



A COMPARISON OF DEXMEDETOMIDINE-PROPOFOL VERSUS FENTANYL-PROPOFOL FOR EASE OF INSERTION OF I-GEL.

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ABSTRACT

Background and Aims- I gel insertion requires anaesthesia and suppression of airways reflexes. That's why we compare dexmedetomidine and fentanyl with propofol for Igel insertion. **Materials and Methods-** a prospective randomized double-blind study was conducted on 60 patients of ASA grade 1 & 2, divided into two groups of 30 each. Group D received IV dexmedetomidine 1µg/kg & Group F received IV fentanyl 2µg/kg and both given over 10 min diluted with 20 ml NS. For induction IV propofol 2 mg/kg was given & after 90 seconds I-GEL was inserted. Parameters observed are apnea time, HR, RR, NIBP and oxygen saturation at baseline, 1, 3, 5 and 10 min after insertion of I-GEL. Statistical analysis of data was performed using the Student t-test & Chi-square test & Analysis was performed using SPSS software. **Results-** 28(93.33%) patients of Group D & 25(83.33%) patients of Group F had score of <2 thus showing the acceptable conditions for insertion of I-GEL. The duration of apnea was longer in Group F (304 s) than in Group D (232 s). RR in Group D got stabilized at 22/min and in Group F at 12/min by 10 min after the insertion of I-GEL. **Conclusion-** dexmedetomidine is a comparable alternative to fentanyl as an adjuvant when co-administered with propofol for insertion of I-Gel and preservation of respiration.

KEYWORDS : Dexmedetomidine, Propofol, Fentanyl, I gel.

Introduction

Since long time endotracheal intubation was used for securing airway in general surgical procedures, cardiopulmonary resuscitation and in traumatized or unconscious patients who needs patent airway. Because of hemodynamic stress responses due to intubation and in "cannot intubate" situations, other modalities like supraglottic airway used widely now a days. The I-GEL^[1], a second generation supraglottic airway device, which allows both spontaneous as well as positive pressure ventilation with less hemodynamic stress response. I-GEL is well known for its simplicity, ease of insertion and also has 100% successful insertion rate by inexperienced users. Unlike other supraglottic airway (classic LMA) it has a noninflatable gel like cuff with an inner and distal gastric channel for suctioning.

Intravenous agents (IV) especially propofol^[2] is preferred for insertion of I-GEL. As propofol lacks analgesic property, opioids are added but they failed to prevent laryngospasm in spite of normocapnia and dose-dependent depression of airway reflexes.^[3]

Dexmedetomidine^[4] is a pharmacologically active dextro isomer of medetomidine, which is a selective α₂ agonist. It has both anesthetic and analgesic effects in addition to its sedative effects at doses of 0.5-2µg/kg IV.

In this study, we compare the effect of dexmedetomidine and fentanyl in combination with propofol for ease of insertion of I-GEL.^[5,6]

Material and Methods

After institutional ethical committee approval and with informed consent of all patients, a prospective randomized double-blind study was conducted on 60 patients of ASA grade 1 & 2. We included patients of the age group 20-50 years, weighing between 50 to 70 kg, undergoing various elective minor surgical procedures under general anesthesia. Patients with risk of aspiration, smokers, undergoing oral surgeries were excluded from the study. Patients were divided into two groups of 30 each. Group D or dexmedetomidine-propofol group received injection dexmedetomidine 1 µg/kg IV over 10 min diluted with 20 ml NS and in Group F or fentanyl-propofol group, the patients were given fentanyl 2

µg/kg over 10 min diluted with 20 ml NS. In both the groups 30 seconds after giving propofol 2 mg/kg was given without any neuromuscular blocking agents. 90 seconds after the propofol injection, I-GEL was inserted. The correct I-GEL placement was confirmed with expansion of the chest wall. From the induction to insertion of I-GEL, patients were given oxygen via mask and ventilated if apnic. If any movement occurred before I-GEL insertion or after, propofol 0.5 mg/kg was administered and wait for 30 s before next attempt at I-GEL placement. Heart rate (HR) <45 was considered as bradycardia and treated with atropine 0.01 mg/kg.^[6,7]

Apnea time - the time from last spontaneous breath after propofol administration to first spontaneous breath, HR, respiratory rate (RR), blood pressure and oxygen saturation were recorded before induction (baseline), 30 s after induction & 1, 3, 5 & 10 min after insertion of I-GEL. Patient's response to I-GEL insertion such as coughing, gagging or any movement were noted and scored according to the scoring system.

Other events such as spontaneous ventilation, breath holding, expiratory stridor and lacrimation were noted. In each category, scores ≤2 were considered optimum for I-GEL insertion.

Statistical analysis of data was performed using the Student t-test (z-test) for parametric data and nonparametric data was analyzed using Chi-square test. Analysis was performed using Statistical Product for Social Sciences (SPSS) software. P < 0.05 was considered statistically significant.

Observation & Results :-

Table 1- Demographic distribution of patients

Variable	Group D	Group F
Age (years)	35.80 ± 9.56	35.45 ± 8.76
Sex (M/F)	13:17	14:16
Weight (Kg)	55 ± 8.50	56 ± 9.40

The two groups were similar in terms of distribution of age, sex and weight.

Table 2- Observed parameters for I-GEL insertion

	Score	Group D	Group F	P value
1- Jaw mobility				>0.05(NS)

Fully Relaxed	1	29	26	
Mild resistance	2	1	2	
Tight but open	3	0	2	
Closed	4	0	0	
2- Coughing/movement				>0.05(NS)
None	1	28	25	
Two or more cough	2	0	0	
Three or more cough	3	0	1	
Bucking/movement	4	2	4	
3- Other events				
Spontaneous ventilation		21	12	<0.05
Breath holding		9	18	<0.05
Expiratory stridor		0	0	
Lacrimation		0	0	
Duration of apnoea		232 sec	304 sec	

P Value >0.05 not significant (NS)

In Group D, jaw mobility appropriate & coughing/movement present in (6.66%) 2 patients.

In Group F, 28 patients had relaxed jaw and 2 patient had tight jaw & coughing/movement present in (16.66%) 5 patients for which additional propofol 0.5 mg/kg was supplemented.

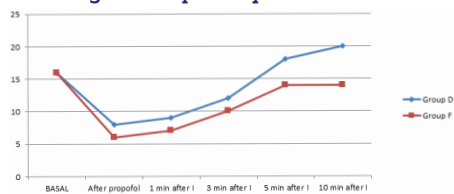
Spontaneous ventilation were preserved in 23 patients in group D than 12 in group F. The duration of apnea was longer in Group F than in Group D.

Table 3:- Insertion condition

	Group D	Group F	P value
Acceptable	28	25	>0.05(NS)
Unacceptable	2	5	>0.05(NS)

Summating the scores for insertion of I-GEL, 28(93.33%) patients of Group D and 25(83.33%) patients of Group F had score of <2 thus showing the acceptable conditions for insertion of I-GEL'

Figure 1:- Changes in respiratory rate



The mean basal RR were comparable in both the group. There was statistically significant increase in the RR in Group D from 5 min onwards after insertion of I-GEL which got stabilized at 22/min by 10 min. In Group F there was no increase in the RR further, which got stabilized at 12/min by 10 min after the insertion of I-GEL.

Discussion

Smooth insertion of I-GEL needs sufficient depth of anesthesia to suppress the airway reflexes and relax the jaw muscles.^[5,6]

When used alone, propofol provides less satisfactory conditions for I-GEL insertion and causes cardiorespiratory depression. In order to decrease the adverse events of propofol, opioids or muscle relaxants were added. Muscle relaxants were found to increase the risk of aspiration whereas opioids increased the incidence and duration of apnea. We have used IV glycopyrrolate, which aids insertion by causing the drying of airway.^[4]

Heart rate does not change significantly after an induction dose of propofol. Propofol either may reset or inhibit the baroreflex, reducing the tachycardic response to hypotension.

Dexmedetomidine causes decrease in the HR by 27% after induction and returns to normal by 10 min.

Our study has shown mild reduction (maximum of 12%) in HR in both the groups. This might probably be because insertion of a bulky device like I-GEL could have caused some sympathetic response negating the effects of dexmedetomidine on HR.

Our study supported by Dabas P & Rasquinha JM et al.^[6] showed that the numbers of patients developing apnea were more in Group F (18) than in Group D (9).

The duration of apnea was longer in Group F (304 s) than in Group D (232 s). This might be because of potentiation of the depressant effect of propofol by fentanyl on respiration. The apnea developed in patients of Group D (9) was probably because of the depressant effect of propofol.

Our study, as expected shows increase in RR in dexmedetomidine group compared to fentanyl group. Previous studies have demonstrated increase in RR and decreased episodes of apnea with dexmedetomidine infusions. Few studies have also shown that hypercapnic arousal phenomenon was not affected by dexmedetomidine, thus its sedation mimicking the natural sleep. As would be expected, the respiratory effects of dexmedetomidine is because, one of its sites of action is the locus caeruleus.

Our study has some limitations such as it has not included control group that is, propofol alone for insertion of I-GEL, as it would be unethical because the propofol was reported several times to be inadequate for I-GEL insertion when used alone and the increase in dose to make it adequate were reported to be unsafe for hemodynamics and respiration. We have not used any inhalational agents from induction till insertion of I-GEL, as it may affect the I-GEL tolerance and underestimate the drug effects as well as its requirements. Study was on single dose of dexmedetomidine for insertion of I-GEL, and we have not included the study concerned with its analgesic effects. Studies regarding different doses of the drug and its analgesia as IV injection and infusion may be needed further in the future. Pain, recovery and sedation scale were not included anywhere in the study as a present study was designed on insertion conditions for I-GEL and in preserving spontaneous respiration.

Conclusion

We hereby conclude that dexmedetomidine is a comparable alternative to fentanyl as an adjuvant when co-administered with propofol for insertion of I-GEL. Both of the drugs provide stable hemodynamic profile but, dexmedetomidine is superior to fentanyl in preserving respiration.

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Conflict of Interest: None declared.

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