



To Compare the Insertion Conditions For I-Gel, Using Propofol, Thiopentone and Thiopentone With Topical Lignocaine Spray. - A Double Blind Randomized Study

KEYWORDS

I-gel, thiopentone, propofol, lignocaine spray

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ABSTRACT

Background: The I-gel mask is a novel supraglottic airway device. The objective of this study is to compare the insertion conditions for I-gel, using propofol, thiopentone and thiopentone with topical lignocaine spray.

Materials and methods: 60 ASA I-II patients aged 18-65yrs scheduled for elective surgeries were randomized into three groups. Group P will receive injection propofol 2.5mg/kg, group T will receive injection thiopentone 5mg/kg and group TL will receive 2 sprays of lignocaine 10% (10mg/puff) to each side of oropharynx (total 40mg) followed by injection thiopentone 5mg/kg.

Results: Mean time taken for i-gel insertion in group T was comparatively longer than other two groups. The difference in rating was significant showing that ease of insertion was superior in group P followed by group TL and then group T.

Conclusion: I-gel inserting condition can be improved by prior topical lignocaine spray.

INTRODUCTION:

A certain degree of jaw relaxation and depth of anaesthesia is required to insert supraglottic airway devices in a non-paralysed patient¹. Most available data on the requirements of anaesthetic drugs and adjuncts used for induction of anaesthesia to allow easy insertion of supraglottic airway devices originate from research involving the laryngeal mask airway². It has been shown that propofol rather than thiopental provides superior conditions for the insertion of the laryngeal mask airway³. Whether this will be the same for i-gel is not known. Propofol is the agent of choice for intravenous induction, as it provides rapid induction with excellent jaw relaxation, but it has disadvantages such as pain at the injection site, involuntary limb movements, prolonged apnoea and hypotension. Thiopentone has advantage of painless injection and less incidence of hypotension, although it does not provide good jaw relaxation and can cause coughing, gagging and laryngospasm. The insertion conditions with thiopentone can be made better by prior topical lignocaine spray to the posterior pharyngeal wall⁴. The objective of this randomised controlled double blind study was therefore to determine whether optimal conditions for i-gel insertion similar to propofol induction could be achieved by supplementation of topical lignocaine spray to thiopentone induction and compare ease of insertion of i-gel with propofol and thiopentone as induction agents.

MATERIALS AND METHODS:

The present randomized study compares the ease of I-gel insertion following induction of anaesthesia with intravenous propofol, thiopentone and thiopentone preceded by topical lignocaine spray (10%)40mg. All patients were given inj. midazolam 0.02mg/kg and inj. fentanyl 2mcg/kg as premedication ten minutes prior to induction.

Group P – received injection propofol 2.0mg/kg over 30 seconds

Group T – received injection thiopentone 5mg/kg over 30 seconds

Group TL – received 2 sprays of lignocaine 10% (10mg/puff) to each side of oropharynx (total 40mg) followed by injection thiopentone 5mg/kg over 30 seconds ten minutes later. I-gel was inserted according to the manufacturer's instructions by the anaesthesiologist who was blinded to the induction agent employed and application of topical lignocaine spray to the posterior pharyngeal wall. Following observations were made:

- 1) Number of insertion attempts
- 2) Success / failure of insertion
- 3) Time taken for insertion was noted i.e. from picking up the device to successful ventilation
- 4) Number and type of airway manipulations required to aid insertion were noted.
 - a) Jaw thrust
 - b) Chin lift
 - c) Changing the size of device
 - d) Increasing depth of anaesthesia.
- 5) Patient response to i-gel insertion was noted:
 - a) Excellent – when there was no gagging, coughing and laryngospasm
 - b) Good – Gagging lasting less than 30 sec
 - c) Poor – More induction agent was required to suppress gagging
 - d) Unacceptable - when gagging, coughing and laryngospasm prevented adequate ventilation.
- 6) Criteria for successful ventilation:
 - a) Visible chest movements
 - b) Square wave capnograph trace
 - c) Oxygen saturation above 95%
 - d) Absence of stridor.
- 7) Subjective ease of insertion:
 - a) Very easy
 - b) Easy
 - c) Difficult
 - d) Very difficult.

RESULTS:

There was no significant difference between the three groups with respect to age, weight, height, sex distribution, ASA grades, Mallampati grading, duration of surgery and size of i-gel used .

TABLE 1: SHOWS PATIENTS CHARACTERISTICS IN THE THREE GROUPS

Variables		
Age (years) –range (mean)	15-76 (37.9 ± 14.14)	
Weight (kg) – range (mean)	40-70 (55.72 ± 7.76)	
Height (cms) – range (mean)	147 – 189 (165.71 ± 10.12)	
Gender	Male	26
	Female	34
ASA grades	1	45
	2	15
Size of i-gel	3	32
	4	28
Duration of surgery (min.) – range (mean)	40 -75 (47.42 ± 9.05)	
Mallampati class	1/2/3/4	35/26/0/0

ASA = American society of anaesthesiologists

I-gel was successfully inserted in one or two attempts in all patients.

TABLE 2: I-GEL INSERTION ATTEMPTS

			Group P	Group T	Group TL	Total
NO.OF ATTEMPTS	1	Count	18	19	18	55
		%	90.0%	95.0%	90.0%	91.7%
	2	Count	2	1	2	5
		%	10.0%	5.0%	10.0%	8.3%
Total		Count	20	20	20	60
		%	100.0%	100.0%	100.0%	100.0%

X² = 0.436 p=0.804 ns

Mean time taken for i-gel insertion in group T was comparatively longer than other two groups and was statistically very highly significant (f=9.773 p<0.001 vhs)

TABLE 3 : I-GEL INSERTION TIME (SEC)

	N	Mean	Standard Deviation	Minimum	Maximum
Group P	20	8.1500	1.8432	6.00	11.00
Group T	20	10.7500	2.6532	7.00	15.00
Group TL	20	8.1500	1.8432	6.00	11.00
Total	60	9.0167	2.4459	6.00	15.00

Statistically no significant difference was found in assessing the patient response to i-gel insertion.

TABLE 4: RESPONSE TO I-GEL INSERTION

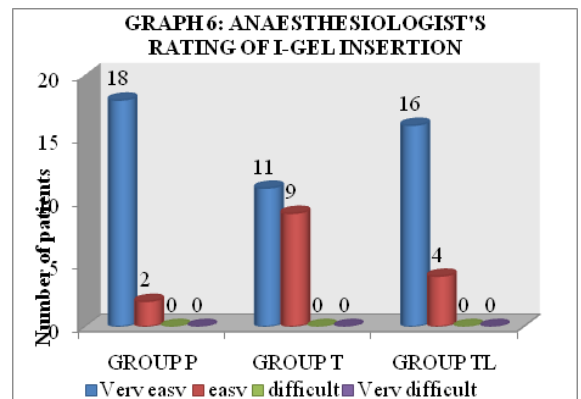
			Group P	Group T	Group TL	Total
Grading	Excellent	Count	20	17	19	56
		%	100.0%	85.0%	95.0%	93.3%
	Good	Count	0	3	1	4
		%	0%	15.0%	5.0%	6.7%

Total		Count	20	20	20	60
		%	100.0%	100.0%	100.0%	100.0%
X ² =3.75, p=0.153ns						

Statistically, no significant difference was seen among the three groups in airway manipulation required for I –gel insertion.

	+	Count	0	1	0	1
		%	.0%	5.0%	.0%	1.7%
Total		Count	20	20	20	60
		%	100.0%	100.0%	100.0%	100.0%
X ² =2.034, p=0.362ns						

The difference in rating was significant (X²= 6.933, p=0.031 sig) showing that ease of insertion was superior in group P followed by group TL and then group T.



DISCUSSION:

I-gel is a relatively new, disposable, supraglottic airway device which has an anatomically designed non inflatable gel-like cuff made of thermoelastic elastomer which is claimed to seal laryngo-pharyngeal space and to enable rapid, easy, safe and reliable application. There has been relatively little published data regarding comparison of i-gel insertion following induction with various agents.

Though statistically not significant success rate of first attempt insertion was better in group TL. Mean insertion time in groups P and TL were similar. Mean time taken for insertion in group T was longer and very highly statistically significant (f = 9.773 and p < 0.001 vhs). This shows that propofol is superior to thiopentone alone as an induction agent for insertion of i-gel because it is more effective at suppressing upper airway reflexes⁵. G.W. Brown et al showed that gagging, laryngospasm were common with thiopentone as an induction agent for insertion of the LMA¹. This problem can be solved by topical lignocaine spray applied to the posterior pharyngeal wall preceding intravenous thiopentone. C.R.Seavell et al assessed the condition for insertion of LMA in 90 patients who received either thiopentone or thiopentone preceded by 40mg of topical lignocaine spray to the posterior pharyngeal wall or propofol and concluded that thiopentone preceded by topical lignocaine spray provides condition for insertion of LMA equal to those of propofol with more hemodynamic stability⁵. Our study with i-gel is in agreement with this data. Patient response to i-gel insertion depending on the incidence of gagging, coughing, laryngospasm was better in group P and group TL when compared to group T but it is not statistically significant. T.M.Cook et al study shows that thiopentone preceded by topical lignocaine spray reduces the incidence of laryngospasm, coughing and gagging. The

difference in rating for i-gel insertion was significant ($X^2=6.933$, $p=0.031$ sig) showing that ease of insertion was superior in group P followed by group TL and then group T. This finding was because thiopentone didn't suppress the upper airway reflexes. Baseline mean arterial pressures (MAP) were similar in three groups. Whereas the recording after 1 min post i-gel insertion showed a very high statistically significant difference between the three groups when compared to baseline ($p<0.01$). The MAP was significantly lower in group P. There was 15 % reduction in MAP 1 min post i-gel insertion in group P, when compared to baseline. The fall in MAP at 5 min post i-gel insertion was similar in all the three groups. After 1 minute of i-gel insertion group P had fall in mean heart rate but there was a significant increase in the mean heart rate in group T and TL from the baseline values. After 5 minutes post i-gel insertion, the heart rate and MAP in all the three groups reached near baseline.

Results show that tachycardia has developed as compared to baseline in thiopentone group⁶. A slight decrease of blood pressure of short duration was also seen in both groups but significantly more in propofol group⁷. Our results suggest that propofol causes more cardiovascular depression than thiopentone⁸. Although propofol caused decrease in MAP it maintained heart rate due to blunting baroreflex reflexes preventing compensatory tachycardia⁹. This effect is beneficial where tachycardia is undesirable.

CONCLUSION:

Propofol induction provides ideal conditions for insertion of i-gel as the upper airway reflexes are suppressed to a greater extent than thiopentone, allowing smoother insertion in short time¹⁰. Application of topical lignocaine spray to the posterior oropharynx prior to thiopentone induction provides the conditions for i-gel insertion equal to those of propofol, with

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