami T. J Anesth. 2015 Oct; 29(5): 654-9*

Trial on 84 adults assigned to either laryngoscopy or control groups, with number of attempts to successful insertion and difficulty of insertion the primary

outcomes measured. Results suggest that laryngoscopy facilitates i-gel insertion by novice doctors.

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**Comparison of i-gel® and LMA Supreme® during laparoscopic cholecystectomy**

*Park SY, Rim JC, Kim H, Lee JH, Chung CJ. Korean J Anesthesiol. 2015 Oct; 68(5): 455-61*

93 patients were allocated into i-gel or LMA Supreme groups, with insertion time, attempts and fiberoptic view of glottis recorded. No significant differences were recorded.

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**I-gel as an alternative to endotracheal tube in adult laparoscopic surgeries: A comparative study**

*Badheka JP, Jadhwal RM, Chhaya VA, Parmar VS, Vasani A, Rajyaguru AM. J Minim Access Surg. 2015 Oct-Dec; 11(4): 251-6*

60 patients were randomly assigned to either the i-gel or ETT group. Ease, insertion attempts and insertion time were measured, followed by gastric tube insertion attempts and perioperative complications. i-gel was quicker to insert and is a safe and suitable alternative to ETT in this scenario.

---

**Comparison of three supraglottic airway devices for airway rescue in the prone position: A manikin-based study**

*Gupta B, Gupta S, Hijam B, Shende P, Rewari V. J Emerg Trauma Shock. 2015 Oct-Dec; 8(4): 188-92*

Insertion of i-gel, ProSeal and LMA Classic were studied in prone position. Time to insertion, ease of insertion, bronchoscopic view and insertion score were compared. i-gel was the quickest and easiest to insert.



### **Comparison of I-gel with Classic Laryngeal Mask Airway Regarding the Ease of Use and Clinical Performance**

Arı DE, Ar AY, Karip CŞ, Siyahkoç İ, Arslan AH, Akgün FN. *Turk J Anaesthesiol Reanim.* 2015 Oct; 43(5): 299-303

Insertion time and successful first attempt incidence were measured within the 50 patients assigned to the device groups. i-gel was quicker to insert and other results 'did not differ'. Authors conclude i-gel may be 'a more advantageous' device compared with LMA.

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### **A prospective randomized comparative study to compare the hemodynamic and metabolic stress response due to endotracheal intubation and i-gel usage during laparoscopic cholecystectomy**

Biswas S, Mandal S, Mitra T, De Ray S, Chanda R, Sur D. *Middle East J Anaesthesiol.* 2015 Oct; 23(3): 315-20

64 patients were randomly assigned to either the i-gel or ETT group, with venous blood samples taken after induction and 20 minutes following. Authors conclude i-gel is 'a suitable, effective and safe' alternative to ETT in this scenario.

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### **Third generation supraglottic airway devices: an undefined concept and misused term. Time for an updated classification of supraglottic airway devices**

Cook TM. *Br J Anaesth.* 2015 Oct; 115(4): 633-4

Letter to the editor suggesting the term 'third generation' is a confused term used primarily for marketing and should therefore be abandoned. The author makes some suggestions for an updated classification.'

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### **A prospective study to evaluate and compare laryngeal mask**

### **airway ProSeal and i-gel airway in the prone position**

Taxak S, Gopinath A, Saini S, Bansal T, Ahlawat MS, Bala M. *Saudi J Anaesth.* 2015 Oct-Dec; 9(4): 446-50

40 patients were allocated to either the i-gel or ProSeal group. Insertion of i-gel on first attempt was successful in 17 of 20 patients, compared to 16 for ProSeal, and was faster to insert. Authors conclude ProSeal provided the better seal but insertion was easier with i-gel.

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### **Time to abandon the 'vintage' laryngeal mask airway and adopt second-generation supraglottic airway devices as first choice**

Cook TM, Kelly FE. *Br J Anaesth.* 2015 Oct; 115(4): 497-9

Editorial posing the question of whether the cLMA (and equivalent SADs) still have a place in modern airway practice or whether it is time to move on and consider whether second generation devices, defined as 'those with specific design features intended to reduce the risk of aspiration', should now be the first choice.

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### **Effect of pneumoperitoneum and Trendelenberg position on oropharyngeal sealing pressure of I-gel™ and ProSeal LMA™ in laparoscopic gynecological surgery: A randomized controlled trial**

Mishra SK, Sivaraman B, Balachander H, Naggapa M, Parida S, Bhat RR, Yuvaraj K. *Anesth Essays Res.* 2015 Sep-Dec; 9(3): 353-8

60 patients were enrolled to either i-gel or ProSeal groups, with the primary objective to compare sealing pressure. Authors conclude ProSeal gave a better seal.

### **Comparison of the i-gel™ and the Laryngeal Mask Airway Classic™ in terms of clinical performance**

*Polat R, Aydin GB, Ergil J, Sayin M, Kokulu T, Ozturk I. Braz J*

*Anesthesiol. 2015 Sep-Oct; 65(5): 343-8*

Performance of i-gel vs LMA Classic was measured in 120 patients, with respect to successful insertion attempts, insertion time, peak airway pressure, regurgitation, fiberoptic glottic view and postoperative complications. i-gel gave a shorter insertion time and better fiberoptic view.

### **Supraglottic Airway Devices and Effect on Voice-Comparison of LMA Proseal and i-gel: Double-Blind Randomized Clinical Trial**

*Vaidya S, Kundra P, Gopalakrishnan S, Parida P, Yuvaraj K, Mohan PM. J Voice. 2015 Oct 12. pii: S0892-*

*1997(15)00134-4*

90 adult patients were randomly assigned to LMA Proseal and i-gel groups, with voice evaluated using perceptive and acoustic analysis. In both groups voice results deteriorated comparably.

### **Comparing performance of ProSeal laryngeal mask airway and I-gel in anesthetized adult patients**

*Zhang JQ, Meng FM, Xue FS, Li RP. Saudi Med J. 2015 Sep; 36(9): 1130*

Questions raised as to the interpretation of results given, particularly user experience and insertion method of ProSeal.

Response from original study author is also declared within.

### **Propofol requirement for insertion of I-gel versus laryngeal mask airway: A comparative dose finding study using Dixon's up-and-down method**

*Ashay NA, Wasim S, Anil TB. J*

*Anesthesiol Clin Pharmacol. 2015 Jul-Sep; 31(3): 324-8*

This randomised controlled trial compared propofol requirements for i-gel and LMA Classic when inserted 60 seconds after injection. i-gel required a significantly lower dose.

### **A randomized controlled trial of the effect of preoperative dexmedetomidine on the half maximal effective concentration of propofol for successful i-gel insertion without muscle relaxants**

*Jang YE, Kim YC, Yoon HK, Jeon YT, Hwang JW, Kim E, Park HP. J Anesth. 2015 Jun; 29(3): 338-45*

37 patients were randomly allocated to either a dexmedetomidine or control (saline) group. Authors conclude that preoperative dexmedetomidine reduced the EC50 of propofol.

### **I-gel saves the day: Bradycardia and apnea in a patient undergoing burr hole and evacuation for a subdural hematoma under scalp block**

*Singh RB, Rizvi MM, Rasheed MA, Sarkar A. Anesth Essays Res. 2015 May-Aug; 9(2): 244-6*

Report of a 32-year-old male who became bradychardic and apneic. An i-gel was inserted and the case was managed 'very well'.

### **The comparison of Proseal and i-gel laryngeal mask airways in anesthetized adult patients under controlled ventilation**

*Ekinci O, Abitagaoglu S, Turan G, Sivrikaya Z, Bosna G, Ozgultekin A. Saudi Med J. 2015 Apr; 36(4): 432-6*

Randomised group of 80 patients split into i-gel and ProSeal groups, with

insertion time, gastric tube insertion and complications among the results measured. Insertion was easier and quicker with i-gel.

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**Comparison of the Disposable Streamlined Liner of the Pharynx Airway and the Disposable I-gel in Anaesthetized, Paralyzed Adults: A Randomized Prospective Study**

*El-Radaideh K, Alhowary AA, Bani Hani D. Anesthesiol Res Pract. 2015; 2015: 971059*

Patients were evenly distributed between the two device groups, with ease and number of insertions, insertion speed and leak pressure amongst outcomes measured. SLIPA™ appeared to be quicker to insert, however blood staining incidence was higher.

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**I-gel versus laryngeal mask airway-Proseal: Comparison of two supraglottic airway devices in short surgical procedures**

*Jadhav PA, Dalvi NP, Tendolkar BA J Anaesthesiol Clin Pharmacol. 2015 Apr-Jun; 31(2): 221-5*

Ease and time to insertion, airway sealing pressure and adverse events were measured in this study of 60 patients randomly allocated to i-gel and ProSeal groups. i-gel proved easier to insert and less traumatic.

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**Randomized comparison of the i-gel(™) with the LMA Supreme (™) in anesthetized adult patients**

*Beleña JM, Núñez M, Vidal A, Gasco C, Alcojor A, Lee P, Pérez JL. Anaesthetist. 2015 Apr; 64(4): 271-6*

140 patients split into device groups, with speed of insertion, success rates, leak pressure and tidal volume evaluated. i-gel proved quicker to insert and generally the

results were comparable.

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**Complications Associated with the Use of Supraglottic Airway Devices in Perioperative Medicine**

*Michalek P, Donaldson W, Vobrubova E, Hakl M. Biomed Res Int. 2015;2015:746560*

Review highlighting the complications that may arise from the use of supraglottic airways, including aspiration and regurgitation of gastric contents, compression of vascular structures and nerve injury.

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**Influence of Head and Neck Position on Oropharyngeal Leak Pressure and Cuff Position with the ProSeal Laryngeal Mask Airway and the I-Gel: A Randomized Clinical Trial**

*Zhang JQ, Meng FM, Xue FS, Li RP. Saudi Med J. 2015 Sep; 36(9): 113090*

Questions raised as to the interpretation of results given, particularly user experience and insertion method of ProSeal. Response from original study author is also declared within.

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**Propofol requirement for insertion of I-gel versus laryngeal mask airway: A comparative dose finding study using Dixon's up-and-down method**

*Mishra SK, Nawaz M, Satyaprakash MV, Parida S, Bidkar PU, Hemavathy B, Kundra P. Anesthesiol Res Pract. 2015; 2015: 705869*

After induction of anaesthesia and device insertion, head position was randomly changed from neutral to flexion, extension and lateral rotation. Leak pressure, fiberoptic view and ventilation scores were among the results measured. Effective ventilation can be performed with both devices, but 'extreme precaution' should be taken in flexion position using ProSeal.

### **Comparison of the proseal, supreme, and i-gel SAD in gynecological laparoscopic surgeries**

*Mukadder S, Zekine B, Erdogan KG, Ulku O, Muharrem U, Saim Y, Mahmut D. ScientificWorldJournal. 2015; 2015: 634320*

105 patients were randomly distributed between the three device groups. Initial leak pressure, insertion time, ease of placement and airway morbidity results all favoured the i-gel.

### **Comparison of the i-gel and the laryngeal mask airway proseal during general anesthesia: a systematic review and meta-analysis.**

*Park SK, Choi GJ, Choi YS, Ahn EJ, Kang H. PLoS One. 2015 Mar 26; 10(3)*

During the meta-analysis, 12 studies were evaluated to find no significant differences in first attempt success rate, leak pressure and quality of fiberoptic view between the devices. i-gel had a shorter insertion time and lower blood staining, incidence of sore throat and dysphagia.

### **Success rate of airway devices insertion: laryngeal mask airway versus supraglottic gel device**

*Pournajafian A, Alimian M, Rokhtabnak F, Ghodraty M, Mojri M. Anesth Pain Med. 2015 Mar 30; 5(2): e22068*

A single-blind randomised trial on 61 patients allocated into i-gel and LMA Classic groups. Airway placement was categorised into three groups: first, second and third attempts. Success rate, insertion time and postoperative complications were measured. i-gel a 'good alternative' to cLMA in this scenario.

### **Does prewarming the i-gel supraglottic airway device fit the larynx better compared to keeping it at room**

### **temperature for non-paralysed, sedated patients: a randomised controlled trial**

*Komasawa N, Nishihara I, Tatsumi S, Minami T. BMJ Open. 2015 Jan 13; 5(1): e006653*

Patients were assigned to a warm (at 42 degrees centigrade) or control room temperature group. Number of attempts until successful insertion and sealing pressure were compared. Authors conclude that pre-warming did not increase insertion success rate.

### **Comparison of the Disposable Streamlined Liner of the Pharynx Airway and the Disposable I-gel in Anaesthetized, Paralyzed Adults: A Randomized Prospective Study**

*El-Radaideh K, Alhowary AA, Bani Hani D. Anesthesiol Res Pract. 2015; 2015: 971059*

Patients were evenly distributed between the two device groups, with ease and number of insertions, insertion speed and leak pressure amongst outcomes measured. SLIPA appeared to be quicker to insert, however blood staining incidence was higher.

### **A performance comparison of the paediatric i-gel with other supraglottic airway devices**

*Smith P, Bailey CR. Anaesthesia. 2015 Jan; 70(1): 84-92*

Review of 62 published articles, including 14 randomised controlled trials, comparing i-gel with other supraglottic airway devices in children. Leak pressure was found to be the most common primary outcome. Authors conclude i-gel is 'at least equivalent' to other devices, and may give higher leak pressures and improved fiberoptic view of the glottis.

**Comparison of the I-gel laryngeal mask airway with the LMA-supreme for airway management in patients undergoing elective lumbar vertebral surgery**

*Kang F, Li J, Chai X, Yu J, Zhang H, Tang C. J Neurosurg Anesthesiol. 2015 Jan; 27(1): 37-41*

Patients were randomised between the two groups, with device inserted in supine position. Insertion time and attempts, airway peak pressure and complications were among results measured. i-gel provided a higher airway seal pressure in the prone position and both devices recorded low complication rates.

**Comparison of insertion of the modified i-gel airway for oral surgery with the LMA Flexible: a manikin study**

*Sanuki T, Sugioka S, Komazawa N, Ueki R, Kaminoh Y, Kotani J. Anesth Prog. 2014 Winter; 61(4): 145-9*

Manikin study, including novice practitioners, using a modified i-gel device and LMA Flexible™. Mean insertion time was significantly shorter for the modified i-gel.

**Comparison of i-gel™ and laryngeal mask airway in anesthetized paralyzed patients**

*Reza Hashemian SM, Nouraei N, Razavi SS, Zaker E, Jafari A, Eftekhari P, Radmand G, Mohajerani SA, Radpay B. Int J Crit Illn Inj Sci. 2014 Oct-Dec;4(4): 288-92*

64 patients assigned to either i-gel or cLMA groups in this randomised controlled trial. Results showed i-gel was 'significantly' quicker to insert.

**A systematic review and meta-analysis of the i-gel(®) vs laryngeal mask airway in adults**

*de Montblanc J, Montblanc J, Ruscio L, Mazoit JX, Benhamou D. Anaesthesia. 2014 Oct; 69(10): 1151-62*

31 adult randomised controlled trials on i-gel against the LMA were assessed, finding that the main clinical advantage of i-gel was less frequent sore throat.

**About laryngeal mask: is the lowest price material the better cost-efficacy choice?**

*Weil G, Matysiak J, Guye ML, Eghbalian A, Bourgain JL. Ann Fr Anesth Reanim. 2014 Sep-Oct; 33(9-10): 508-13*

Using LMA Unique as a reference, cost efficacy comparisons were made against i-gel, Ambu® AuraOnce™ and LMA Supreme. Conclusions suggested that latest generation devices are still expensive despite low rate of complications.

**Management of a transbronchial cryobiopsy using the i-gel airway and the Arndt endobronchial blocker**

*Sastre JA, Cordovilla R, Jiménez MF, López T. Can J Anaesth. 2014 Sep; 61(9): 886-8*

Letter indicating that use of the i-gel provides an optimum conduit for performing this technique and allows for control of bleeding complications when used with the Arndt blocker.

**Randomized prospective trial comparing two supraglottic airway devices: i-gel™ and LMA-Supreme™ in paralyzed patients**

*Joly N, Poulin LP, Tanoubi I, Drolet P, Donati F, St-Pierre P. Can J Anaesth. 2014 Sep; 61(9): 794-800*

100 patients were randomised between the two device groups, with 92%

inserted successfully in both. i-gel recorded a shorter insertion time and higher incidence of complete vocal chord visualisation.

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**Soft Palate Ulceration After Brief Use of an i-Gel Supraglottic Airway**

*de Graaff HJ, Teeuw R, de Quelerij M, Verbrugge SJ, Boudesteijn EA. A A Case Rep. 2014 Aug 15; 3(4): 48-50*

A case of extensive soft palate ulceration after the use of i-gel.

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**Editorial Comment: Mucosal Erosion of the Cricoid Cartilage After the Use of an i-Gel Supraglottic Airway Device in a Patient with Diffuse Idiopathic Skeletal Hyperostosis AND Soft Palate Ulceration After Brief Use of an i-Gel Supraglottic Airway**

*Hagberg CA. A A Case Rep. 2014 Aug 15; 3(4): 51-2*

Comment on two case reports by Schaer et al and de Graaff et al in which the importance of evaluating risk factors for difficult supraglottic airway use were highlighted. Author focuses on the importance of understanding recommended insertion techniques as part of greater knowledge of SADs.

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**Mucosal Erosion of the Cricoid Cartilage After the Use of an i-Gel Supraglottic Airway Device in a Patient with Diffuse Idiopathic Skeletal Hyperostosis**

*Schaer AC, Keel MJ, Dubach P, Greif R, Luyet C, Theiler L. A A Case Rep. 2014 Aug 15; 3(4): 45-7*

Reported case on an 82-year-old patient with previously undiagnosed diffuse idiopathic skeletal hyperostosis of the cervical spine.

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**Use of i-gel for caesarean section with kyphoscoliosis**

*Gupta SL, Satya Prakash MV, Prabu G. BMJ Case Rep. 2014 Jul 10; 2014*

Patient presented for emergency caesarean section with scar tenderness. i-gel was inserted at the first attempt and there was no audible leak during ventilation.

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**Successful airway management using i-gel in 7 patients undergoing awake craniotomy**

*Matsunami K, Sanuki M, Yasuuiji M, Nakanuno R, Kato T, Kawamoto M. Masui. 2014 Jul; 63(7): 789-93*

Report of cases using i-gel successfully with easy insertion, concluding that the device is useful in this scenario.

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**Is I-gel airway a better option to endotracheal tube airway for sevoflurane-fentanyl anesthesia during cardiac surgery?**

*Elgebaly AS, Eldabaa AA. Anesth Essays Res. 2014 May-Aug; 8(2): 216-22*

49 adult patients were randomly assigned between each device group, with fentanyl doses, hemodynamic parameters and mean arterial pressure among results taken at various points throughout the procedure. i-gel requires less anaesthetic doses in this scenario.

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**Evaluation of a new supraglottic airway device in ambulatory surgery: the I-gel**

*Jaoua H, Djaziri L, Bousselmi J, Belhouane H, Skander R, Ben Maamer A, Cherif A, Ben Fadhel K. Tunis Med. 2014 Apr; 92(4): 239-44*

100 patients scheduled for short duration elective surgery were included, with ease of insertion, leak fraction, gastric leak, complications and ease of insertion among

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the parameters measured. Success rate of insertion was 99%, with first-attempt success at 92%. Authors conclude that the I-gel can be used 'safely and effectively'.

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### **i-gel™ in Ambulatory Surgery: A Comparison with LMA-ProSeal™ in Paralyzed Anaesthetized Patients.**

*Das A, Majumdar S, Mukherjee A, Mitra T, Kundu R, Hajra BK, Mukherjee D, Das B. J Clin Diagn Res. 2014 Mar; 8(3): 80-4*

Ease of insertion and time taken to placement and post-operative complications were measured. i-gel was easier to insert with a shorter insertion time.

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### **Application of PEEP using the i-gel during volume-controlled ventilation in anesthetized, paralyzed patients**

*Kim YB, Chang YJ, Jung WS, Byen SH, Jo YY. J Anesth. 2013 Dec; 27(6): 827-31*

After placement of an i-gel device in 40 patients, 20 were ventilated without PEEP while the other half received 5cmH<sub>2</sub>O. Incidences of significant leaks and leak volumes were similar in both groups.

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### **Use of extraglottic airways in patients undergoing ambulatory laparoscopic surgery without the need for tracheal intubation**

*Subitharan T, Teoh WH. Saudi J Anaesth. 2013 Oct; 7(4): 436-41*

Ransomised control trial comparing LMA Supreme with i-gel in 70 patients, with leak pressure, insertion success rates and leak fractions among the outcomes measured. While no post-operative complications were reported with i-gel, three patients suffered mild sore throat and one had mucosal injury in the

Supreme group. i-gel had a higher but 'clinically inconsequential' leak fraction.

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### **Reverse technique for i-gel® supraglottic airway insertion**

*Sen I, Bhardwaj N, Latha YS. J Anaesthesiol Clin Pharmacol. 2013 Jan; 29(1): 128-9*

Case reported of tongue folding during procedure on a 30-year-old woman. Usual insertion technique did not provide a patent airway, so the authors confirm they used a reverse technique - proving successful. Authors conclude the technique was atraumatic and may be a suitable back-up.

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### **Failed tracheal intubation in obstetric anaesthesia: 2 yr national case-control study in the UK**

*Quinn AC, Milne D, Columb M, Gorton H and Knight M. Br J Anaesth. 2013 Jan; 110(1): 74-80*

The purpose of this UK-wide study was to further evaluate the predetermined rate that one in 250 obstetric patients suffer failed intubation whilst undergoing general anaesthesia. Due to the lack of national figures, the study used the UK Obstetric Surveillance System (UKOSS) of data collection in centres across the UK to record incidence, risk factors and any reports of failed intubations. All contacted centres responded, equalling 57 completed reports, giving a unit-based estimation of one case in every 224 patients. Univariate analyses also recorded in detail in this report.

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### **i-gel® supraglottic airway in clinical practice: a prospective observational multicentre study**

*Theiler L, Gutzmann M, Kleine-Brueggeney M, Urwyler N, Kaempfen B, Greif R. Br J*

*Anaesth.* 2012 Dec; 109(6): 990-5

Over a period of 24 months, 2049 uses of the i-gel were measured across five independent hospitals in Switzerland to evaluate insertion success rates, leak pressures, adverse events, and risk factors for failure. Patients' mean age was 47 years. The authors concluded that the i-gel is a reliable device, failing in less than 5% of patients and providing high leak pressures. Serious adverse events are rare.

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### **Comparison of the Proseal LMA® and intersurgical i-gel® during gynecological laparoscopy**

*Jeon WJ, Cho SY, Baek SJ, Kim KH. Korean J Anesthesiol.* 2012 Dec; 63(6): 510-4

Adult patients undergoing gynaecological laparoscopy were split into two groups of 30 and randomly assigned to either PLMA or i-gel. Insertion time and number of attempts were recorded. After successful insertion in all patients in both groups, on first attempt, airway leak pressure was also measured. No significant difference in insertion time or leak pressure. Authors conclude that i-gel is a reasonable alternative to PLMA in this scenario.

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### **The effects of prewarming the i-gel® on fitting to laryngeal structure**

*Nishiyama T, Kohno Y, Kim HJ, Shin WJ, Yang HS. Am J Emerg Med.* 2012 Nov; 30(9): 1756-9

180 patients were randomised into two equal groups, one for insertion of i-gel at room temperature, the other at 37 degrees centigrade. Insertion time, number of insertion attempts, inspiratory and leak pressures, and leak fraction were compared. Report found no significant difference between the two groups.

### **Cadaver study of oesophageal insufflation with supraglottic airway devices during positive pressure ventilation in an obstructed airway**

*Schmidbauer W, Genzwürker H, Ahlers O, Proquitte H, Kerner T. Br J Anaesth.* 2012 Sep; 109(3): 454-8

This, the first data collection study on the extent of oesophageal insufflation when oropharyngeal leak pressures are exceeded, used the i-gel inserted into cadavers. Compared alongside LMA Supreme, LMA ProSeal, LTS-D™, LTS II™ and Combitube®, performance was measured in a surgically-closed trachea to replicate total airway obstruction. Volume of insufflation from controlled ventilation was measured at inspirator pressures of 20, 40 and 60 mbar, with the former producing no insufflation with any device.

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### **Randomized comparison of the i-gel™, the LMA Supreme™, and the Laryngeal Tube Suction-D using clinical and fiberoptic assessments in elective patients**

*Russo SG, Cremer S, Galli T, Eich C, Bräuer A, Crozier TA, Bauer M, Strack M. BMC Anesthesiol.* 2012 Aug 7; 12: 18

Three groups of 40 elective patients each were assigned to i-gel, LMA Supreme and Laryngeal Tube Suction-D for a prospective, randomised and comparative study of position (fibre optic) and clinical performance data during surgery. Speed of insertion and success rates, leak pressure, dynamic airway compliance, and signs of postoperative airway morbidity were recorded, with i-gel registering a 95% insertion success rate and the highest airway compliance. In conclusion, all devices were considered suitable for ventilation in elective surgery.



### **New single use supraglottic airway device with noninflatable cuff and gastric tube channel**

*Siddiqui AS, Ahmed J, Siddiqui SZ, Haider S, Raza SA. J Coll Physicians Surg Pak. 2012 Jul; 22(7): 419-23*

An experimental study using i-gel on 100 female patients undergoing elective gynaecologic surgery was performance-measured on ease of insertion, time to insert, peak airway pressure and leak pressure. A gastric tube was placed in each patient. Pharyngolaryngeal morbidities were also recorded. In 92% of patients, i-gel was inserted successfully first time and there were no instances of blood on the device post-procedure. Authors confirm the i-gel is a simple and easy to use device.

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### **General anesthesia in a case of right-sided aortic arch with Kommerell's diverticulum diagnosed on preoperative examination**

*Nakano S, Uda R, Nakajima O, Yamamoto N, Akatsuka M. Masui. 2012 Jul; 61(7): 765-8*

Case of the use of i-gel as preferred airway device and vehicle for tracheal intubation in a 59-year-old male with known Kommerell's diverticulum, scheduled for repair of a tibial fracture under general anaesthesia. The i-gel resulted in an uneventful operation with both controlled and spontaneous respiration, and the authors' conclude that i-gel is a useful device in such specific cases.

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### **LMA Supreme™ vs i-gel™--a comparison of insertion success in novices**

*Ragazzi R, Finessi L, Farinelli I, Alvisi R, Volta CA. Anaesthesia. 2012 Apr; 67(4): 384-8*

Following a short lecture and manikin training, novice airway users were randomly selected to insert either the LMA Supreme or i-gel into 80 patients undergoing breast surgery, to measure insertion success rate and ventilation profile.

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### **A comparison of the i-gel® and classic LMA® insertion in manikins by experienced and novice physicians**

*Stroumpoulis K, Isaia C, Bassiakou E, Pantazopoulos I, Troupis G, Mazarakis A, Demestihia T, Xanthos T. Eur J Emerg Med. 2012 Feb; 19(1): 24-7*

116 volunteer doctors were assigned to either a novice or experienced group depending on their level of LMA insertion experience. After a brief training session the volunteers were randomly allocated to insertion of the cLMA and i-gel in a manikin. Success rate, insertion time and perceived ease of use were recorded. Success rate on the first attempt was significantly higher with the i-gel in both user groups. The i-gel produced similar success rates for novices and experienced users, but the cLMA had a lower success rate amongst novices. All insertions were successful by the second attempt. Insertion time was significantly shorter with the i-gel, although the authors note that this may be due to the lack of an inflatable cuff.

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### **Similar oropharyngeal leak pressures during anaesthesia with i-gel, LMA-ProSeal and LMA-Supreme Laryngeal Masks**

*Van Zundert TC, Brimacombe JR. Acta Anaesthesiol Belg. 2012; 63(1): 35-41*

Random allocation of 150 patients to either i-gel, LMA ProSeal or LMA Supreme to compare, primarily,

oropharyngeal leak pressure and changes in pressure between 30 and 60 minutes after insertion. Results in this case showed that there were no significant differences in leak pressure.

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### **The influence of head and neck position on ventilation with the i-gel® airway in paralysed, anaesthetised patients**

*Sanuki T, Uda R, Sugioka S, Daigo E, Son H, Akatsuka M, Kotani J. Eur J Anaesthesiol. 2011 Aug; 28(8): 597-9*

20 adult patients scheduled for oral surgery were ventilated using the i-gel. Leak pressure, ventilation score and fiberoptic view were measured with the patient's head and neck in neutral position, extended position, flexion and rotated to the right. Leak pressure was higher during flexion, lower during extension and comparable to neutral position during rotation. Ventilation score was significantly worse during flexion. Fiberoptic view was not affected by head and neck position. The authors recommend that the i-gel is not used in cases where head and neck flexion is likely, but they state that it is otherwise suitable for surgery where the head is moved.

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### **The use of i-gel® extraglottic airway during percutaneous dilatational tracheostomy: a case series**

*Corso RM, Piraccini E, Agnoletti V, Baccanelli M, Coffa A, Gambale G. Minerva Anestesiol. 2011 Aug; 77(8): 852-3*

The i-gel was used in eight patients for tracheostomy. Patients were extubated and the ET tube was replaced with the i-gel. A percutaneous tracheostomy kit was then advanced to the second tracheal ring and the procedure was performed. Arterial pressure, PaO<sub>2</sub>/FiO<sub>2</sub>, minute ventilation

and airway pressure were measured before, during and after tracheostomy. There were no significant differences in ventilatory and haemodynamic parameters. Use of the i-gel was successful in seven of eight patients. The i-gel provided better views of the glottis compared to the cLMA and ventilation was comparable to the ET tube. Large trials must take place to determine whether a one in eight failure rate remains.

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### **Successful use of i-gel in three patients with difficult intubation and difficult ventilation**

*Asai T, Masui. 2011 Jul; 60(7): 850-2*

Three cases of successful ventilation using the size three i-gel on female patients with a mix of predicted and unpredicted difficult intubation, and where both facemask ventilation and tracheal intubation were difficult. Author concludes that i-gel 'has a potential role as a rescue device, by allowing ventilation and tracheal intubation in patients with difficult airways.'

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### **Comparison of the i-gel® and the LMA Unique® laryngeal mask airway in patients with mild to moderate obesity during elective short-term surgery**

*Weber U, Oguz R, Potura LA, Kimberger O, Kober A, Tschernko E. Anaesthesia. 2011 Jun; 66(6): 481-7*

In this crossover study, 50 adult patients with BMI 25-35kg/m<sup>2</sup> were assigned to ventilation with the i-gel and the LMA Unique® in random order. Insertion attempts, difficulty (on a scale of 1-4), time to insertion and leak pressure were measured with each device. Leak pressure was higher with the i-gel, with a mean value of 23.7cm H<sub>2</sub>O compared to 17.4cm H<sub>2</sub>O with the LMA Unique. Within

the study population, there was a bigger difference in leak pressures amongst patients with BMI >30. Insertion was generally comparable, although the i-gel had a significantly shorter insertion time.

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### **i-gel® vs AuraOnce® laryngeal mask for general anaesthesia with controlled ventilation in paralyzed patients**

*Donaldson W, Abraham A, Deighan M, Michalek P. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2011 Jun; 155(2): 155-63*

Devices were generally comparable with high overall and first-attempt success rates. The i-gel had a significantly higher seal pressure (30.4 compared to 27.8cm H<sub>2</sub>O) and a lower incidence of postoperative complications.

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### **Performance and skill retention of intubation by paramedics using seven different airway devices – a manikin study**

*Ruetzler K, Roessler B, Potura L, Priemayr A, Robak O, Schuster E, Frass M. Resuscitation. 2011 May; 82(5): 593-7*

41 paramedics with no previous experience watched a lecture and demonstration. They then attempted to insert each of six supraglottic airways and an ET tube into a manikin in random order. After three months, all participants were assessed again without receiving further training. All supraglottic airways except ProSeal were more successful than the ET tube. i-gel, Unique and LT-D had significantly faster times to insertion and ventilation than the other devices. There was no significant difference in success rates for supraglottic airways after three months, however, ET tube insertion rates decreased from 78% to 58% in that time.

### **Performance of supraglottic airway devices and 12 month skill retention: a randomised controlled study with manikins**

*Fischer H, Hochbrugger E, Fast A, Hager H, Steinlechner B, Koinig H, Eisenburger P, Frantal S, Greif R. Resuscitation. 2011 Mar; 82(3): 326-31*

This study compared the use of the i-gel, LMA Supreme, LMA Unique and LMA ProSeal supraglottic airways and bag-valve mask ventilation. 267 third-year medical students were given standardised training before using all devices in random order on an airway training manikin. The number of attempts needed to secure the device, time to successful ventilation, tidal volume, ease of use and incidence of gastric inflation were all recorded. After 12 months, participants used the devices again without further training. In both assessments, the i-gel and the Supreme were the most likely to be inserted successfully on the first attempt. These devices were rated as the easiest to use. The i-gel and bag-valve mask had the quickest time to successful ventilation, however the rate of gastric inflation was much higher with the bag-valve mask.

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### **National census of airway management techniques used for anaesthesia in the UK: first phase of the Fourth National Audit Project at the Royal College of Anaesthetists**

*Woodall NM, Cook TM. Br J Anaesth. 2011 Feb; 106(2): 266-71*

There are 309 NHS hospitals that carry out surgery. In this study, a volunteer from each of these hospitals reported the main airway management technique used in every general anaesthetic within a specified two-week period. This data was

then used to estimate the annual use of various airway devices. The total number of procedures was 114,904, leading to an annual estimate of 2.9 million. Supraglottic airways were used in 56.2% of cases. The i-gel was the second most popular choice of supraglottic airway with 4,574 cases. This equates to 7.1% of supraglottic airways and 4% of all devices used.

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### **The i-gel® in failed obstetric tracheal intubation**

*Berger M, Corso RM, Piraccini E, Agnoletti VA, Valtancoli E, Gambale G. Anaesth Intensive Care. 2011 Jan; 39(1): 136-7*

A 36-year-old morbidly obese pregnant woman presented for emergency caesarian was anaesthetised using RSI. To limit insertion attempts an i-gel was used, successfully inserted at the first attempt and a healthy baby was delivered with no further complication to the mother. Concluded that i-gel is likely to be the better airway management device when speed is of the essence, compared to other laryngeal masks.

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### **Supraglottic airway devices: recent advances**

*Cook T, Howes B. CEACCP 2010 Dec; 11 (2): 56-61*

This review article looks at the evidence for the efficacy and safety of supraglottic airway devices. The authors use the cLMA as a standard for comparison. The ProSeal, i-gel, LMA Supreme and LTS Mk. II are all discussed. The review also explains the classification of supraglottic airways into 1st and 2nd generation devices.

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### **Comparison of i-gel® supraglottic with laryngeal mask airway**

*Ali A, Sheikh NA, Ali L, Siddique SA.*

*Professional Med J 2010; 17 (4): 643-647*

100 patients received ventilation via the i-gel or cLMA during elective surgery. The devices were compared for ease of insertion, insertion time, number of airway manipulations needed and post-operative complications. The devices were generally comparable. More airway manipulations were required with the i-gel, however this was not a statistically significant increase compared to the cLMA. The incidence of complications was very low, with one case of blood on an i-gel and one incident of laryngospasm with each device.

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### **Comparison of the LMA Supreme® vs. the i-gel in paralysed patients undergoing gynaecological laparoscopic surgery with controlled ventilation**

*Teoh WH, Lee KM, Subitharan T, Yahaya Z, Teo MM, Sia AT. Anaesthesia. 2010 Dec; 65(12): 1173-9*

This study compared the i-gel to the LMA Supreme for the seal pressure during gynaecological laparoscopic surgery in the Trendelenburg position in 100 female patients. There was no difference in the oropharyngeal leak pressure with similar success rates for first time insertion and times to first capnograph trace. Both devices proved to be equally effective for gynaecological laparoscopic procedures.

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### **Airway management using i-gel® in two patients for awake craniotomy**

*Tsuruta S, Yamada M, Shimizu T, Satsumae T, Tanaka M, Mizutani T. Masui. 2010 Nov; 59(11): 1411-4*

This paper describes the use of an i-gel for ventilation during two craniotomy procedures. Both patients were anaesthetised and operated on using the

asleep-awake-asleep technique. The i-gel was inserted successfully and removed for the first time as the patients were able to respond to their own names being called. After the 'awake' period of surgery was complete, the i-gel was reinserted easily in both cases despite a 30° rotation of the neck. There were no adverse incidents. The authors conclude that the i-gel is appropriate for use during asleep-awake-asleep surgery due to the ease of insertion when the neck is rotated.

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### **PLMA® vs. i-gel: a comparative evaluation of respiratory mechanics in laparoscopic cholecystectomy**

*Sharma B, Sehgal R, Sahai C, Sood J. (delete double entry - page 7). J Anaesthesiol Clin Pharmacol. 2010 Oct; 26(4): 451-7*

In this study, the performance of the LMA ProSeal and i-gel was compared during laparoscopic surgery. 60 patients were randomised into two groups and had the supraglottic airway inserted by an experienced anaesthesiologist (defined as >500 and >50 insertions for ProSeal and i-gel respectively).

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### **Placement of a bronchial blocker through the i-gel® supraglottic airway device for single lung ventilation: preliminary study**

*Arévalo Ludeña J, Arcas Bellas JJ, López Pérez V, Cuarental García A, Alvarez-Rementería Carbonell R. Rev Esp Anesthesiol Reanim. 2010 Oct; 57(8): 532-5*

In 25 patients, a bronchial blocker was inserted under direct vision with a fiberoptic bronchoscope through an i-gel. The i-gel provided a reliable, safe seal of the airway. The authors concluded that such a technique, for anaesthetists with the appropriate experience using a flexible fiberoptic scope, can facilitate safe,

effective management of selected patients who are to undergo certain thoracic procedures.

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### **Comparative study between i-gel®, a new supraglottic airway device, and classical laryngeal mask airway in anaesthetised spontaneously ventilated patients**

*Helmy AM, Atef HM, El-Taber EM, Henidak AM. Saudi J Anaesth. 2010 Sep-Dec; 4(3): 131-136*

This study compared the cLMA and i-gel in 80 healthy adult patients. The patients were randomly assigned to two groups for insertion of one of the devices during surgery. Haemodynamic data, oxygen saturation and end-tidal CO<sub>2</sub> were similar in both groups. Leak pressure was significantly higher with the i-gel, which also had a shorter insertion time. Postoperative complications were generally comparable, however there was a higher incidence of nausea and vomiting in the cLMA group due to gastric insufflation.

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### **A Comparison of Successful Eschmann Introducer Placement Through Four Supraglottic Airway Devices**

*Mitchell CA, Riddle ML, Pearson NM, Tauferner DH, Carl R. Annals Of Emergency Medicine 2010 Sep; 56(3): S25*

Study to determine if a bougie could be successfully placed in a cadaver by emergency medicine providers using four supraglottic airway devices: LMA Supreme, i-gel, LMA and KingLT™. Time to placement, confidence in the procedure and correct placement via direct laryngoscopy post-removal were recorded. No great significant differences in most areas, however i-gel was much quicker than KingLT to successfully insert, and generally outperformed it. LMA Supreme

and i-gel considered the better devices for such a procedure, although the authors concede that using a cadaver did inhibit the study.

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### **Comparison of guided insertion of the LMA Proseal® vs. the i-gel®**

*Gasteiger L, Brimacombe J, Perkhofor D, Kaufmann M, Keller C. Anaesthesia. 2010 Sep; 65(9): 913-6.*

This study compared the use of the LMA Proseal and the i-gel in 152 adult female patients. A duodenal tube guided insertion technique was used for both devices. There was no significant difference between insertion success rates and insertion times of the two devices. Leak pressure was 7cm H<sub>2</sub>O higher with the ProSeal, providing a better seal for ventilation.

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### **Comparison of the Intersurgical® Solus™ laryngeal mask airway and the i-gel supralaryngeal device**

*Amini S, Khoshfetrat M. Anaesthesia. 2010 Aug; 65(8): 805-9*

120 healthy adult patients were assigned to either the Solus™ or i-gel device for general anaesthesia. Airway quality measures, leak pressure, insertion time and complications were recorded. Both devices performed well and had low incidences of complications. The Solus® laryngeal mask required less airway manipulation, and provided better leak pressures and views of the vocal cords. i-gel was quicker to insert.

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### **The supraglottic airway i-gel® in comparison with ProSeal laryngeal mask airway and classic laryngeal mask airway in anaesthetised patients**

*Shin W, Cheong Y, Yang H, Nishiyama T. Eur J Anaesthesiol. 2010 Jul; 27(7): 598-601*

167 patients were randomly assigned to device groups. Haemodynamic data, airway leak pressure, leak volume, success rates and postoperative complications were assessed.

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### **In vitro study of magnetic resonance imaging artefacts of six supraglottic airway devices**

*Zaballos M, Bastida E, del Castillo T, de Villoria JG, Jiménez C. Anaesthesia. 2010 Jun; 65(6): 569-72*

In this study, the artefacts created during MRI by six supraglottic airways, the Classic LMA, the ProSeal LMA, the LMA Unique, the LMA Supreme, the Ambu® disposable laryngeal mask and the i-gel were investigated. There were no artefacts with the i-gel or Ambu® devices.

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### **The i-gel®, a new supraglottic airway**

*Asai T, Liu EH, Masui. 2010 Jun; 59(6): 794-7*

In this study, the i-gel was used to ventilate 20 spontaneously breathing adult patients during anaesthesia. Insertion time, success rate, ability to insert a gastric tube and complications (including the presence of blood on the device) were recorded. The i-gel was inserted on the first attempt in 19 of 20 patients and had a mean insertion time of 12 seconds. Gastric tube insertion was possible in all cases. Removal was uneventful for all patients and did not result in any complications. The authors believe that the i-gel is a useful device for maintaining the patient airway during general anaesthesia.

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### **Insertion of the i-gel® airway in prone position**

*Taxak S, Gopinath A. Minerva Anesthesiol. 2010 May; 76(5): 381*



This case study describes the use of the i-gel while the patient was in a prone position for surgery. A 45kg 16-year-old boy laid in a prone position with his head turned laterally. After induction of anaesthesia, a size three i-gel was inserted on the first attempt. There were no adverse events either during or after surgery and the i-gel was removed while the patient was still prone. Previous research has shown that the cLMA and ProSeal airways can be inserted in the prone position, and i-gels have successfully ventilated prone patients who were turned over after insertion. However, this is the first reported case of i-gel insertion while the patient is already prone. Routine use of this technique should only occur after further research has taken place.

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### **Lubrication of the i-gel® supraglottic airway and the classic laryngeal mask airway**

*Chapman D. Anaesthesia 2010; 65(1): 89*

This letter is a response to the 2009 study by Janakiraman (see page 7) et al. which compared the i-gel to the LMA Classic. In that study, the authors stated that the devices were lubricated along the tip and the posterior surface. However, the correct lubrication procedure for the i-gel is different; the thermoplastic material used to make the device is tacky until lubricated and requires lubrication on all four sides of the cuff.

### **What's new in supraglottic airways? Three decades of evolution to tract separation**

*Viernes DC, Joffe AM, Goldman AJ. Anaesthesiology News Guide to Airway Management 2010; 9-14*

This paper describes the history of the gastric channel in supraglottic airways,

providing case reports and performance comparisons between devices. The section on the i-gel states that the device has inferior seal pressure compared to the LMA Proseal®, but that drainage through the gastric channel was comparable. The i-gel is quicker and easier to place than standard LMAs. A case report is included which describes the successful use of a size five i-gel in a 63-year-old man with a difficult airway.

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### **Randomised crossover comparison between the i-gel and the LMA Unique® in anaesthetised, paralysed adults**

*Uppal V, Gangaiah S, Fletcher G, Kinsella J. Br J Anaesth. 2009 Dec; 103(6): 882-5*

In this study, the i-gel and LMA Unique® were both used in 39 patients. Leak pressure, insertion attempts, number of airway manipulations and leak volumes were similar for both devices. Insertion time was significantly less for the i-gel at 12.2s compared to 15.2s for the LMA Unique®. It can be concluded that the i-gel is a reasonable alternative to the LMA Unique® during controlled ventilation.

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### **Supreme! Or is it? A reply**

*Cook TM, Gatward JJ. Anaesthesia 2009 Oct; 64(11): 1262-1263*

This letter is a response to Kushakovsky and Ahmad (2009 - see above) regarding the performance of the LMA Supreme, LMA ProSeal™ and i-gel devices. The letter states that the i-gel and ProSeal have both been shown to vent gastric contents when they have good placement and oesophageal seal, but that this has not been studied in the LMA Supreme. Only small studies comparing the LMA Supreme, ProSeal and i-gel are available, although these generally show comparable performance. The authors recommend

further research with larger study populations.

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### **Supreme! Or is it?**

*Kushakovsky V, Ahmad I. Anaesthesia 2009 Oct; 64(11): 1262*

This letter is a response to a small LMA Supreme® study. The authors say that they have been using the device in patients having nasopharyngeal surgery as it protects the airway from any bleeding and has a gastric channel to remove any blood in the stomach. However, they have reviewed recent research and believe that their current practice may change. In previous studies, the i-gel has performed as well as the LMA Supreme even when all i-gel patients have been given a size 4 device and the LMA Supreme has been sized correctly. Gastric tube placement in the two devices and the LMA ProSeal is also comparable. The authors are considering the use of the i-gel or ProSeal instead of the Supreme.

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### **Supraglottic airways and pulmonary aspiration: the role of the drain tube**

*Drolet P. Can J Anaesth. 2009 Oct; 56(10): 715-20*

This article discusses the gastric channel or drain tube as a safety feature provided in supraglottic airways. Although pulmonary aspiration of gastric contents is a relatively rare event, it can be made rarer with the use of devices that include a gastric channel, particularly if they are inserted using a bougie. i-gel is discussed.

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### **Supreme® laryngeal mask airway vs. the i-gel® supraglottic airway in patients under general anaesthesia and mechanical ventilation with no neuromuscular block: a randomised clinical trial**

*Fernández Díez A, Prez Villafane A, Bermejo González JC, Marcos Vidal JM. Rev Esp Anesthesiol Reanim. 2009 Oct; 56(8): 474-8*

In this study, 85 patients were randomised into two groups for ventilation via LMA Supreme or i-gel supraglottic airways. Ease of insertion, seal pressure, ventilatory parameters and insertion of a gastric tube were all recorded. Both devices were easy to insert, with the Supreme and i-gel being inserted on the first attempt in 95.2 and 86% of cases respectively. Performance was generally comparable.

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### **A comparison of postoperative throat and neck complaints after the use of the i-gel® and the La Premiere® disposable laryngeal mask: A double-blinded, randomized, controlled trial**

*Keijzer C, Buitelaar DR, Efthymiou KM, Sramek M, Ten Cate J, Ronday M, Stoppa T, Huitink JM, Schutte PF. Anesth Analg. 2009 Oct; 109(4): 1092-5*

This study from the department of Anesthesiology and Intensive Care at the Netherlands Cancer Institute - Antoni van Leeuwenhoek Hospital and the VU University Medical Center in Amsterdam compared the rate of postoperative sore throat and neck complaints with i-gel to a well known brand of laryngeal mask. Patients were interviewed postoperatively at 1hr, 24hrs and 48 hrs. The authors found significantly lower levels of sore throat with i-gel, as well as lower levels of dysphagia.

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### **A comparison of the i-gel® with the LMA-Unique® in nonparalysed anaesthetised adult patients**

*Francksen H, Renner J, Hanss R, Scholz J, Doerges V, Bein B. Anaesthesia. 2009 Oct; 64(10): 1118-24*



In this study, 80 patients were randomly allocated to either i-gel or LMA-Unique insertion before minor surgery. Ventilation, insertion time, airway pressure, leak pressure and postoperative sore throat were all measured. Results were similar for all parameters other than airway leak pressure, which was significantly higher in the i-gel (mean pressure 29cm H<sub>2</sub>O compared to 18cm H<sub>2</sub>O). Both devices are acceptable for use in securing an airway, however the increased leak pressure is an advantage for the i-gel.

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### **i-gel® and lightening of anaesthesia?**

*Ghai A, Saini S, Hooda S. Anaesthesia. 2009 Oct; 64(10): 1151*

This letter is a response to Baxter's 2008 report of lightened anaesthesia due to a leak from the gastric channel of the i-gel. The authors found that they experienced similar problems with the LMA Supreme. No glottic structures were visualised on fibreoscopy through the airway channel, and through the gastric channel, it revealed the tip in front of the glottis rather than the oesophagus.

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### **A comparison of correct i-gel® placement with and without the aid of a bougie**

*Gosalia N, Khan RM, Kaul N, Sumant A. J Anaesth Clin Pharmacol 2009; 25(3): 345-347*

In this study, the i-gel's placement and performance were studied for insertions carried out with and without the use of a gum elastic bougie. 50 patients were randomised into two groups. In the first group, the i-gel was inserted using the standard method. In the second group, a bougie was used to insert the device via the gastric channel. The time taken for

insertion and the number of attempts needed were similar for both methods. Leakage and patient discomfort were less common when the bougie was used. The authors conclude that using a bougie improves i-gel placement without increasing insertion time or adverse effects.

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### **Evaluation of the new supraglottic airway devices Ambu® Aura Once® and Intersurgical® i-gel®. Positioning, sealing, patient comfort and airway morbidity**

*Heuer JF, Stiller M, Rathgeber J, Eich C, Züchner K, Bauer M, Timmermann A. Anaesthetist. 2009 Aug; 58(8): 813-20*

In this study, the i-gel was compared to the cLMA, ProSeal and Ambu Aura Once supraglottic airways. 40 patients were assigned to each of the four groups for insertion of one of the airways during surgery. Ease of insertion and insertion time were comparable for all devices. The ProSeal and Aura Once airways had significantly better placement and seal pressures. Airway morbidity did not occur in any of the groups. The cLMA was significantly more likely to cause postoperative sore throat.

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### **Crossover comparison of the Laryngeal Mask Supreme® and the i-gel® in simulated difficult airway scenario in anesthetized patients**

*Theiler LG, Kleine-Brueggeney M, Kaiser D, Uruyler MD, Luyet C, Vogt A, Greig R, Unibe MME. Anesthesiology. 2009 Jul; 111(1): 55-62*

This study looked at a simulated difficult airway scenario by using a neck collar to limit both mouth opening and neck movement. Both devices were placed in random order in each of 60 patients.

The primary outcome was overall success rate. Other measurements included time to successful ventilation, seal pressure, fibreoptic view and adverse events. The authors concluded the two devices tested had a 'similar insertion success and clinical performance in the simulated difficult airway situation'. The i-gel enabled better fibreoptic laryngeal view and less epiglottic downfolding.

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### **A randomised crossover trial comparing the i-gel® supraglottic airway and classic laryngeal mask airway**

*Janakiraman, C, Chethan, DB, Wilkes, AR, Stacey, MR, Goodwin, N. Anaesthesia. 2009 Jun; 64(6): 674-8*

This study compared the performance of i-gel and cLMA airways in 50 healthy adult patients. The success rate on the first insertion attempt was significantly lower in the i-gel group. Overall success after two attempts did not show a significant difference, although a change of device size was allowed. Leak pressures and fibreoptic view of the vocal cords were significantly better with the i-gel, with the two devices producing leak pressures of 20 (i-gel) and 17cm H<sub>2</sub>O (cLMA). 14 patients needed a change in i-gel size.

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### **Comparison of clinical performance of i-gel® with LMA Proseal® in elective surgeries**

*Singh I, Gupta M, Tandon M. Indian J Anaesth. 2009 Jun; 53(3): 302-5*

This clinical investigation into performance of i-gel compared to another supraglottic airway with gastric access, concluded that i-gel was easier to insert, required fewer attempts at insertion, had easier gastric tube placement and was less traumatic than the other device tested. Sixty patients were randomly assigned

into two groups: Group 1 (n=30) for i-gel and Group P (n=30). Assessment was made of sealing pressure, ease of insertion, success rate of insertion, ease of gastric tube placement, airway trauma by post operative blood staining of the device, tongue, lip and dental trauma, hoarseness, regurgitation/aspiration and cost effectiveness.

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### **Tongue trauma associated with the i-gel® supraglottic airway**

*Michalek, P, Donaldson, WJ, Hinds, JD. Anaesthesia 2009 May; 64(6): 692-693*

This article includes three cases of patient injury caused by the i-gel. In the first case, a paramedic had difficulty inserting the device. It was removed immediately and it was found that the patient was bleeding from the frenulum. The second patient's tongue was caught in the bowl of the i-gel during insertion. Although the i-gel was repositioned successfully, there was minor swelling and bleeding upon removal. This patient reported soreness for three days. The final case involved an insertion which appeared successful, however the patient reported a sore tongue and loss of taste lasting three weeks. The authors recommend two alternative insertion techniques to avoid mouth injuries – sliding the i-gel over the thumb into the mouth or rotating the device so the tongue cannot get caught.

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### **Successful use of the i-gel® airway in prone position surgery**

*Senthil Kumar M, Pandey R, Khanna P. Paediatr Anaesth. 2009 Feb; 19(2): 176-7*

This report highlighted the case of a 10-year-old child, weighing 30kg, scheduled for an elective pyeloplasty. A size three i-gel was inserted and secured after confirming correct placement and

a suction catheter inserted down the gastric channel. The child was positioned prone and the correct positioning of i-gel reconfirmed by appropriate CO<sub>2</sub> wave form, absence of audible leak and chest auscultation. At the end of the procedure, the child was returned to a supine position and i-gel removed after reversal. The patient recovered without any complications.

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### **Is i-gel® a new revolution among supraglottic airway devices? - a comparative evaluation**

*Jindal P, Rizvi A, Sharma JP. Middle East J Anaesthesiol. 2009 Feb; 20(1): 53-8*

This study compared i-gel to two other supraglottic airways in respect of haemodynamic changes, including heart rate, systolic and diastolic blood pressure, mean arterial pressure and rate pressure product. The authors concluded that 'i-gel effectively conforms to the perilaryngeal anatomy despite the lack of an inflatable cuff, it consistently achieves proper positioning for supraglottic ventilation and causes fewer haemodynamic changes as compared to other supraglottic airway devices.'

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### **A preliminary study of i-gel®: a new supraglottic airway device**

*Kannaujia A, Srivastava U, Saraswat N, Mishra A, Kumar A, Saxena S. Indian J Anaesth. 2009 Feb; 53(1): 52-6*

50 patients had the i-gel inserted for ventilation during surgery. The number of insertion attempts, insertion time, manipulations required for an effective airway and seal pressure were recorded. Gastric tube placement and adverse events were also noted where they occurred. Before removal of the device, stability was tested by measuring the expiratory

tidal volume with the patient's head in standard, rotated, chin lift and no-pillow positions. Success rate was 90% at the first attempt and 100% at the second. Median insertion time was 11 seconds. Insertion depth was increased in four patients and a jaw thrust was required in two more. All gastric tubes were placed successfully. Mild cough or postoperative sore throat was seen in a total of four patients. Seal pressure was approximately 20cm H<sub>2</sub>O. The i-gel was also found to be stable during head and neck movement.

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### **Comparison of the i-gel® with the cuffed tracheal tube during pressure-controlled ventilation**

*Uppal V, Fletcher G, Kinsella J. Br J Anaesth. 2009 Feb; 102(2): 264-8*

In this study, published in the BJA, twenty-five patients were given a standard anaesthetic, followed by insertion of an i-gel. The lungs were ventilated at three different pressures and the difference between the inspired and expired tidal volumes used to calculate the leak volume and leak fraction. The i-gel was then removed and replaced with a conventional tracheal tube, for which similar readings were taken. The results were then compared. From the data taken, the authors concluded that, 'compared with a tracheal tube there is no significant difference in the gas leak when using an i-gel during PCV with moderate airway pressures'.

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### **Oesophageal seal of the world supralaryngeal airway device I-gel in comparison with the laryngeal mask airways Classic and ProSeal using a cadaver model**

*Schmidbauer W, Bercker S, Volk T, Bogusch G, Mager G, Kerner T Br J Anaesth. 2009*

*Jan; 102(1): 135-9*

The three supraglottic devices were inserted into eight unfixed cadaver models with exposed oesophagi, connected to a water column producing both a slow and fast oesophageal pressure increase. During a fast increase of oesophageal pressure (simulated vomiting procedure) with the oesophageal lumen of the i-gel and pLMA open, the authors reported that 'the entire oesophageal liquid was drained to the outside without any tracheal aspiration occurring.'

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### **Phenomenon with i-gel airway: a reply**

*Chapman D. Anaesthesia 2009 Jan; 64(2): 228*

This letter is a reply to Baxter (2008). Baxter described two incidents where air was 'entrained through the suction port' leading to decreased end-tidal sevoflurane and lightened anaesthesia. This response suggests that the devices in question may not have been inserted fully, meaning that the airway and gastric channels were not isolated from each other. To ensure full insertion takes place, users should make sure that the level of anaesthesia, patient position and insertion method are correct.

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### **Airway management in the outpatient setting: new devices and techniques**

*Jolliffe L, Jackson I. Curr Opin Anaesthesiol. 2008 Dec; 21(6): 719-22*

This review highlighted the potential benefits of the current supraglottic airway devices available and their suitability for ambulatory surgery. With regard to i-gel, it was commented that it was designed to 'anatomically fit the perilaryngeal and hypolaryngeal structures without the need for an inflatable cuff. This offers the potential for easier insertion, reduced tissue compression and increased stability

after insertion.' They further reported that 'Higher mean seal pressures help to facilitate ventilation in laparoscopic work'.

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### **Phenomenon with i-gel® airway?**

*Baxter, S. Anaesthesia. 2008 Nov; 63(11): 1265*

This correspondence article reports a problem that occurred in two patients ventilated with an i-gel during anaesthesia. In the first case, anaesthesia started to lighten and end-tidal sevoflurane fell. The user suspected air entrainment through the suction port. In the second case, anaesthesia remained stable but end-tidal sevoflurane still dropped. The user placed a finger over the suction port and sevoflurane levels returned to normal. In both cases, the i-gel was replaced with a laryngeal mask airway.

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### **Evaluation of the i-gel® airway in 300 patients**

*Bamgbade OA, Macnab WR, Khalaf WM. Eur J Anaesthesiol. 2008 Oct; 25(10): 865-6*

This letter reported that first time insertion with i-gel was achieved in <5 seconds in 290/300 patients. Three patients with difficult airway underwent successful fiberoptic endotracheal intubation through i-gel and all patients underwent adequate pressure mode ventilation with airway pressures of 10-30cm H<sub>2</sub>O initially and spontaneous breathing subsequently. In addition, lubricated gastric tubes were easily inserted through the gastric channel at the first attempt in all 80 cases where this was performed. The authors concluded that 'i-gel is very suitable for peri-operative airway management, positive pressure ventilation and weaning from ventilation.

It is also useful as an intubation aid and has a potential role in airway management during resuscitation.’

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### **Evaluation of the size 4 i-gel® airway in one hundred nonparalysed patients**

*Garward JJ, Cook TM, Seller C, Handel J, Simpson T, Vanek V, Kelly F. Anaesthesia. 2008 Oct; 63(10): 1124-30*

A study of i-gel in 100 elective, anaesthetised patients. Parameters assessed included ease of use, positioning, airway quality, seal pressure and complications. First time insertion success was 86%. Median airway leak pressure was 24cm H<sub>2</sub>O. On fiberoptic examination via the device, the vocal cords were visible in 91% of patients. The incidence of airway obstruction, airway irritation, oropharyngeal trauma and other complications was low. Insertion of the device into the correct position was rapid and easy. The authors concluded that, ‘these attributes would suggest potential roles in anaesthesia, management of the difficult airway and airway management during CPR’. Further studies are now indicated against i-gel’s likely clinical competitors.

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### **Use of the epiglottic airway i-gel® during anaesthetic maintenance: first clinical impressions**

*Mustafaeva MN, Mizikov VM, Kochneva ZV, Vashchinskaia TV, Sarkisova NG, Rusakov MA, Levitskaia NN. Anesteziol Reanimatol. 2008 Sep-Oct; (5): 55-8*

This paper describes the development of supraglottic airways and the i-gel in particular. A review of the available i-gel literature showed that there are considerable benefits to using the device during general anaesthesia. The experiences of the authors during the use

of i-gel in 34 patients are also described. The authors believe that the i-gel is suitable for use during anaesthesia and potentially resuscitation. However, more research should be carried out, especially in terms of comparison with other supraglottic airways.

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### **i-gel® insertion by novices in manikins and patients**

*Wharton NM, Gibbison B, Gabbott DA, Haslam GM, Muchatuta N, Cook TM. Anaesthesia. 2008 Sep; 63(9): 991-5*

This study evaluated the performance of i-gel in manikins and anaesthetised patients when used by novices. The i-gel was deployed with minimal evidence of patient trauma and 100% insertion success. In their summary, the authors concluded that, ‘i-gel is rapidly inserted in both manikins and patients by novice users and compares favourably to other supraglottic airways available. Further work determining safety and efficacy during cardio-pulmonary resuscitation is required.’

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### **Aspiration recognition with an i-gel® airway**

*Liew G, John B, Ahmed S. Anaesthesia. 2008 Jul; 63(7): 786*

A report on a case of a young male patient undergoing surgery where i-gel helped with the recognition and management of regurgitation. During this case, gastric contents were noticed to be coming out of the gastric channel. No secretions were evident in the airway channel. As regurgitation continued, surgery was paused and the patient’s airway secured following rapid sequence induction. There was no clinical evidence of aspiration and a post-op chest X-ray revealed clear lung fields. It transpired the patient had

consumed a fizzy drink a few hours prior to the operation, something he failed to mention during a pre-operative visit.

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### **Are supraglottic airways a safe alternative to tracheal intubation for laparoscopic surgery?**

*Thompson J, O'Neill S. Br J Hosp Med (Lond). 2008 May; 69(5): 303*

This review article compares supraglottic airways to tracheal intubation for laparoscopic surgery. Evidence gathered so far indicates that supraglottic airways such as the i-gel produce adequate ventilation and pressures with a reduced risk of complications such as aspiration. The authors state that further investigation should take place to determine whether these devices can be used in obese patients during laparoscopic procedures.

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### **A new single use supraglottic airway with a noninflatable cuff and an esophageal vent: An observational study of the i-gel®**

*Richez B, Saltel L, Banchereau F, Torrielli R, Cros AM. Anesth Analg. 2008 Apr; 106(4): 1137-9*

This study on 71 ASA I-II women scheduled for gynaecological surgery, reported a 97% insertion success rate with i-gel. Mean seal pressure was 30cm H<sub>2</sub>O. A gastric tube was inserted in 100% of cases. Only one case of coughing and sore throat occurred. The authors concluded that 'the i-gel is a reliable, easily inserted airway device that provides an adequate seal with a low morbidity rate.'

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### **Nerve damage following the use of an i-gel® supraglottic airway device**

*Theron AD, Loyden C. Anaesthesia. 2008 Apr; 63(4): 441; discussion 441-2*

This article describes a post-operative complication after i-gel use. The patient was successfully ventilated with a size four i-gel, which was in line with the recommendation for the patient's weight (85kg). After surgery, the patient reported numbness in the lower lip. An examination shows swelling and an ulcer on the inside of the lip. There are two possible explanations for this injury – the patient's lip may have been caught in the tape used to secure the i-gel or it may have been caught in between the i-gel and the patient's teeth. The authors warn that this could occur with any airway device, but that extra care should be taken with the i-gel due to the bulkier design.

### **Case series: protection from aspiration and failure of protection from aspiration with the i-gel® airway**

*Gibbison B, Cook TM, Sellar C. Br J Anaesth. 2008 Mar; 100(3): 415-7*

Regurgitation of gastric contents was seen in three low-risk patients during anaesthesia. In two patients where only low volumes of gastric fluid were seen flowing from the i-gel, there was no sign of aspiration. An 85kg male patient regurgitated large amounts of liquid, and although this was mostly expelled from the i-gel's gastric channel there were signs of minor aspiration. The i-gel allowed early identification of regurgitation in these cases.

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### **Early experiences with the i-gel®**

*Dinsmore J, Maxwell W, Ickeringill M. Resuscitation 2007 October; 5(4): 574-575*

In the study described in this letter, 39 anaesthetists completed ease of use surveys for 227 i-gel devices. Compared with their experience of the cLMA, the anaesthetists considered the i-gel quick and easy to

insert. Insertion and ventilation on the first attempt were successful in the majority of cases. There were 18 unsatisfactory airways, six of which were caused by incorrect sizing. The i-gel was comparable to the cLMA in terms of adverse effects such as visible blood and sore throat.

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**Evaluation of four airway training manikins as patient simulators for the insertion of eight types of supraglottic airway devices**

*Jackson KM, Cook TM Anaesthesia. 2007 Apr; 62(4): 388-93*

The airway arm of this trial compared devices including i-gel, CobraTM, SLIPA and Laryngeal Tube Suction II. Each device was inserted twice into each manikin by ten anaesthetists, with each insertion scored and ranked. No one manikin outranked the others for all devices. i-gel insertion was 'significantly the easiest'.

**Initial anatomic investigations of the i-gel® airway a novel supraglottic airway without inflatable cuff**

*Levitan RM, Kinkle WC. Anaesthesia. 2005 Oct; 60(10): 1022-6*

The first ever published study examined the positioning and mechanics of the i-gel in 65 non-embalmed cadavers, with 73 endoscopies, 16 neck dissections and six neck radiographs. The mean percentage of glottic opening score for the 73 insertions was 82%. In each of the neck dissections and radiographs the bowl of the device covered the laryngeal inlet. In their summary, the authors concluded that the i-gel was consistently positioned over the laryngeal inlet and that the unique gel-like material of the device performed as intended, conforming to the perilaryngeal



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## Anaesthesia Paediatric

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### **Ambu AuraOnce versus i-gel laryngeal mask airway in infant and children undergoing surgical procedures. A randomized controlled trial**

*Alzahem AM, Aqil M, Alzahrani AH. Saudi Med J. 2017 May; 38(5): 482-490*

Randomised assignment of 112 patients to either AuraOnce or i-gel groups in which oropharyngeal leak pressure, ease of insertion and fiberoptic viewing were measured. i-gel recorded more favourable leak pressures and superior fiberoptic viewing, in which the primary outcome measure was oropharyngeal leak pressure (OPLP). Secondary outcomes included ease of insertion, first insertion success and fiberoptic view of the glottis. OPLP was higher with the i-gel.

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### **Presumed air entrainment through the gastric port of a paediatric i-gel device**

*Seeley JP, Pearson K, Baxter A. Anaesthesia. 2017 Feb; 72(2): 262-263*

Case report of light anaesthesia in a patient with a size 1.5 i-gel, despite adequate inspired concentration of sevoflurane and optimum positioning of the device by experienced operators. Entrainment was confirmed by capnography. No harm came to the patient. Authors pose the question of whether the gastric port inlet is positioned too anteriorly in paediatric sizes of i-gel.

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### **Presumed air entrainment through the gastric port of a paediatric i-gel device - a manufacturer's reply**

*Chapman D. Anaesthesia. 2017 Feb; 72(2): 263-264*

Response to the letter from Seeley et al. Manufacturer posits that the reason

for light anaesthesia and hence air entrainment, may have been caused by the tip of the device not being located in the upper oesophageal opening and the non-inflatable cuff located against the laryngeal framework, meaning the airway and gastric channels would not be isolated from each other. In the event described by the case report, reference to the user guide would suggest reinsertion of the device using a gentle jaw thrust, deep rotation or triple manoeuvre to achieve optimum depth of insertion.

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### **A randomised trial to compare i-gel and ProSeal laryngeal mask airway for airway management in paediatric patients**

*Nirupa R, Gombar S, Ahuja V, Sharma P. Indian J Anaesth. 2016 Oct; 60(10): 726-731*

Prospective, randomised controlled study on 100 patients, with the primary outcome being leak pressure assessed at five minutes. i-gel recorded 'superior' pressure and shorter insertion times compared to ProSeal.

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### **Pilot manikin study showed that a supraglottic airway device improved simulated neonatal ventilation in a low-resource settings**

*Pejovic NJ, Trevisanuto D, Nankunda JJ, Tylleskar T. Acta Paediatr. 2016 Sep 1*

After brief training, 25 participants attempted insertion, with success rate and insertion time recorded. i-gel achieved 100% insertion success rate and was more effective than the face mask in establishing PPV.

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### **What are the factors associated with successful I-gel™ insertion and uneventful anaesthesia in children**



## **under age two?**

*Magne C, Pichenot V, Didier P, Bérard L, Lejus-Bourdeau C. Anaesth Crit Care Pain Med. 2016 Sep 23*

Size 1 and 1.5 were used in this study on patients under the age of two. Successful insertion at the first attempt was recorded in 75% of cases.

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## **Laryngeal mask airway ProSeal provides higher oropharyngeal leak pressure than i-gel in adult patients under general anesthesia: a meta-analysis**

*Maitra S, Baidya DK, Arora MK, Bhattacharjee S, Khanna P. J Clin Anesth. 2016 Sep;33:298-305*

Meta-analysis of 10 RCTs to assess results when comparing the oropharyngeal leak pressure of each device. LMA ProSeal returned more favourable results, although i-gel deemed easier to insert. ProSeal also reported higher blood staining.

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## **Observation of ventilation effects of I-gel™, Supreme™ and Ambu AuraOnce™ with respiratory dynamics monitoring in small children**

*Gu Z, Jin Q, Liu J, Chen L. J Clin Monit Comput. 2016 Aug 4*

105 patients were including in this paediatric study, with primary outcomes including leak pressure and respiratory dynamic data. Authors conclude that the 'i-gel presented a better sealing effect and fewer adverse reactions.'

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## **Retrospective cohort investigation of perioperative upper respiratory events in children undergoing general anesthesia via a supraglottic airway**

*No HJ, Koo BW, Oh AY, Seo KS, Na HS, Ryu JH, Lee SW. Medicine (Baltimore).*

*2016 Jul; 95(28)*

Observational analysis of medical records of previous anaesthetic procedures at one university hospital. Comparison of the two anaesthetic agents included use of four supraglottic airways: LMA Flexible, LMA Supreme, LarySeal® and i-gel.

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## **Spatial relationship of I-gel and Ambu® AuraOnce on pediatric airway: a randomized comparison based on three dimensional magnetic resonance imaging**

*Aqil M, Delvi B, Abujamea A, Alzahrani T, Alzahem A, Mansoor S, Aaljazeera A. Minerva Anesthesiol. 2016 Jun 17*

Sixty paediatric patients were split between the two groups, with scans of head and neck performed after confirmation of device placement. Both devices 'significantly' reduced the area of glottis opening. i-gel produced greater dilation of upper oesophageal sphincter. Authors conclude more studies needed to test these results to 'reduce morbidity on pediatric airway'.

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## **I-gel assisted fiberoptic intubation in a child with Morquio's syndrome**

*Dhanger S, Adinarayanan S, Vinayagam S, Kumar MP. Saudi J Anaesth. 2015 Apr-Jun; 9(2): 217-9*

Report of the successful use of i-gel guided fibreoptic intubation.

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## **Challenge to pediatric anatomical variation : Can we draw the ideal line on the pediatric I-gel?**

*Abukawa Y, Hiroki K, Iwakiri H, Fukuda T, Ozaki M. J Anesth. 2016 Apr; 30(2): 199-204*

130 patients aged 7 months to 13 years

monitored under general anaesthesia, with size selection based on patient's body weight. Average insertion length grew longer with increasing height and weight. Authors conclude a line could be drawn on sizes 1.5 and 2 only.

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### **The association between thenar eminence and i-gel dimensions in paediatric patients**

*Cuvas Apan O, Apan A. Braz J Anesthesiol. 2016 Mar-Apr; 66(2): 171-5*

270 patients aged 0-12 years not requiring tracheal intubation were recruited. After induction, thenar eminence dimensions were measured and compared with the patient's inserted i-gel. Authors conclude their results showed that the dimensions of thenar eminence fitted the weight-based size selection of i-gel, and that it could be a practical way to choose the correct size device.

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### **Optimum sevoflurane concentration for I-gel insertion in unpremedicated children**

*Ghai B, Sethi S, Bansal D, Ram J. J Clin Anesth. 2015 Dec; 27(8): 627-31*

Patients were randomly assigned to i-gel size 2 or LMA Classic size 2 groups, with target end-tidal sevoflurane concentration maintained for 8-10 minutes before insertion. This concentration was decreased in subsequent patients depending on response according to Dixon method. Authors conclude i-gel insertion can be accomplished at nearly half the concentration required for LMA Classic.

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### **Evaluation of I-gel™ airway in different head and neck positions in anesthetized paralyzed children**

*Jain D, Ghai B, Bala I, Gandhi K, Banerjee G Paediatr Anaesth. 2015 Dec; 25(12):*

*1248-53*

30 children induced with sevoflurane in oxygen and administered atracurium intravenously. Oropharyngeal leak pressure in neutral, maximum flexion and maximum extension were primary outcomes measured. In extreme flexion of head and neck, caution is warranted during ventilation.

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### **Small is the new big: An overview of newer supraglottic airways for children**

*Goyal R. J Anaesthesiol Clin Pharmacol. 2015 Oct-Dec; 31(4): 440-9*

Overview of currently available options in paediatric sizes, suitability of each, published data and general concerns regarding their use.

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### **Comparison of Four Different Supraglottic Airway Devices in Terms of Efficacy, Intra-ocular Pressure and Haemodynamic Parameters in Children Undergoing Ophthalmic Surgery**

*Peker G, Takmaz SA, Baltacı B, Başar H, Kotanoğlu M. Turk J Anaesthesiol Reanim. 2015 Oct; 43(5): 304-12*

Prospective, randomised study on 60 children aged 1-10 years. Insertion attempts and ease, leak pressure and complications were recorded. Results suggest no difference between the devices under these conditions.

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### **Comparison of Second-Generation Supraglottic Airway Devices (i-gel versus LMA ProSeal) During Elective Surgery in Children**

*Sanket B, Ramavakoda CY, Nishtala MR, Ravishankar CK, Ganigara A AANA J. 2015 Aug; 83(4): 275-80*

Study to compare efficacy of each device on patients aged up to 10 years.

Ease of insertion, time to insertion and oropharyngeal leak pressure were some of the measurements taken. Insertion time was significantly faster with i-gel.

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### **Performance of size 1 I-gel compared with size 1 ProSeal laryngeal mask in anesthetized infants and neonates**

*Kayhan GE, Begec Z, Sanli M, Gedik E, Durmus M. ScientificWorldJournal. 2015; 2015: 426186*

50 patients were split between the two groups, with airway leak pressure the primary outcome measured. No significant differences were found here, however i-gel insertion time was shorter.

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### **A randomized comparison of the i-gel with the self-pressurized air-Q intubating laryngeal airway in children**

*Kim MS, Lee JH, Han SW, Im YJ, Kang HJ, Lee JR. Paediatr Anaesth. 2015 Apr; 25(4): 405-12*

Eighty children were split between each device group, with leak pressure and fiberoptic view assessed at three intervals. i-gel was 'significantly easier' to insert and had high pressures at all measurement points.

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### **A comparative study of Laryngeal Mask Airway size 1 vs. i-gel size 1 in infants undergoing daycare procedures**

*Pant D, Koul A, Sharma B, Sood J Paediatr Anaesth. 2015 Apr; 25(4): 386-91*

Forty children 2-5kg in body weight were allocated to either i-gel or LMA Classic groups, with oropharyngeal seal pressure the primary outcome measured. Results showed that i-gel OSP was higher and statistically significant.

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### **An evaluation of the I-gel supraglottic airway in 70**

### **pediatric patients**

*Yeoh TY, Chan KB, Yeo LS, Liu EH, Pan TL. J Anesth. 2015 Apr; 29(2): 295-8*

An evaluation of 70 children undergoing general anaesthesia, with insertion time, leak pressure and gastric tube insertion among the results. Overall insertion success was 96%.

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### **A systematic review and meta-analysis of the i-gel vs laryngeal mask airway in children**

*Choi GJ, Kang H, Baek CW, Jung YH, Woo YC, Cha YJ. Anaesthesia. 2014 Nov; 69(11): 1258-65*

A review of nine randomised controlled trials suggested that clinical performance of i-gel was similar to LMA, save for leak pressure and fiberoptic view, both of which favoured i-gel.

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### **A comparison of i-gel™ and LMA Supreme™ in anesthetized and paralyzed children**

*Kim H, Lee JY, Lee SY, Park SY, Lee SC, Chung CJ. Korean J Anesthesiol. 2014 Nov; 67(5): 317-22*

100 patients were randomly assigned to either device group, with insertion success rate, leak pressure and postoperative complications among results measured. i-gel demonstrated higher leak pressure, but a longer insertion time.

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### **Evaluation of i-gel(™) airway in children: a meta-analysis**

*Maitra S, Baidya DK, Bhattacharjee S, Khanna P Paediatr Anaesth. 2014 Oct; 24(10): 1072-9*

A total of nine studies were included using search keywords, with results finding that i-gel gave significantly higher leak pressure and ProSeal. Authors conclude it is an

effective alternative to ProSeal and cLMA.

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**A comparison of surfactant administration through i-gel and ET-tube in the treatment of respiratory distress syndrome in newborns weighing more than 2000 grams.**

*Sadeghnia A, Tanhaei M, Mohammadizadeh M, Nemati M. Adv Biomed Res. 2014 Jul 31; 3: 160*

Randomised control trial on newborns with respiratory distress syndrome, comparing administration of surfactant. Results show that administration using i-gel was more successful than control group and 'could even be promoted to standard care position'. More research needed.

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**The LMA-Supreme versus the I-gel in simulated difficult airway in children: a randomised study**

*Kus A, Gok CN, Hosten T, Gurkan Y, Solak M, Toker K. Eur J Anaesthesiol. 2014 May; 31(5): 280-4*

Prospective, crossover, randomised trial of i-gel against cLMA on 48 post-burn neck contracture patients with reduced neck movement and mouth opening. Primary outcome was overall success rate, with other measurements taken in time to ventilation, leak pressure, fiberoptic view and visualisation of square wave pattern. Success rate for i-gel was 91.7%, against 79.2% for cLMA. i-gel outperformed cLMA in all measurements. Authors conclude their study has 'better clinical performance in the difficult airway management of the airway in the post burn contracture of the neck'.

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**A clinical evaluation of the pediatric i-gel™ for airway management during MRI examination**

*Corso RM, Battelli D, Maitan S, Zampone S, Agnoletti V. J Anaesthesiol Clin Pharmacol. 2014 Apr; 30(2): 288-90*

Database review of 45 patient records meeting authors' set criteria, which included i-gel sizes 1-2.5. i-gel use in MRI produces no artefacts and the authors conclude the device is a useful device in this scenario, offering quick insertion time and low rate of complications.

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**A randomised comparison of the i-gel™ and the Laryngeal Mask Airway Classic™ in infants**

*Kim MS, Oh JT, Min JY, Lee KH, Lee JR Anaesthesia. 2014 Apr; 69(4): 362-7*

54 infants were allocated with success rate at first attempt and fiberoptic views measured. First-attempt success was 100% for i-gel, compared to 69 in LMA.

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**A comparison of supraglottic airway i-gel™ vs. classic laryngeal mask airway in small children.**

*Lee JH, Cho HS, Shin WJ, Yang HS. Korean J Anesthesiol. 2014 Feb; 66(2): 127-30*

Airway sealing ability, success rate of insertion and adverse events were among the recorded outcomes in this study. Leak pressures and insertion success rates are similar between the two devices, however the i-gel slid out of the mouth of a small amount of patients in this scenario. Authors recommend the device should be secured more tightly.

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**Current UK practice of pediatric supraglottic airway devices - a survey of members of the Association of Paediatric Anaesthetists of Great Britain and Ireland.**

*Bradley AE, White MC, Engelhardt*

*T, Bayley G, Beringer RM. Paediatr Anaesth. 2013 Nov; 23(11): 1006-9*

In this survey distributed to the members of APAGBI, the current usage of supraglottic airway devices in routine practice and difficult airways in the UK was assessed. Of the 244 members, 88% preferred the use of first-generation devices, with the most important design feature being the availability of a complete range of sizes. 77% would like to see more randomised controlled trials on SAD safety in children.

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### **A randomized comparison of the i-gel and the ProSeal laryngeal mask airway in pediatric patients: performance and fiberoptic findings**

*Fukuhara A, Okutani R, Oda Y. J Anesth. 2013 Feb;27(1): 1-6*

A prospective, randomised and controlled test of 134 children, aged three months to 15 years old, undergoing general anaesthesia were inserted with either i-gel size 1.5-3 or ProSeal equivalent to gauge insertion performance. Outcome variables included leak pressure, ease of insertion, success rate and fiberoptic view. Most outcomes were very similar, however fiberoptic view was significantly better with i-gel.

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### **A randomized equivalence trial comparing the i-gel® and laryngeal mask airway Supreme® in children**

*Jagannathan N, Sommers K, Sohn LE, Sawardekar A, Shah RD, Mukherji II, Miller S, Voronov P, Seraphin S. (delete double mention on same page) Paediatr Anaesth. 2013 Feb; 23(2): 127-33*

Total of 170 children were assigned to either the i-gel or LMA Supreme, with leak pressure the primary outcome

measured. Secondary evaluations included insertion time, insertion success rate, fiberoptic view and complications, to name a few. Resulting median leak pressure was higher with i-gel and the authors conclude it could be a 'useful alternative to the Supreme'.

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### **Tracheal compression caused by oversized i-gel® in children**

*Agnoletti V, Piraccini E, Corso RM, Cittadini A, Maitan S, Della Rocca G, Gambale G. Minerva Anesthesiol. 2013 Jan; 79(1): 107-8*

Unlike other supraglottic airway devices, paediatric i-gel does not cause artifacts when used for MRI. The authors of this study found, after evaluation, that the patient weight grading could be an inadequate criteria for i-gel selection for MRI due to the potential for partial or even complete airway obstruction. This study does not rule out the use of a paediatric i-gel entirely, merely pointing to the importance of size selection. The authors deduce that further studies in this area should be conducted to substantiate the evidence.

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### **LMA ProSeal® vs. i-gel® in ventilated children: A randomised, crossover study using the size 2 mask**

*Gasteiger L, Brimacombe J, Oswald E, Perkhofner D, Tonin A, Keller C, Tiefenthaler W. Acta Anaesthesiol Scand. 2012 Nov;56(10):1321-4*

Fifty-one children aged 1.5-6 years, weighing 10-25kg, were studied randomly using either the size 2 LMA ProSeal or i-gel. The hypothesis tested was that oropharyngeal leak pressure and fiberoptic position of the airway tube differ between the two devices, with results proving similar.

**Comparison of size 2.5 i-gel™ with proseal LMA™ in anaesthetised, paralyzed children undergoing elective surgery**

*Mitra S, Das B, Jamil SN. N Am J Med Sci. 2012 Oct; 4(10): 453-7*

Investigation on the usefulness of paediatric i-gel size 2.5 against the PLMA equivalent in 60 randomly assigned patients due for anaesthetised elective surgery. Leak pressure was the primary outcome recorded, with further results for ease of insertion, hemodynamic data and postoperative complications also measured. Most areas offered no significant difference, although i-gel proved easier to insert and recorded a higher leak pressure. Due to author-defined parameters such as cost-effectiveness, they deduce that i-gel 'must be more frequently used'.

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**A clinical evaluation of the I-gel™ supraglottic airway device in children**

*Hughes C, Place K, Berg S, Mason D. Paediatr Anaesth. 2012 Aug; 22(8): 765-71*

Over a 12-month period, 154 children were studied using i-gel sizes ranging from 1 to 2.5 to assess the device based on successful rates of insertion, airway leak pressure, position confirmed by fiberoptic laryngoscopy, gastric tube placement, manipulations required, and complications. First insertion attempt was 93.5%, and complications arose in 20% of cases. Most were minor, however reports suggest there were cases of displacement and flexion compromising airway quality. Authors confirm 'vigilance' had to be used to secure the device, and that a decision on whether the higher cost for i-gel is worth it depends on further studies of this kind.

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**The effect of i-gel® airway on intraocular pressure in pediatric patients who**

**received sevoflurane or desflurane during strabismus surgery"**

*Sahin A et al. Paediatr Anaesth. 2012 Aug; 22(8): 772-5*

47 children due for eye surgery were administered with sevoflurane or desflurane randomly for anaesthesia. Intraocular pressure was then measured prior to i-gel insertion, at two and five minutes after insertion, and immediately after removal. Sustained pressure decrease present during procedure, but no significant difference between pre- and post-operative pressure.

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**Initial experience of the i-gel® supraglottic airway by the residents in pediatric patients**

*Abukawa Y, Hiroki K, Ozaki M. J Anesth. 2012 Jun; 26(3): 357-61*

This study investigated the use of paediatric i-gel by residents on a total of 70 children of ASA score I-II undergoing surgery, split into three groups. Group 1: size 1.5; group 2: size 2; group 3: size 2.5. Seven characteristics were evaluated, including ease of i-gel and gastric tube insertion, leak pressure and hypoxia rate. Overall insertion success rate and first-attempt success rate were 99% and 94% respectively, with gastric tube insertions easy in all cases. Results show that the i-gel is a safe and effective device for use by residents with limited experience of paediatric airway devices. The authors warn that special attention should be given when using size 1.5 that the airway is protected.

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**A randomised trial comparing the i-gel® with the LMA Classic in children**

*Lee J-R et al. Anaesthesia. 2012 Jun; 67(6): 606-11*

99 children underwent general anaesthesia randomly via either i-gel or cLMA. Leak pressure, ease of insertion, time taken to insert, fiberoptic examination and complications were all measured. There was no significant difference in leak pressure, however the i-gel displayed a shorter insertion time and improved glottic view.

and that 'no learning curve is needed before a high success insertion rate is obtained. The i-gel appears to be safe for paediatric management'.

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### **A cohort evaluation of the paediatric i-gel® airway during anaesthesia in 120 children**

*Beringer R, Kelly F, Cook T, Nolan J, Hardy R, Simpson T, White M. Anaesthesia 2012; 66(12): 1121-1126*

120 children up to 13 years of age were studied using the paediatric i-gel during general anaesthesia to assess efficacy and usability. Insertion success and number of attempts, ventilation, leak pressure and fiberoptic view were all recorded. Airway manipulations and complications were also noted. In 94% of children the i-gel was inserted and a clear airway maintained without complication.

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### **The i-gel®, a single-use supraglottic airway device with a non-inflatable cuff and an esophageal vent: An observational study in children**

*Beylacz L, Bordes M, Semjen F, Cros AM. Acta Anaesthesiol Scand 2009; 53(3): 376-379*

This study evaluated the i-gel in 50 children above 30kg undergoing short-duration surgery. The parameters measured included: ease of insertion, seal pressure, ease of inserting a gastric tube and post operative complications. The first time insertion success rate was 100%. No laryngeal leak occurred. The mean seal pressure was 24.9cm H<sub>2</sub>O. The authors concluded that i-gel was very easy to insert



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## Difficult Airways

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### **Bilateral pneumonectomy with difficult airway managed by using a combination of i-gel and EZ-Blocker™**

Ueshima H, Otake H. *J Clin Anesth.* 2016 Nov; 34: 516

Report of a successful case using i-gel insertion after two failed attempts at intubation with a video laryngoscope on a 73-year-old female with hypertension and a difficult airway.

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### **A proposal for a new scoring system to predict difficult ventilation through a supraglottic airway**

Saito T, Chew ST, Liu WL, Thinn KK, Asai T, Ti LK. *Br J Anaesth.* 2016 Sep; 117 Suppl 1: i83-i86

By using previously reported derivation data, a score was validated in 5532 patients ranging between 0 and 7 points. Under this format, the authors conclude the scoring system to be easy to perform and reliable.

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### **i-gel as alternative airway tool for difficult airway in severely injured patients**

Häske D, Schempf B, Niederberger C, Gaier G. *Am J Emerg Med.* 2016 Feb;34(2):340.e1-4

Report of two cases where i-gel was successfully used in a prehospital setting on patients with severe head and neck trauma. Authors suggest that, on evidence, i-gel is an 'appropriate primary airway tool'.

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### **Successful i-gel insertion combined with Macintosh laryngoscope with a swollen tonsil**

Komasawa N, Nishihara I, Minami T. *J*

*Clin Anesth.* 2016 Feb; 28: 89-90

In this case of a 13-year-old patient, the i-gel was inserted passed the swollen tonsil to give unventful mechanical ventilation and no postoperative complications or bleeding of the tonsil.

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### **The i-gel Supraglottic Airway as a Conduit for Fiberoptic Tracheal Intubation - A Randomized Comparison with the Single-use Intubating Laryngeal Mask Airway and CTrach® Laryngeal Mask in Patients with Predicted Difficult Laryngoscopy**

Michálek P, Donaldson W, McAleavey F, Abraham A, Mathers RJ, Telford C. *Prague Med Rep.* 2016;117(4):164-175

Comparative study of three supraglottic airways as conduits in patients with predicted difficult laryngoscopy. Primary outcome measure was success rate of tracheal intubation through the device. No statistical difference was recorded in success rates between devices, however i-gel proved quicker to insert compared to ILMA® and the intubation time was shorter compared to CTrach. i-gel is a suitable alternative to sILMA and CTrach in this scenario, and the shorter times recorded may provide an advantage in cases of difficult oxygenation.

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### **High arch palate: A bane for ProSeal laryngeal mask airway but a boon for i-gel**

Bala R, Hazarika A, Pandia MP, Kumar N. *J Anaesthesiol Clin Pharmacol.* 2015 Oct-Dec;31(4): 568

Report of failed ProSeal insertion, with i-gel successfully inserted in its place at the first attempt.



**In a difficult access scenario,  
supraglottic airway devices improve  
success and time to ventilation**

*Wetsch WA, Schneider A, Schier R, Spelten O, Hellmich M, Hinkelbein J. Eur J Emerg Med. 2015 Oct; 22(5): 374-6*

Manikin study to assess speed of effective ventilation administered in a simulated motor vehicle accident victim, comparing i-gel against tracheal intubation, Ambu AuraOnce and laryngeal tube. Fastest effective ventilation achieved with i-gel.

**Use of the i-gel for Tracheostomy in  
a Patient with Neck Deformity and  
Tracheal Stenosis**

*Yokota T, Asai T, Okuda Y, Masui. 2015 Mar; 64(3): 307-9*

Successful report of i-gel maintaining a clear airway during tracheostomy.

**Easy airway management using the  
i-gel™ supraglottic airway in a patient  
with Treacher Collins syndrome**

*Soh J, Shin HW, Choi SU, Lim CH, Lee HW. Korean J Anesthesiol. 2014 Dec; 67(Suppl): S17-8*

Case report of failed fiberoptic intubation and videolaryngoscope on a 25-year-old male with TCS who had undergone emergency abdominal surgery. i-gel was used instead and was inserted on first attempt and the airway successfully maintained.

**Perioperative management of an obese  
patient complicated with sleep apnea  
syndrome (SAS) undergoing awake  
craniotomy**

*Komayama N, Kamata K, Maruyama T, Nitta M, Muragaki Y, Ozaki M. Masui. 2014 Oct; 63(10): 1117-21*

In this case, the patient was anaesthetised

using the i-gel until the dura was opened, whereupon anaesthesia stopped and the i-gel removed.

**i-gel and facemask combination for  
impossible ventilation**

*Matsunami S, Komasaawa N, Minami T. J Clin Anesth. 2014 Sep; 26(6): 509-10*

Case report of failed fiberoptic intubation and videolaryngoscope on a 25-year-old male with TCS who had undergone emergency abdominal surgery. i-gel was used instead and was inserted on first attempt and the airway successfully maintained.

**i-gel and facemask combination for  
impossible ventilation**

*Matsunami S, Komasaawa N, Minami T. J Clin Anesth. 2014 Sep; 26(6): 509-10*

Case report of an obese patient with difficult airway inserted with an i-gel following failed facemask ventilation. After using a combination of i-gel and facemask ventilation improved sufficiently due to device's fit to the larynx.

**Awake insertion of i-gel under  
dexmedetomidine sedation in a patient  
with severe obstructive sleep apnea  
syndrome**

*Matsunami S, Komasaawa N, Kuzukawa Y, Fujitate Y, Minami T. Masui. 2014 Jul 63(7): 807-9*

Case of successful insertion of i-gel with no vital sign change.

**Airway rescue in a patient with severe  
obstructive sleep apnea syndrome and  
impossible ventilation after induction of  
general anesthesia**

*Komasaawa N, Kusunoki T, Soen M, Minami T. Masui. 2014 Jun; 63(6): 644-6*

Success rescue ventilation of this patient after general anaesthesia. Manual ventilation became impossible and oropharyngeal airway did not improve situation - i-gel was immediately inserted giving sufficient ventilation as intubation was performed.

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### **Use of the i-gel in unexpected difficult airway.**

*Sramek M, Keijzer Ch. Br J Anaesth. 2014 Feb; 112(2): 386-7*

Letter to the editor supporting the findings in the Theiler et al. study (Br J Anaesth 2012) with results of their own study on the success of i-gel in management of the unexpected difficult airway.

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### **Randomized crossover comparison of the laryngeal mask airway classic with i-gel® laryngeal mask airway in the management of difficult airway in post burn neck contracture patients**

*Singh J, Yadav MK, Marabhatta SB, Shrestha BL. Indian J Anaesth. 2012 Jul; 56(4): 348-52*

Prospective, crossover, randomised trial of i-gel against cLMA on 48 post-burn neck contracture patients with reduced neck movement and mouth opening. Primary outcome was overall success rate, with other measurements taken in time to ventilation, leak pressure, fibreoptic view and visualisation of square wave pattern. Success rate for i-gel was 91.7%, against 79.2% for cLMA. i-gel outperformed cLMA in all measurements. Authors conclude their study has 'better clinical performance in the difficult airway management of the airway in the post burn contracture of the neck'.

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### **Use of an i-gel® in a 'can't intubate/can't ventilate' situation**

*Corso RM, Piraccini E, Agnoletti V, Gambale G. Anaesth Intensive Care. 2010 Jan; 38(1): 212*

This report details the use of an i-gel to provide an airway for a 63-year-old male with severe subglottic swelling. Two prior attempts at insertion of a gum elastic bougie failed and facemask ventilation was ineffective. A well-known brand of laryngeal mask was inserted, but ventilation was impossible, so it was removed and replaced with an i-gel. Subsequent intubation through the i-gel was performed successfully with a flexible fibrescope.

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### **The use of an i-gel® supraglottic airway for the airway management of a patient with subglottic stenosis: a case report**

*Donaldson W, Michalek P. Minerva Anesthesiol. 2010 May; 76(5): 369-72*

This report details the case of a 47-year-old woman with subglottic stenosis. During preoperative screening she stated that there had been difficulty inserting an endotracheal tube during an earlier procedure. During anaesthesia, a size four i-gel was inserted on the first attempt. A fibrescope was passed down the i-gel and into the trachea, where subglottic stenosis could be seen. The i-gel showed no signs of leaking and did not cause any trauma. The authors note that this is the first case report where an i-gel has been used in a patient with subglottic stenosis, and state that preoperative tests should be carried out before choosing to use the device in this situation.

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### **Insertion of the i-gel® airway obstructed by the tongue**

*Taxak S, Gopinath A. Anaesthesiology 2010 Feb; 112(2): 500- 501*

This correspondence article responds to Theiler et al's comments on the design of the i-gel and subsequent effects of tongue size. The authors state that they have noticed a similar issue where the patient's tongue is carried towards the back of the mouth by the i-gel, which then cannot be inserted fully. The i-gel had to be removed and re-inserted. The authors recommend stabilising the tongue before attempting to insert the device. A reply from the authors of the original report says that a tongue retractor should be used for this rather than fingers. This response also points out that although the tongue may also get caught between the teeth and the i-gel bite block, this could happen with any supraglottic airway.

maintained the airway immediately after induction, allowing oxygenation and ventilation. Fibreoptic identification of the laryngeal inlet was successful on the first attempt and a tracheal tube inserted into the trachea, without complication, in both patients.

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### **Use of the i-gel® laryngeal mask for management of a difficult airway**

*Emmerich M, Dummmler R. Anaesthetist 2008; 57(8): ,779-781*

In this case report, the i-gel was used as a conduit for intubation in a patient who was known to have problems with intubation. Direct laryngoscopy was not possible, but ventilation and a good fibreoptic view of the glottis were achieved by using the i-gel. Intubation via the device was completed successfully using a 6.0mm cuffed endotracheal tube.

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### **Fibreoptic intubation through an i-gel® supraglottic airway in two patients with predicted difficult airway and intellectual disability**

*Michalek P, Hodgkinson P, Donaldson W. Anesth Analg 2008; 106(5): 1501-1504*

This case study describes successful fibreoptic guided tracheal intubation through the i-gel in two uncooperative adult patients with learning disability and predicted difficult airway. The i-gel

## Resuscitation and Emergency Medicine

### **Competence in the use of supraglottic airways by Australian surf lifesavers for cardiac arrest ventilation in a manikin**

*Holbery-Morgan L, Angel C, Murphy M, Carew J, Douglas F, Murphy R, Hood N, Rechtman A, Scarff C, Simpson N, Stewardson A, Steinfeld D, Radford S, Douglas N, Johnson D. Emerg Med Australas. 2017 Feb; 29(1): 63-68*

Life savers in Australia who already use pocket masks and BVMs were trained to use the LMA and i-gel on a manikin. Time to effective ventilation was similar between the pocket mask, BVM and i-gel, but longer for LMA. Authors feel there is a limited role for supraglottic airway devices in this scenario.

### **I-gel O<sub>2</sub> resus pack, a rescue device in case of severe facial injury and difficult intubation**

*Baratto F, Gabellini G, Paoli A, Boscolo A Am J Emerg Med. 2017 Jan 26*

Report of two cases of attempted suicide by firearm managed with the use of the i-gel® O<sub>2</sub> Resus Pack. In both patients, laryngoscopy attempts failed before an i-gel was inserted and either fiberoptic-assisted intubation or fiberoptic bronchoscopy were performed. Authors conclude that the i-gel's properties mean the device could easily be used by untrained rescuers and might perform an important role during out-of-hospital emergency.

### **Design and implementation of the AIRWAYS-2 trial: A multi-centre cluster randomised controlled trial of the clinical and cost effectiveness of the i-gel supraglottic airway device versus**

### **tracheal intubation in the initial airway management of out of hospital cardiac arrest**

*Taylor J, Black S, J Brett S, Kirby K, Nolan JP, Reeves BC, Robinson M, Rogers CA, Scott LJ, South A, Stokes EA, Thomas M, Voss S, Wordsworth S, Bengner JR. Resuscitation. 2016 Sep 30; 109: 25-32*

Patient enrollment began in June 2015 for this study comparing the use by paramedics of the i-gel against endotracheal intubation in OHCA in the UK. The primary outcome is the modified Rankin Scale score at hospital discharge. The trial will enrol 9070 patients over two years.

### **Evaluation of six different airway devices regarding regurgitation and pulmonary aspiration during cardio-pulmonary resuscitation (CPR) – A human cadaver pilot study**

*Piegeler T, Roessler B, Goliasch G, Fischer H, Schlaepfer M, Lang S, Ruetzler K. Resuscitation. 2016 May; 102: 70-4*

Randomised human cadaver study comparing Laryngeal Tube, EasyTube®, LMA Classic, i-gel, ETI and BVM effect on protection against regurgitation and aspiration during CPR. Five minutes of CPR was administered according to 2010 European Resuscitation Council Guidelines. Aspiration was detected in two out of five cadavers with i-gel, while none were recorded when using ETI. Study provides experimental evidence that ETI offers superior protection during CPR.

### **Airway management in out-of-hospital cardiac arrest in Finland: current practices and outcomes**

*Hiltunen P, Jäntti H, Silfvast T, Kuisma M, Kurola J. Scand J Trauma Resusc Emerg*

*Med. 2016 Apr 12; 24: 49*

Data on patients with OHCA and attempted resuscitation in an area of Finland over a six-month period in 2010 was collected, with airway techniques and adverse events recorded. Of the 614 patients, 67% were treated with endotracheal intubation and 30% with supraglottic airway devices. Overall survival to hospital discharge was 17.8%.

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### **An exploration of the views of paramedics regarding airway management**

*Brandling J, Rhys M, Thomas M, Voss S, Davies SE, Bengner J. Scand J Trauma Resusc Emerg Med. 2016 Apr 27; 24: 56*

A study within a UK ambulance study exploring the customs and beliefs of paramedics in relation to airway management and whether tracheal intubation sustains professional identity. Interviews were conducted with 17 participants, which identified four key factors: pride, utility, expectations and professionalisation. Authors conclude the interviews identified a 'wide range of views' on airway management based on evidence and experience.

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### **Layperson mouth-to-mask ventilation using a modified I-gel laryngeal mask after brief onsite instruction: a manikin-based feasibility trial**

*Schälte G, Bomhard LT, Rossaint R, Coburn M, Stoppe C, Zoremba N, Rieg A BMJ Open. 2016 May 12; 6(5): e010770*

100 participants were analysed using a labelled i-gel with an integrated mouthpiece and asked to follow an instruction chart. 79% were able to ventilate the manikin effectively, with 90% using the correct turn and direction.

### **Randomised comparison of the effectiveness of the laryngeal mask airway supreme, i-gel and current practice in the initial airway management of out of hospital cardiac arrest: a feasibility study**

*Benger J, Coates D, Davies S, Greenwood R, Nolan J, Rhys M, Thomas M, Voss S. Br J Anaesth. 2016 Feb; 116(2): 262-8*

A cluster randomised trial of paramedics within one ambulance service in England over a 12-month period, split into groups using either the i-gel or LMA Supreme or usual practice for all patients with non-traumatic adult OHCA. Primary outcome was study feasibility, including recruitment and protocol adherence. Secondary outcomes included survival to hospital discharge and to 90 days. 184 of 535 paramedics consented, with 615 patients recruited. The LMA Supreme arm was suspended following 'adverse incidents'. No differences were reported in secondary outcomes.

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### **Airway management during cardiopulmonary resuscitation**

*Bernhard M, Bengner JR Curr Opin Crit Care. 2015 Jun; 21(3): 183-7*

An evaluation of latest scientific evidence regarding airway management during in- and out-of-hospital CPR.

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### **Performance of intubation with 4 different airway devices by unskilled rescuers: manikin study**

*Lee DW, Kang MJ, Kim YH, Lee JH, Cho KW, Kim YW, Cho JH, Kim YS, Hong CK, Hwang SY. Am J Emerg Med. 2015 May; 33(5): 691-6*

LMA Classic, i-gel, PENTAX® Airway Scope® and Macintosh laryngoscope were all tested, with time to ventilation,

intubation success rate and difficulty of intubation measured. Authors conclude that intubation with i-gel was faster and easier.

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**i-gel: a new supraglottic device for effective resuscitation of a very low birthweight infant with Cornelia de Lange syndrome**

*Galderisi A, De Bernardo G, Lorenzon E, Trevisanuto D. BMJ Case Rep. 2015 Mar 25; 2015*

Successful report of an infant resuscitated at birth using a size 1 i-gel, positioned by a trainee paediatrician at first attempt, after failed face-mask ventilation.

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**Simulation analysis of three intubating supraglottic devices during infant chest compression**

*Kohama H, Komasaawa N, Ueki R, Kaminoh Y, Nishi S. Pediatr Int. 2015 Feb; 57(1): 180-2*

Study on performance of air-Q, Ambu Aura-i® and i-gel in a manikin simulation, undertaken by 22 novice physicians. Rate of success and insertion time with and without chest compressions were measured.

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**Emergency airway management by paramedics: comparison between standard endotracheal intubation, laryngeal mask airway, and I-gel**

*Leventis C, Chalkias A, Sampanis MA, Foulidou X, Xanthos T. Eur J Emerg Med. 2014 Oct; 21(5): 371-3*

Study to investigate intubation skill levels of 72 paramedics using ETI, LMA and i-gel in a manikin model. The success rate was higher, and the insertion time lower for those using i-gel. There was a 'statistically significant association'

between experience level and insertion time of LMA. Authors conclude that paramedics should 'lay greater emphasis on airway management using supraglottic devices, especially i-gel'.

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**Evaluation of chest compression effect on airway management with air-Q, aura-i, i-gel, and Fastrack intubating supraglottic devices by novice physicians: a randomized crossover simulation study**

*Komasawa N, Ueki R, Kaminoh Y, Nishi S. J Anesth. 2014 Oct; 28(5): 676-80*

A group of 20 novice physicians inserted the named devices into manikins with or without chest compressions, whereupon insertion time and successful ventilation rate were measured. In cases of successful ventilation, blind tracheal intubation via the inserted device was performed. Chest compression did not significantly decrease ventilation success rates in each device, however insertion time with i-gel did suffer, according to the authors.

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**Higher insertion success with the i-gel supraglottic airway in out-of-hospital cardiac arrest: a randomised controlled trial**

*Middleton PM, Simpson PM, Thomas RE, Bendall JC. Resuscitation. 2014 Jul; 85(7): 893-7*

Subjects with out-of-hospital cardiac arrest were allocated to either the i-gel or Portex Soft Seal laryngeal mask group, within a large Australian ambulance group. Primary outcome was successful insertion of the airway. The i-gel had a significantly higher success rate than Portex® Soft Seal® and significantly lower median ease of insertion scores.

### **Introduction of the I-gel supraglottic airway device for prehospital airway management in a UK ambulance service**

*Duckett J, Fell P, Han K, Kimber C, Taylor C. Emerg Med J. 2014 Jun; 31(6): 505-7*

Clinical review of the advanced airway management techniques within the North East Ambulance Service in the UK. i-gel a popular choice for airway management during prehospital cardiopulmonary resuscitation, giving higher successful insertion rates than endotracheal tube. Authors conclude that they anticipate i-gel will be the first choice device for use in prehospital cardiac arrest.

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### **Shift of the i-gel position after chest compression: comparison of fixation methods using Durapore tape, Multipore tape, or a fixation strap**

*Seno H, Komazawa N, Fujiwara S, Miyazaki S, Tatsumi S, Sawai T, Minami T, Masui. 2014 May; 63(5): 590-3*

Manikin study to investigate effectiveness of three fixation methods on an automated chest compressor. Fixation strap may prove useful in stabilising i-gel insertion in this scenario.

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### **Role of the i-gel in emergency airway management**

*Ueshima H, Asai T, Masui. 2014 Apr; 63(4): 472-4*

Manikin study to assess the role of I-gel in CPR. Results showed the device was significantly easier and faster to insert.

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### **Oxygenation, ventilation, and airway management in out-of-hospital cardiac arrest: a review**

*Henlin T, Michalek P, Tjll T, Hinds JD, Dobias M Biomed Res Int. 2014;*

*2014;376871*

A comprehensive review assessing the changing core protocols of treatment of out-of-hospital cardiac arrest (OHCA), covering basic life support (BLS), oxygenation, passive oxygenation, airway management strategies, intubation, use of supraglottic airways and post-return of spontaneous circulation (ROSC) care.

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### **Comparison of blind intubation through the I-gel and ILMA Fastrach by nurses during cardiopulmonary resuscitation: a manikin study**

*Melissopoulou T, Stroumpoulis K, Sampanis MA, Vrachnis N, Papadopoulos G, Chalkias A, Xanthos T. Heart Lung. 2014 Mar-Apr; 43(2): 112-6*

A group of 45 nurses inserted the i-gel and ILMA in a manikin with and without continuous chest compressions. ILMA proved more successful than the i-gel, but continuation of compressions caused higher insertion times in both devices. Authors conclude that nursing staff can use both devices 'as conduits with comparable success rates, regardless of whether chest compressions are interrupted or not'.

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### **Supraglottic airways: the history and current state of prehospital airway adjuncts**

*Ostermayer DG, Gausche-Hill M. Prehosp Emerg Care. 2014 Jan-Mar; 18(1): 106-15*

Review discussing the history, developments, benefits and complications of supraglottic devices in prehospital care. Devices covered included Laryngeal Mask Airway, Air-Q and i-gel.



### **Performance of the i-gel™ during pre-hospital cardiopulmonary resuscitation**

*Häske D, Schempf B, Gaier G, Niederberger C. Resuscitation 2013; 84(9): 1229-32*

This observational study of i-gel use during CPR assessed ease of insertion, ventilation quality, leak and whether ventilation was possible without chest compression interruption. Insertions were attempted by 63 paramedics and seven emergency physicians in pre-hospital CPR, with an overall 90% first-attempt insertion success rate. Insertion was reported as easy in 80% of cases, with the same figure representing cases with no leak recorded. In 74% of cases, continuous chest compression was still possible. The authors say that, 'the i-gel is an easy supraglottic device to insert and enables adequate ventilation during CPR'.

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### **A comparison of three supraglottic airway devices used by healthcare professionals during paediatric resuscitation simulation**

*Schunk D, Ritzka M, Graf B, Trabold B. Emerg Med J. 2013 Sep; 30(9): 754-7.*

66 healthcare professionals of differing experience in paediatric airway management participated in a study comparing laryngeal masks, i-gel and laryngeal tube. Separated into three groups and after brief training in each, the participants were asked to place the device. Positioning and time to insert were recorded. Results show that i-gel is superior to both laryngeal mask and laryngeal tube under these circumstances.

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### **Pre-hospital transient airway management using the I-gel with sustained spontaneous breathing in different emergency situations**

*Tiesmeier J, Emmerich M. Minerva*

*Anesthesiol October 5 2010; Epub Ahead Of Print*

Three case studies where an i-gel was used in an emergency situation are presented on the back of the authors' previous knowledge that this SAD has 'advantageous characteristics', including quick insertion time, good seal pressures and high success rates. Cases were: a 'violent' but sedated male patient; a 69-year-old patient suffering a cerebral seizure; and an unconscious and intoxicated patient found at home. Regurgitation and aspiration were not seen in any case. Authors conclude that, alongside other pre-clinical emergency situations, i-gel can be used in cases of sustained spontaneous breathing, and 'could be considered for extended use outside the hospital'.

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### **iGel supraglottic airway use during hospital cardiopulmonary resuscitation**

*Larkin CB, d'Agapeyeff A, King BP, Gabbott DA. Resuscitation 2012; 83(6): E141*

100 size 4 i-gel airways were inserted in patients by a mixture of nurses, junior doctors and Resuscitation Officers, either before or after bag valve mask ventilation. 83/100 insertions were considered 'Easy' and 82/100 were inserted at the first attempt, with only one attempt resulting in complete failure. Any audible leak and visible chest movement via synchronous and asynchronous ventilation was measured. 99% of users confirmed they would prefer to use i-gel instead of an oropharyngeal airway. Authors confirm that, as a result of their first 100 insertions, i-gel is their preferred supraglottic airway device of choice during the initial phase of CPR whilst the Resuscitation Team is summoned.

## **Hands-off time during insertion of six airway devices during cardiopulmonary resuscitation: A randomised manikin trial**

*Ruetzler K, Gruber C, Nabecker S, Wohlfarth P, Priemayr A, Frass M, Kimberger O, Sessler D, Roessler B. Resuscitation 2011; 82(8): 1060-1063*

After an audio-visual lecture and practical demonstration, 40 voluntary emergency medical technicians with limited airway management experience were recruited to perform airway management with six devices, including the i-gel, during sustained compressions on manikins. Hands-off time was significantly longer when inserting a traditional endotracheal tube, whereas the supraglottic devices were inserted successfully on each occasion.

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## **Assessment of the speed and ease of insertion of three supraglottic airway devices by paramedics: a manikin study**

*Castle N, Owen R, Hann M, Naidoo R, Reeves D. Emerg Med J 2010; 27(11): 860-863*

In this study, 36 final-year paramedic students were randomised into one of six groups, each of which inserted three airway devices into a manikin in a different order. The devices used were the i-gel, the laryngeal mask airway and the Laryngeal Tube airway. The students were timed while performing each insertion and interviewed afterwards to determine which device they preferred and why. All insertions were successful on the first attempt. The i-gel was significantly faster than its competitors with a mean insertion time of 12.3s. Due to the speed and ease of insertion, 63% of students named the i-gel as their preferred airway.

## **Airway management for out-of-hospital cardiac arrest – more data required**

*Nolan JP, Lockey D. Resuscitation 2009; 80(12): 1333-1334*

This editorial discusses the options that are available for airway management when cardiac arrest occurs outside a hospital environment. It is stated that supraglottic airways are easier to insert than endotracheal tubes and have the added benefit of allowing chest compressions to continue while they are inserted. The article references i-gel studies with both positive and negative outcomes. Overall, insertion time was quicker but ventilation was sometimes found to be inadequate. One study showed that the i-gel had a higher leak pressure than the cLMA, however a German study found that the i-gel produced a tight seal at 20cm H<sub>2</sub>O in only around half of the patients involved. Most of the available i-gel data comes from small studies. Randomised controlled trials are needed to confirm the performance of the i-gel and other supraglottic airways during CPR.

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## **Pre-hospital resuscitation using the i-gel**

*Thomas M, Bengert J. Resuscitation 2009; 80(12): 1437*

This correspondence article describes 12 attempts to ventilate patients in cardiac arrest using the i-gel. The device could usually be inserted on the first attempt; however, on seven out of 12 occasions ventilation was then found to be inadequate. The i-gels were correctly positioned, but there were large leaks. The authors state that the reason for this is unclear, but that the device may be harder to position correctly when patients are not in the most appropriate position for insertion. An alternative explanation is

that higher pressure is needed to ventilate the lungs after cardiac arrest, in which case other supraglottic airways should have the same problem.

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### **Influence of airway management strategy on 'no-flowtime' in a standardized single rescuer manikin scenario - a comparison between LTS-D and i-gel®**

Wiese CHR, Bahr J, Popov AF, Hinz JM, Graf BM. *Resuscitation* 2009; 80(1): 100-103

This paper compared i-gel to another supraglottic airway in a manikin cardiac arrest scenario. The study evaluated the effect use of these devices had on No-Flow Time (NFT). The authors stated that 'an ideal supraglottic airway should be inserted rapidly with minimal training and it should enable controlled ventilation'. i-gel met those criteria during resuscitation in a manikin and NFT was kept as low as possible, consistent with ERC guidelines.

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### **Use of an i-gel® for airway rescue**

Joshi NA, Baird M, Cook TM. *Anaesthesia* 2008; 63(9): 1010-1026

A middle-aged female patient was scheduled for an elective operation on her hand. She had undergone several general anaesthetics in the past when a cLMA had been used without documented problems. She had a Mallampati score of three and a thyromental distance of 6cm. Face mask ventilation with an oropharyngeal airway was extremely difficult. A pLMA was inserted, but ventilation was not possible. A size four cLMA was also tried with the same result. A size four i-gel was then inserted. This immediately provided unobstructed ventilation and stable oxygenation saturation of 98%. The

authors commented that 'the i-gel's role in difficult airway management remains to be established, but its ease of insertion, short wide airway tube and good airway leak pressures make it a potentially useful airway device in cases of difficult mask ventilation.'

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### **Airway techniques and ventilation strategies**

Nolan JP, Soar J. *Curr Opin Crit Care* 2008; 14(3): 279-286

This review by Jerry Nolan and Jasmeet Soar discusses the advantages and disadvantages of various methods of airway management during cardiopulmonary resuscitation, and the role of ventilation during out-of-hospital CPR. In the section on supraglottic airways, i-gel was one of a number of devices mentioned. It confirmed that the ease of insertion of the i-gel and its favourable leak pressure make it 'theoretically very attractive as a resuscitation device for those inexperienced in tracheal intubation'. It also confirmed further study was required.

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### **Effect of chest compressions on the time taken to insert airway devices in a manikin**

Gatward JJ, Thomas MJC, Nolan JP, Cook TM. *Br J Anaesth* 2008 Mar;100(3): 351-356

In this study, 40 volunteer doctors regularly involved in CPR, were timed inserting four different airway devices, including i-gel and a tracheal tube, with and without stopping chest compressions. Comparison of the speed of insertion of the different devices during CPR allowed ranking of the devices. The i-gel was inserted approximately 50% faster than the other devices tested.

### **The i-gel® supraglottic airway: A potential role for resuscitation?**

*Gabbott DA, Beringer R. Resuscitation 2007; 73(1): 161-162*

A letter on initial findings following clinical use of i-gel in 100 patients. In order to evaluate its potential use in a resuscitation setting, the investigators confined their use to a size four device. They used i-gel on 100 patients undergoing elective surgery under general anaesthesia. The device was used in patients with a weight range of 40-100kg. In 98/100 cases, the i-gel was adequately positioned on the first or second attempt. The mean and median leak on sustained pressure was 24cm H<sub>2</sub>O. Airway trauma, demonstrated by visible blood on the device on removal, was only detected on one occasion. There was one case of regurgitation. The gastric fluid was successfully vented through the oesophageal drainage port without any evidence of aspiration.

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### **The i-gel® airway for ventilation and rescue ventilation**

*Sharma S, Rogers R, Popat M. Anaesthesia 2007; 62(4): 412-423*

This case report concerns use of an i-gel on a teenage patient scheduled for closure of colostomy. Two years previously he had a grade 3 (Cormack & Lehane) view at laryngoscopy. On this occasion there were no clinical features to predict difficult intubation. Laryngoscopy revealed a grade 4 view. Two attempts at tracheal intubation with a gum elastic bougie failed. A cLMA was inserted. Despite providing satisfactory ventilation, two attempts at fibreoptic intubation through the device failed. A size 4 i-gel was inserted and satisfactory

ventilation achieved. After fibreoptic confirmation of a good view of the vocal cords, a size 6.5mm cuffed tracheal tube was successfully passed through the i-gel blindly into the trachea at the first attempt. The i-gel was left in place until extubation.

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### **The i-gel® supraglottic airway: A potential role for resuscitation?**

*Gabbott DA, Beringer R. Resuscitation. 2007 Apr; 73(1): 161-2*

A letter on initial findings following clinical use of i-gel in 100 patients. In order to evaluate its potential use in a resuscitation setting, the investigators confined their use to a size four device. They used i-gel on 100 patients undergoing elective surgery under general anaesthesia. The device was used in patients with a weight range of 40-100kg. In 98/100 cases, the i-gel was adequately positioned on the first or second attempt. The mean and median leak on sustained pressure was 24cmH<sub>2</sub>O. Airway trauma, demonstrated by visible blood on the device on removal, was only detected on one occasion. There was one case of regurgitation. The gastric fluid was successfully vented through the oesophageal drainage port without any evidence of aspiration.

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### **The i-gel® supraglottic airway and resuscitation - some initial thoughts**

*Soar J. Resuscitation 2007; 74(1): 197*

Case report detailing use of i-gel during cardiac arrest, with insertion of the device taking less than 10 seconds and ventilation was achieved without a leak.

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## Conduit for Intubation

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### **A comparison of the Macintosh laryngoscope and blind intubation via I-gel in intubating an entrapped patient: A randomized crossover manikin study**

*Bielski K, Smereka J, Ladny JR, Szarpak L. Am J Emerg Med. 2017 May; 35(5): 787-789*

Letter to the editor with the results of the author's comparison manikin study on tracheal intubation and blind intubation via an i-gel in a difficult airway management scenario simulating restricted access to a trapped patient. Of the 27 paramedics involved none had experience in blind intubation. First attempt success rate was 51.8% with tracheal intubation and 92.6% with i-gel.

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### **Are nurses able to perform blind intubation? Randomized comparison of I-gel and laryngeal mask airway**

*Ladny JR, Bielski K, Szarpak L, Cieciel M, Konski R, Smereka J. Am J Emerg Med. 2017 May; 35(5): 786-787*

Manikin study to assess effectiveness of blind intubation through the i-gel, LMA Classic and a standard cuffed tracheal tube, performed by 34 nurses in CPR conditions across two scenarios (with and without chest compressions). Primary measure was time to intubation. i-gel recorded a lower median time to intubation and higher, statistically significant, successful insertion rates in both scenarios. Performing compressions doesn't significantly affect time to perform blind intubation in this setting, but reduces the effectiveness of first intubation attempt. i-gel was faster in both scenarios.

### **A comparison of various supraglottic airway devices for fiberoptical guided tracheal intubation**

*Metterlein T, Dintenfelder A, Plank C, Graf B, Roth G. Rev Bras Anesthesiol. 2017 Mar - Apr; 67(2): 166-171*

Random assignment of 52 adult patients to different supraglottic devices, from: Laryngeal Tube, LMA, i-gel, LMA Unique, LMA Supreme and Aura-once. After successful ventilation, device positioning was examined to assess glottic opening. Glottic view ranged from 40% for Laryngeal Tube to 90%, with i-gel recording 70%.

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### **Comparison of the Macintosh laryngoscope and blind intubation via the iGEL for intubation with cervical spine immobilization: A randomized, crossover, manikin trial**

*Gawlowski P, Smereka J, Madziala M, Szarpak L, Frass M, Robak O. Am J Emerg Med. 2017 Mar; 35(3): 484-487*

Paramedics performed standard intubation and blind intubation in three airway scenarios. Results show that blind intubation with the i-gel was superior to ETI performed by paramedics.

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### **Comparison of blind intubation through the I-gel and the Air-Q™ by novice physicians during cardiopulmonary resuscitation: A randomized, crossover, manikin trial**

*Szarpak L. Am J Emerg Med. 2017 Mar; 35(3): 509-510*

Letter to the editor describing author's study comparing blind intubation using the two named devices by 36 novice physicians. Time to intubation was 'significantly shorter' with the i-gel, and overall 80.6% of participants preferred

this device.

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**Continuous ventilation during intubation through a supraglottic airway device guided by fiberoptic bronchoscopy: a observational assessment**

*Landsdalen HE, Berge M, Kristensen F, Guttormsen AB, Sjøtland E. Acta Anaesthesiol Scand. 2017 Jan; 61(1): 23-30*

An observational study using Tracheal intubation Assisted by Bronchoscopy And Sad during Continuous Oxygenation (TABASCO) method through the i-gel. Easy intubation was secured in all patients with no adverse events recorded.

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**Tracheal intubation through I-gel performed during simulated cardiopulmonary resuscitation**

*Wojewodzka-Zeleznikowicz M, Majer J. Am J Emerg Med. 2017 Jan 16*

Manikin study to compare the efficacy of ETI performed by 27 nurses using the i-gel as a guide with/without chest compressions. Results showed that in this scenario, nurses were able to perform blind intubation using the i-gel with 'high efficiency'.

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**Fiberoptic-guided intubation after insertion of the i-gel airway device in spontaneously breathing patients with difficult airway predicted: a prospective observational study**

*Arévalo-Ludeña J, Arcas-Bellas JJ, Alvarez-Rementería R, Alameda LE. J Clin Anesth. 2016 Dec; 35: 287-292*

After i-gel insertion in 85 adult patients, general anaesthesia was induced to place an endotracheal tube by fibreoptic bronchoscope. i-gel insertion time, intubation time and oxygen saturation

were monitored. Authors conclude this to be a safe and effective technique.

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**Intubation Success through I-gel® and Intubating Laryngeal Mask Airway® Using Flexible Silicone Tubes: A Randomised Noninferiority Trial**

*Naik L, Bhardwaj N, Sen IM, Sondekoppam RV. Anesthesiol Res Pract. 2016; 2016: 7318595*

Study on 120 patients comparing intubation success through i-gel or ILMA. Overall success rate proved lower with i-gel in this scenario, with no differences in secondary outcomes.

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**Endotracheal intubation using i-gel® and lightwand in a patient with difficult airway: a case report**

*Choi CG, Yang KH, Jung JK, Han JU, Lee CS, Cha YD, Song JH. Korean J Anesthesiol. 2015 Oct; 68(5): 501-4*

Report of i-gel used to ventilate a 59-year-old male with rotator cuff syndrome after failed tracheal intubation.

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**I-gel Versus LMA-Fastrach Supraglottic Airway for Flexible Bronchoscope-Guided Tracheal Intubation Using a Parker (GlideRite) Endotracheal Tube: A Randomized Controlled Trial**

*Moore A, Gregoire-Bertrand F, Massicotte N, Gauthier A, Lallo A, Ruel M, Todorov A, Girard F. Anesth Analg. 2015 Aug; 121(2): 430-6*

120 patients were randomly assigned to i-gel or LMA Fastrach groups, with tracheal intubation and mask insertion success rate measured. Use of i-gel as a conduit in this scenario is equivalent to Fastrach, however gives shorter intubation times and a better visualisation of the



glottic opening.

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**A randomized comparison between the i-gel™ and the air-Q™ supraglottic airways when used by anesthesiology trainees as conduits for tracheal intubation in children**

*Jagannathan N, Sohn L, Ramsey M, Huang A, Sawardekar A, Sequera-Ramos L, Kromrey L, De Oliveira GS. Can J Anaesth. 2015 Jun; 62(6): 587-94*

96 children aged one month to six years were randomised into either i-gel or air-Q groups, with time to successful tracheal intubation the primary end point. Both served as effective conduit devices in this scenario.

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**A comparison of fiberoptic-guided tracheal intubation through the Ambu® Aura-i™, the intubating laryngeal mask airway and the i-gel™: a manikin study**

*de Lloyd LJ, Subash F, Wilkes AR, Hodzovic I. Anaesthesia. 2015 May; 70(5): 591-7*

Thirty Anaesthetists each performed two tracheal intubations through each device. i-gel was the quickest device, with no failed intubation reported, compared to six for the Aura-I.

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**Tracheal Intubation via the i-gel and the Aintree Intubation Catheter in a Patient with Unexpected Difficult Intubation**

*Hashimoto Y, Takahashi K, Saito T, Asai T, Arai T, Okuda Y. Masui. 2015 May; 64(5): 534-6*

Report of a successful case of a 64-year-old male difficult to intubate using a Macintosh laryngoscope, intubated via an i-gel.

**I-gel Laryngeal Mask Airway Combined with Tracheal Intubation Attenuate Systemic Stress Response in Patients Undergoing Posterior Fossa Surgery.**

*Tang C, Chai X, Kang F, Huang X, Hou T, Tang F, Li J. Mediators Inflamm. 2015; 2015: 965925*

Patients were allocated to either tracheal tube intubation or i-gel facilitated intubation groups, with haemodynamic profile, oxidative response and anaesthesia recovery parameters measured. Using i-gel combined with an endotracheal tube in this scenario proved safe and effective, 'leading to uneventful recovery'.

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**Nasopharyngeal airway as an aid to remove i-gel™ after endotracheal intubation through the device**

*Sen I, Bhardwaj N, Latha Y. J Anaesthesiol Clin Pharmacol. 2014 Oct; 30(4): 572-3*

Use of NPA to aid removal of i-gel was evaluated in 20 adult patients - in 17 the device was inserted at the first attempt. No complications such as gagging and laryngospasm were noted during insertion or removal of i-gel.

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**Fiberoptic-guided tracheal intubation through the i-gel supraglottic airway**

*Shimizu M, Yoshikawa N, Yagi Y, Tsumura Y, Kukida A, Hirakawa K, Hotta A, Nakamoto A, Ohira N, Tatekawa S. Masui. 2014 Aug; 63(8): 841-5*

Bronchoscopic view through the i-gel was graded after insertion, whereupon tracheal intubation was performed and the i-gel removed. First attempt at intubation successful in all 52 patients.

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**Comparison of supraglottic devices i-gel® and LMA Fastrach® as conduit for endotracheal intubation**



Kapoor S, Jethava DD, Gupta P, Jethava D, Kumar A. *Indian J Anaesth*. 2014 Jul; 58(4): 397-402

Two randomised groups were assigned either device and after insertion, blind tracheal intubation was attempted. Success at first attempt and overall intubation success rates were assessed. Authors concluded that the i-gel is 'a better device' for rescue ventilation.

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**Utility of the Aintree Intubation Catheter in fiberoptic tracheal intubation through the three types of intubating supraglottic airways: a manikin simulation study**

Ueki R, Komazawa N, Nishimoto K, Sugi T, Hirose M, Kaminoh Y. *J Anesth*. 2014 Jun; 28(3): 363-7

Manikin trial comparing LMA Fastrach single use, air-Q and i-gel with success rate of tracheal intubation, intubation time and collision with the glottis measured. Results suggest Fastrach took longer to intubate with a higher failure rate, and the Aintree Intubation Catheter reduces collisions.

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**Tracheal intubation with a camera embedded in the tube tip (Vivasight™)**

Huitink JM, Koopman EM, Bouwman RA, Craenen A, Verwoert M, Krage R, Visser IE, Erwtelman M, van Groeningen D, Tijink R and Schauer A. *Anaesthesia*. 2013 Jan; 68(1): 74-8

Study on tracheal intubation in manikins and patients with a camera embedded in the tip of the tracheal tube Vivasight™ pre-loaded in a size 5 i-gel. All attempted intubations were successful, with a mean time of 1.4 seconds, and was faster when compared to intubation via LMA.

**The i-gel® supraglottic airway- a useful tool in case of difficult fiberoptic intubation**

Emmerich M, Tiesmeier J. *Minerva Anesthesiol*. 2012 Oct; 78(10): 1169-70

A 69-year-old man with a history of difficult intubation could not be intubated via conventional bronchoscopy. Different ETT sizes and airway manoeuvres were tried without success, until the bronchoscope was properly placed through a size 5 i-gel. Operation was completed without complication and the patient reported no neck discomfort or difficulty breathing.

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**Tracheal intubation through i-gel® conduit in a child with post-burn contracture**

Gupta Richa, Gupta Ruchi, Wadhawan S, Bhadoria P. *J Anaesthesiol Clin Pharmacol*. 2012 Jul; 28(3): 397-8

Report of i-gel (size 2.5) used as a conduit for intubation on a nine-year-old girl scheduled for post-burn contracture with limited neck extension. Spontaneous ventilation and depth of anaesthesia were maintained, even after removal of the i-gel. Authors conclude that fiberoptic ventilation through i-gel is a 'highly successful technique'.

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**Tracheal intubation through the i-gel® Supraglottic airway versus the LMA Fastrach®: A randomized controlled trial**

Halgawi A, Massicotte N, Lallo A, Gauthier A, Boudreault D, Ruel M, Girard F. *Anesth Analg*. 2012 Jan; 114(1): 152-6

160 patients were randomised for blind intubation via i-gel or LMA Fastrach. First attempt and overall success rates were recorded and time to intubation was measured.

**Reply to letter: Comparison of the i-gel® supraglottic airway as a conduit for tracheal intubation with the intubating laryngeal mask airway**

*Michalek, P, Donaldson, W. Resuscitation 2010 July; 81(7): 911*

This article is a response to Xue et al (2010). The authors generally agree that there are limitations to this study. However, the tracheal tubes used were noticeably longer than the body of the i-gel. Although the results of manikin studies cannot be extrapolated to clinical practice, they are an important part of the testing needed before a product is used on patients.

**Comparison of the i-gel® supraglottic airway as a conduit for tracheal intubation with the intubating laryngeal mask airway**

*Xue, FS, Wang, Q, Yuan, YJ, Xiong, J, Liao, X. Resuscitation 2010 July; 81(7): 910*

This letter points out some issues with the manikin intubation study carried out by Michalek et al (2010). The study claimed to compare fibreoptic and blind intubations in the i-gel and ILMA, however only the blind intubation was fully assessed. It may have been more useful to compare a wider range of intubation aids. The authors warn that endotracheal tubes are often a similar length to the intubating airway, and that removal should be studied. It is stated that the results of the study only apply to manikins, not clinical practice.

**Comparison of fibrescope guided intubation via the classic laryngeal mask airway and i-gel® in a manikin**

*De Lloyd L, Hodzovic I, Voisey S, Wilkes AR, Latto IP. Anaesthesia. 2010 Jan; 65(1):*

*36-43*

This randomised crossover study compared the cLMA to the i-gel during endotracheal intubation of a manikin. 32 anaesthetists took part in the study. For each device, two intubations took place with the tracheal tube directly over the fibrescope and two used an Aintree Intubation Catheter. Intubation took significantly less time with the i-gel using both methods. Five oesophageal intubations occurred with the cLMA. Anaesthetists stated a preference for the i-gel due to the ease of use. The authors conclude that the i-gel is a more appropriate choice for intubation than the cLMA.

**A comparison of the i-gel supraglottic airway as a conduit for tracheal intubation with the intubating laryngeal mask airway: a manikin study**

*Michalek P, Donaldson W, Graham C, Hinds JD. Resuscitation. 2010 Jan; 81(1): 74-7*

In this study 25 anaesthetists carried out blind and fibreoptic intubations through the ILMA and i-gel devices. The study took place with three different airway training manikins. There was no difference in the success rate of fibreoptic intubations between the two airways. During blind intubation, the i-gel was significantly less successful. The i-gel is therefore recommended for fibreoptic intubation only.

**i-gel supraglottic airway for rescue airway management and as a conduit for intubation in a patient with acute respiratory failure**

*Campbell J, Michalek P, Deighan M. Resuscitation. 2009 Aug; 80(8): 963*

This case report details the case of a

54-year-old man with acute respiratory failure, who had a grade four view at laryngoscopy. He was difficult to bag-mask ventilate and a laryngeal mask was inserted as an airway rescue technique. As ventilation was not possible with this device, it was removed and a size four i-gel inserted. This allowed good ventilation. A fibrescope was passed down the airway channel and a 7.0mm endotracheal tube passed over the fibrescope and through the i-gel. The i-gel was then removed, leaving the airway secure.

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## MRI and Extreme Environments

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### Impact of airway management strategies on magnetic resonance image quality

*Ucisik-Keser FE, Chi TL, Hamid Y, Dinh A, Chang E, Ferson DZ. Br J Anaesth. 2016 Sep;117 Suppl 1:i97-i102*

Study to determine effectiveness of airway management techniques in overcoming MRI artifacts, using images obtained from electronic records. Use of no airway device; oral, nasal or supraglottic airway (SGA); or tracheal tube were the techniques assessed. Authors conclude use of SGA 'significantly improves image quality.'

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### Evaluation of the efficacy of six supraglottic devices for airway management in dark conditions: a crossover randomized simulation trial

*Ohchi F, Komazawa N, Imagawa K, Okamoto K, Minami T. J Anesth. 2015 Dec; 29(6): 887-92*

17 novice doctors and 15 experienced performed insertion of ProSeal, LMA Classic, LMA Supreme, Laryngeal Tube, air-Q and i-gel in light and dark conditions on an adult manikin. Authors conclude that Supreme, i-gel, laryngeal tube and air-Q are more effective in the dark, and that anatomically shaped supraglottic airway devices may help novice doctors.

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### Comparison of five 2nd-generation supraglottic airway devices for airway management performed by novice military operators

*Henlin T, Sotak M, Kovaricek P, Tyll T, Balcerek L, Michalek P. Biomed Res*

*Int. 2015; 2015: 201898*

Prospective, randomised, single-blinded study comparing five supraglottic airway devices (ProSeal LMA, Supreme LMA, SLIPA, Laryngeal Tube Suction-D and i-gel) in low light conditions on 505 patients after induction of general anaesthesia. Insertion time was shortest in Supreme LMA and i-gel groups.

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### Use of i-gel in magnetic resonance imaging

*Kaur K, Bhardwaj M, Kumar P, Lal J, Johar S, Hooda S. Acta Anaesthesiol Taiwan. 2014 Mar; 52(1): 41-2*

Image quality and trauma evidence were measured in 10 adult patients undergoing MRI. Authors conclude i-gel causes the least ferromagnetic interference compared with other devices and improves the image quality.

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### Magnetic resonance imaging study of the in vivo position of the extraglottic airway devices i-gel<sup>TM</sup> and LMA Supreme<sup>TM</sup> in anaesthetized human volunteers

*Russo SG, Cremer S, Eich C, Jipp M, Cohnen J, Strack M, Quintel M & Mohr A. Br J Anaesth 2012; 109(6): 996-1004*

This randomized cross-over study of 12 volunteer patients was conducted primarily to measure the in situ position of the LMA Supreme and i-gel via MRI scan. Position was also assessed functionally and optically by fibrescope. Results showed that the devices differed significantly: the LMA Supreme protruded deeper into the oesophageal sphincter, whilst i-gel caused greater compression of the tongue. Glottic aperture reduction and hyoid bone displacement were also measured. Authors deem the results relevant to the risk of

aspiration, glottic narrowing, airway resistance and soft-tissue morbidity.

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### **The i-gel - A promising airway device for magnetic resonance imaging suite**

*Taxak S, Bhardwaj M, Gopinath A. J Anaesth Clin Pharmacol 2012; 28(2): 263–264*

Two successful cases of paediatric i-gel used to manage the airway during brain MRI under general anaesthesia. The first, a three-month-old, was maintained using size one; whilst a size two was used on the second case, a boy aged three-and-a-half with a Mallampati score of two. Usual capnography readings taken to ensure secure placement, and in both cases there was no evidence of desaturation. Compared to other laryngeal mask airways, the authors conclude that i-gel suffers no risk of displacement, meaning intubation does not have to be repeated on known sensitive patients. They also deduce that i-gel has other advantages, including ease of insertion and minimum adverse effects on removal of the device. Large studies are required, however, to 'confirm its usefulness'.

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### **Insertion of six different supraglottic airway devices whilst wearing chemical, biological, radiation, nuclear-personal protective equipment: a manikin study**

*Castle N, Pillay Y, Spencer N. Anaesthesia 2011; 66(11): 983-8*

Six different supraglottic airway devices, including i-gel, were tested by 58 paramedics for speed and ease of insertion in a manikin, whilst wearing either a standard uniform or chemical, biological, radiation, nuclear-person protective equipment (CBRN-PPE). During the latter test, i-gel was the fastest of the six to insert with a mean insertion time of 19

seconds. Overall, the wearing of CBRN-PPE has a detrimental effect on insertion time of supraglottic airways.

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### **Paediatric i-gel evaluation under nuclear magnetic resonance (NMR)**

*Monclus E, Garces A, Vassileva I, Sanchez A, Banchs R. Eur J Anaesthesiol 2010; 27(47): 155*

70 children who were already scheduled for a cranial MRI scan took part in this study. The epiglottis was found to be in the bowl of the i-gel in all patients, however the device still performed well.

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### **Extraglottic airway devices for use in diving medicine - part 3: the i-gel®**

*Acott CJ. Diving and Hyperbaric Medicine 2008; 38(3): 124-127*

This study looked at the use of i-gel in airway management of a patient in a diving bell or deck decompression chamber. The study highlighted the potential limitations of some supraglottic airways used in Hyperbaric Medicine, such as possible cuff expansion with a decrease in pressure on decompression and change in cuff volume due to gas diffusion as the gas mixtures change, problems not associated with i-gel. It showed that, subjectively, there was no change in the consistency of the i-gel at 203 and 283kPa pressure and that no bubbles were detected following decompression from 203, 283 or 608kPa. The i-gel was also preferred by the Diver Medical Technicians (DMTs) to the alternative device included in the manikin section of the study because it 'lacked a cuff and was easier to insert from any position'.

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