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Comparsion Of Pro-Seal Lma & I-Gel For Hemodynamic Stability In Patients Undergoing General Anesthesia

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ABSTRACT

BACKGROUND: Ensuring optimal airway management during anaesthesia is crucial for patient safety. Supraglottic Airway Devices (SGAs) have become valuable alternatives to traditional methods like endotracheal intubation. The choice of supraglottic airway device can impact the hemodynamic stability during general anaesthesia.

MATERIALS AND METHOD: 30 adult patients of American Society of Anaesthesiology grading of I and II, 18-65 years of age, posted for surgery under general anaesthesia were divided into two equal groups according to the LMA used. Patient were randomly intubated with either I-gel or Pro-Seal LMA and the hemodynamic response at the time of LMA insertion were recorded.

RESULTS: Both ProSeal LMA and I-gel maintained hemodynamic stability, with minimal difference observed between two groups before insertion of the airway. I gel was better at maintaining heart rate and diastolic blood pressure post insertion showing better stress response with p value <0.05 compared to ProSeal LMA.

CONCLUSION: Our study demonstrates that both I-gel and ProSeal LMA are effective in maintaining stability during general anaesthesia and with similar hemodynamic profiles. These findings support the use of either

device in this context and further research can be built on these to explore results and to explore other aspects of their performance.
Keywords: General anesthesia, supra glottic airway, hemodynamic stress response

INTRODUCTION

Supraglottic airway devices offer advantages by reducing the significant hemodynamic response typically associated with traditional methods such as laryngoscopy and endotracheal intubation.[1] The I-gel airway, developed by Intersurgical Ltd in Workingham, Berkshire, United Kingdom, & the Pro-Seal LMA (LMA-P) are both 2nd generation supraglottic airway devices. The I-gel introduced in 2007, while Pro-Seal LMA introduced in 2000.[4] The I-gel is a supraglottic airway device without an inflatable cuff, intended for single-use. It features a gastric drain conduit and is designed to position itself above the vocal cords.[5] The LMA-ProSeal has an inflatable cuff, featuring a drain tube that runs alongside the ventilation tube and passes through the mask bowl. This unique design improves its pharyngeal seal, thanks to the posterior inflatable cuff and the larger size of the LMA-P. [4] Hence, we planned to carry out an observational study to compare the hemodynamic alterations while using I-gel and ProSeal LMA as a means to securing airway in patients undergoing general anaesthesia.

MATERIALS & METHODOLOGY

This observational study was carried out in the Anaesthesiology department , after approval from the Institutional Ethical Committee (SVIEC/ON/Medi/SRP/JULY/23/120). The study included 30 patients aged between 18 & 65 years of either gender belonging to ASA I & II divided into 2 equal groups of 15, who were to undergo elective surgeries undergoing general anaesthesia were a part of this study. Patients with limited mouth opening (less than 2 cm), increased risk of aspiration, history of cardiovascular disease, epilepsy or convulsions, significant neurological, psychiatric, neuromuscular disorders were excluded. Detailed history was taken a day prior to surgery. General examination, physical & systemic- examination and airway-assessment were carried out. All routine investigations were done. Patients were kept nil per orally for 8 hours prior to surgery. Patients were shifted to preoperative area and after doing preoperative check-up procedure was explained, consent was taken in their native language.

In the operating room, multipara monitor was attached, and baseline vital signs were noted. Intravenous (i.v.) injections of glycopyrrolate (0.2mg), ondansetron (4mg), and midazolam (0.5mg) were administered as premedication to the patients. After that, patients received three minutes of 100% oxygen pre-oxygenation via face masks. Propofol (2–2.5mg/kg) & succinylcholine (1mg/kg) injections were used for induction. An I-gel or PLMA airway of the proper size based on weight of the patient was then used to secure the airway, following the manufacturer's instructions.

Following a bilateral air entry check, isoflurane using the circle system, oxygen, and nitrous oxide in a 1:1 ratio were used to maintain anesthesia. A loading dose of 0.5mg/kg intravenous Inj. atracurium was given, followed by maintenance with 0.1 mg/kg. In order to preserve eucapnia, patients were mechanically ventilated using Volume Control mode. Monitoring of critical parameters was done at baseline, 1, 3, 5, 10, and 15 minutes after I-gel/PLMA insertion. These parameters included heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), and pulse oximetry (SpO2). Coughing, regurgitation, aspiration, bronchospasm, gastric insufflation, hiccups, and laryngospasm were among the complications that were noted.

OBSERVATION & RESULTS

15 patients were compared in Group 1 & Group 2 each showed demographically comparable data of age, gender and ASA grading (Table 1)

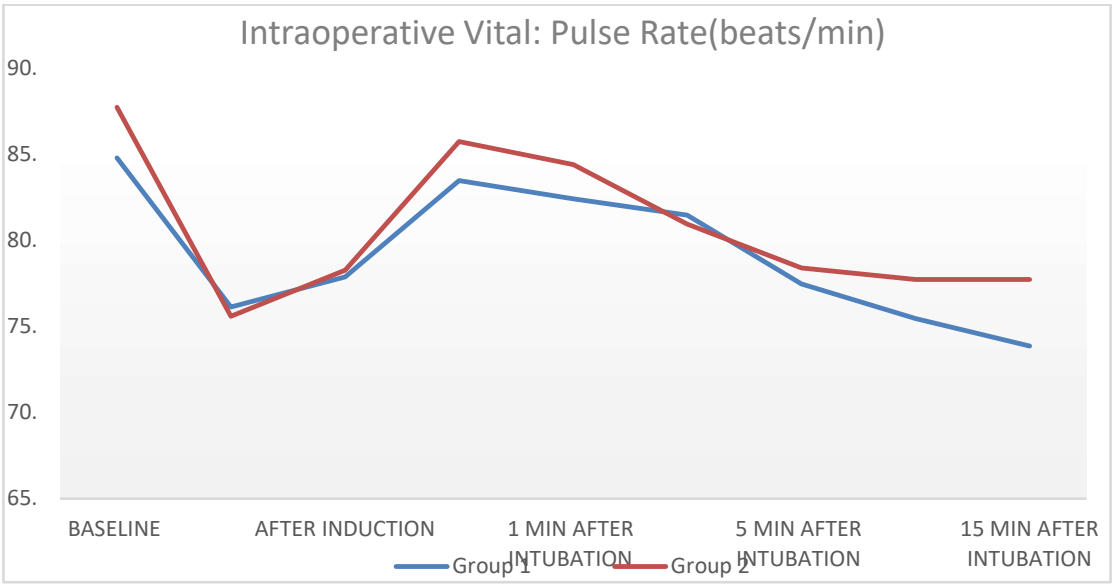
Group 1= ProSeal LMA

Group 2= I-Gel

	Group 1	Group 2	P value
Age	38.13±10.82	35.53±7.99	0.4606(NS)
Gender (F/M)	7/8	6/9	0.7518(NS)
ASA (I/II))	6/9	6/9	0.7503 (NS)

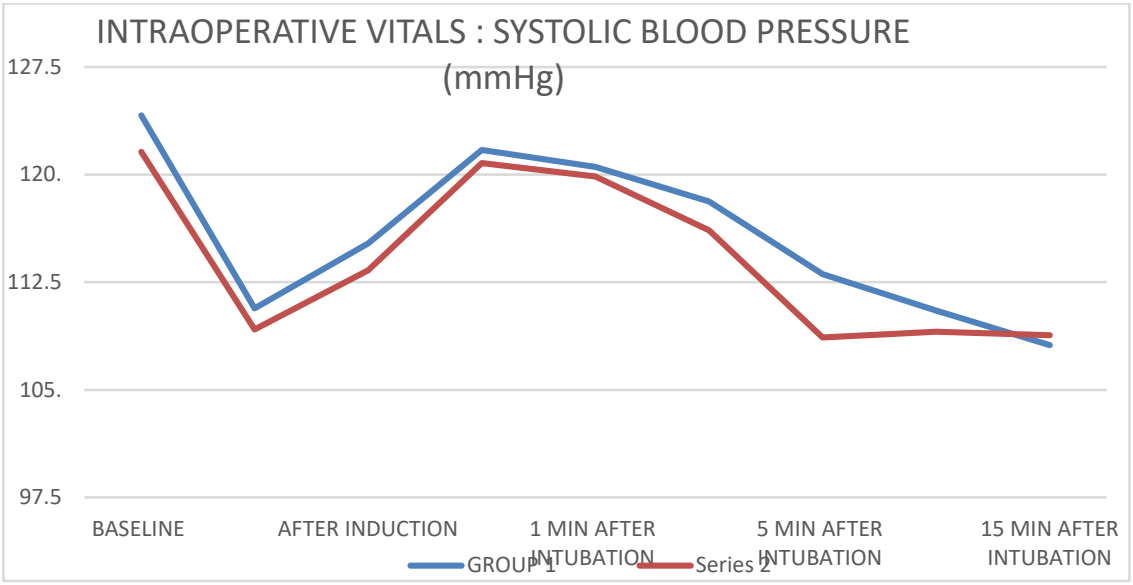
TABLE 1: COMPARISON OF AGE, GENDER AND ASA

Based on table 1, we can say that the demographic profile of both group was similar



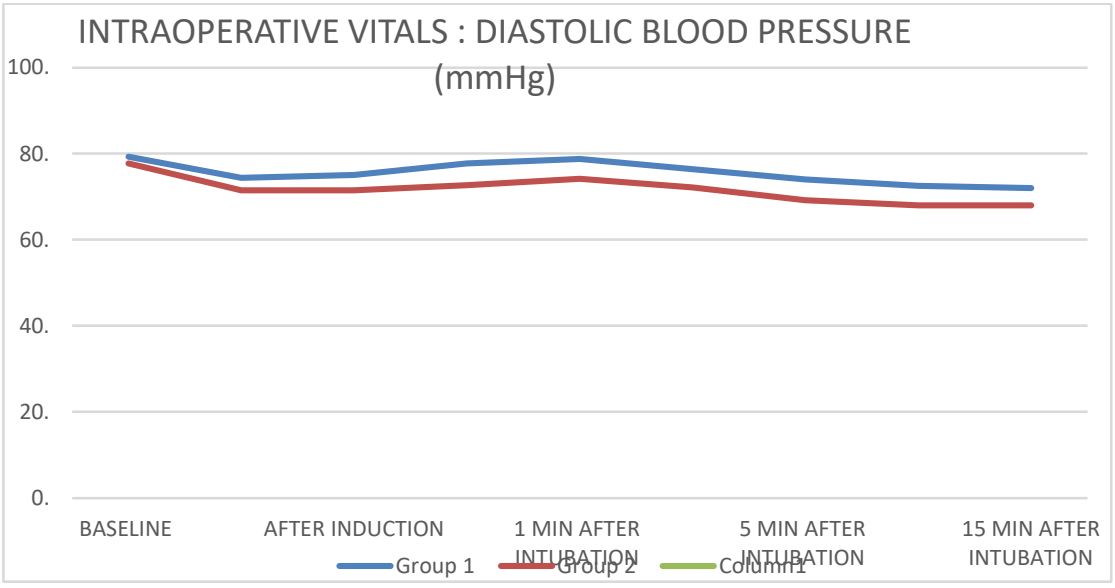
GRAPH 1: COMPARISON OF HEART RATE (beats/min)

Based on the graph1 it was found that Group 1 and Group 2 were comparable with slight increase in Heart Rate during intubation followed by decreasing trend 1, 3, 5 and 10 minutes after intubation. But 15 mins following intubation there was a decrease in hemodynamic stress response in terms of pulse rate with p value of 0.02 which was statistically significant.



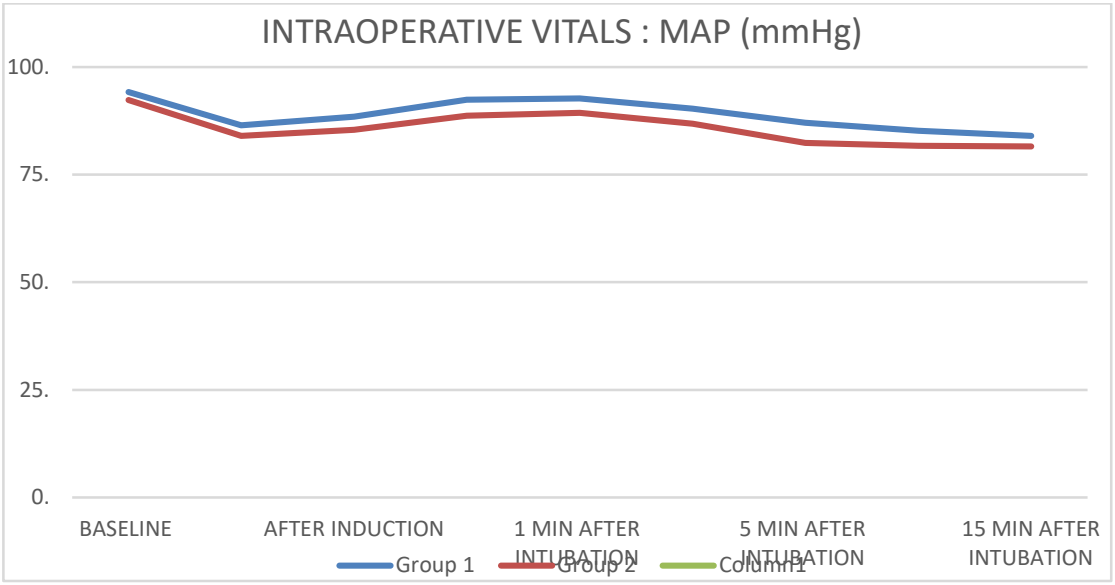
GRAPH 2: COMPARISON OF SBP (mm/Hg)

Based on graph 2 it was found that Group 1 and Group 2 were comparable with slight increase in systolic blood pressure during intubation followed by decreasing trend 1, 3, 5, 10 and 15 minutes after intubation. But at 5 mins following intubation there was a decrease in hemodynamic stress response in terms of systolic blood pressure with p value of 0.02 making it statistically significant.



GRAPH 3: COMPARISON OF DBP (mm/Hg)

Based on the graph 3 in case of Diastolic Blood Pressure, Group 2 was more efficient than Group 1 in attenuating pressor response after intubation with p value of < 0.05.



GRAPH 4: COMPARISON OF MEAN ARTERIAL BLOOD PRESSURE(mm/Hg)

Based on the graph 4 we can say that Group 2 was more efficient than Group 1 in attenuating pressor response after intubation in terms of mean arterial pressure with p value of < 0.05.

DISCUSSION

This study was conducted for comparing the two supraglottic airway-devices, PLMA & I-gel to monitor hemodynamic changes and effect on oxygen saturation at multiple time intervals. The demographic profile of both the group were similar. In our study we found out that there was a slight increase in heart rate during securing the airway with either I-geal or ProSeal LMA followed by decreasing trend noticed after intubation. We also noticed that there were comparable with increase in systolic blood pressure during intubation due to hemodynamic stress response followed by decreasing trend 1min, 3min, 5min, 10min and 15min following intubation with decrease at 5 minutes after intubation with p value-0.02 which was statistically significant. The study also found that patients whose airway was secured with I-gel had significant decrease in DBP & MAP at 1min, 3min, 5min, 10min and 15 min following intubation with p value of < 0.05. We further found out that there was no difference pulse oximetry monitored while intubating & at 1,3,5, 10 & 15 minutes after intubation in both groups. In 2014, Anjan et al[3] carried a double-blind, prospective, randomized trial including sixty patients ages 20 to 30. The patients were randomly assigned into two equal groups of 30 for airway maintenance during day care procedures under general anesthesia (GA). The patients received either I-gel or PLMA. They noticed that blood pressure and heart rate were less changed in i-gel than in PLMA, with our study's results showing that these differences were statistically significant (p <0.05). In 2018, Anisha et al[9] performed a study among 84 patients scheduled for elective surgery who were divided into 3 equal groups at random, each with 28 patients: group P (PLMA), group I (I-gel), and group S (SLMA). They demonstrated that, up to ten minutes following device implantation, HR, DBP, and MAP were similar in all three groups (P > 0.05). For the first five minutes, there was no significant difference in the three groups' systolic blood pressure (SBP). But ten minutes after the device was inserted, group S's SBP was greater than group I's (P = 0.028), although it was similar to ours in the other groups. In 2017, Pratibha et al[1] conducted a study among 126 patients undergoing short surgical procedures and there airway was randomly secured by either I-gel or PLMA. They discovered that the mean pulse rate before and after premedication did not differ significantly.

A difference was observed between the two groups at 1min, 3min, 5min, 10min, and 15min, with a p-value<0.05 for the PLMA group's higher pulse rate which was statistically significant. No significant changes were observed in mean arterial pressure before, after premedication, at induction, or during insertion. However, the PLMA group showed a significantly higher intraoperative change in mean arterial pressure at 1min, 3min, 5min, 10min, and 15min. In 2016, Raajaram et al[7] conducted a prospective randomized study with fifty patients (n = 25, per group) who had i-gel or ProSeal LMA placed for elective procedures to protect their airway. Prior to surgery as well as one, three, and five minutes after implantation, they examined the hemodynamic parameters. Their investigation revealed that while mean blood pressure and heart rate were comparable prior to surgery, Group 2 (i-gel) had a significantly ($p<0.05$) more stable heart rate than Group 1 (LMA ProSeal) throughout the entire postoperative period. Following device insertion, the groups' mean blood pressures were similar. In 2022, Ashraf et al[8] conducted a randomized observational study among Eighty patients were randomly assigned to one of two groups, with forty patients in each group. Hemodynamic parameters and oxygen saturation did not differ between the two groups, according to the study. A trial led by Poonam et al. (2016)[6] involved 60 patients who underwent brief surgical procedures and were randomized to receive either LMA-Proseal or I-gel. They noticed that the hemodynamic data showed no discernible variations. 80 participants were split into two groups for a prospective, randomized research in 2013 by Gaurav et al. [10]: Group I consisted of I-gel insertion (n = 40) and Group P consisted of LMA Proseal insertion (n = 40). The analysis demonstrated that during the procedure, hemodynamic values were similar amongst the groups.

LIMITATIONS

The limitations of our study are: First, a smaller sample size so study covers a very small group of the population. Second, the duration of the study is small, to 15 minutes post-induction. Third, the study included only normotensive patients, which means the outcomes may not accurately reflect the effectiveness and safety of hypertensive individuals. Since this is a hospital-based study, its generalizability is limited.

CONCLUSION

From our study, we can say that I-gel is better than ProSeal LMA in decreasing hemodynamic stress response following insertion of the supraglottic airway device.

SOURCE OF FUNDING

NIL

CONFLICT OF INTEREST

No conflicts of interest was seen.

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REFERENCES

1. Pratibha Sd, Patil V, Patil B, Sorganvi V, Comparison of two supraglottic airways - I-gel and Proseal laryngeal mask airway for ease of insertion and hemodynamic stability. Indian J Clin Anaesth 2017;4(3):400-405

2. Comparison between i-gel airway an the proseal laryngeal mask airway in pediatric patients undergoing general anesthesia R. Acharya, N M Dave Pediatric Anesthesia and Critical Care Journal [Internet]. 2016;4(2):97–102. Available from: http://dx.doi.org/10.14587/paccj.2016.20
3. Das A, Majumdar S, Mukherjee A, Mitra T, Kundu R, Hajra BK, Mukherjee D, Das B. i-gel™ in Ambulatory Surgery: A Comparison with LMAProSeal™ in Paralyzed Anaesthetized Patients. J Clin Diagn Res. 2014;8(3):80-84. doi:10.7860/JCDR/2014/7890.4113.
4. Hayashi K, Suzuki A, Kunisawa T, Takahata O, Yamasawa Y, Iwasaki H. Masui. The Japanese journal of anesthesiology. 2013;62(2):134-9
5. Park SK, Choi GJ, Choi YS, Ahn EJ, Kang H. Comparison of the i-gel and the laryngeal mask airway proseal during general anesthesia: a systematic review and meta-analysis. PLoS One. 2015;10(3):e0119469. doi:10.1371/journal.pone.0119469.
6. Jadhav PA, Dalvi NP, Tendolkar BA. I-gel versus laryngeal mask airwayProseal: Comparison of two supraglottic airway devices in short surgical procedures. J Anaesthesiol Clin Pharmacol. 2015;31(2):221-225. doi:10.4103/0970-9185.155153.
7. Raajaram Mu, Suresh Rajkumar, Ezhilrajan V. Comparison of i-gel with LMA ProSeal for ease of insertion in adult anaesthetised paralysed patients: a prospective randomized trial. Int J Med Res Rev. 2016;4(4):531-536. doi:10.17511/ijmrr.2016.i04.10.
8. Singh A, Bhalotra AR, Anand R. A comparative evaluation of ProSeal laryngeal mask airway, I-gel, and Supreme laryngeal mask airway in adult patients undergoing elective surgery: A randomized trial. Indian J Anaesth. 2018;62(11):858–864. doi:10.4103/ija.IJA_153_18.
9. Ashraf N, Zargar O-U-U, Albina A, Farooqi A. Comparative study of Igel with proseal LMA for ease of insertion and effect on hemodynamics in pediatric patients. Int J Res Med Sci [Internet]. 2022;10(11):2549. Available from: http://dx.doi.org/10.18203/2320-6012.ijrms20222856
10. Chauhan G, Nayar P, Seth A, Gupta K, Panwar M, Agrawal N. Comparison of clinical performance of the I-gel with LMA proseal. J Anaesthesiol Clin Pharmacol. 2013;29(1):56-60. doi: 10.4103/0970-9185.105798. PMID: 23493414; PMCID: PMC3590543.
11. Uppal V, Gangaiah S, Fletcher G, Kinsella J. Randomized crossover comparison between the i-gel and the LMA-Unique in anaesthetized, paralysed adults. Br J Anaesth. 2009;103(6):882-5.
12. Mukadder S, Zekine B, Erdogan KG, Ulku O, Muharrem U, Saim Y, et al. Comparison of the Proseal, Supreme, and I-gel SAD in gynecological laparoscopic surgeries. ScientificWorldJournal. 2015;2015:634320.
13. Liew GH, Yu ED, Shah SS, Kothandan H. Comparison of the clinical performance of I-gel, LMA Supreme and LMA ProSeal in elective surgery. Singapore Med J. 2016;57(8):432-7.
14. Ekinci O, Abitagaoglu S, Turan G, Sivrikaya Z, Bosna G, Özgultekin A. The comparison of ProSeal and I-gel laryngeal mask airways in anesthetized adult patients under controlled ventilation. Saudi Med J. 2015 Apr;36(4):432-6. doi: 10.15537/smj.2015.4.10050.
Tokgöz O, Tüfek A, Beyaz SG, Yüksel MU, Çelik F, Aycan İÖ, et al. Comparison of the efficacies of I-gel and LMA-ProSeal for airway management in pediatric patients. Turk J