Original Research Paper

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Anesthesiology

COMPARATIVE EVALUATION OF I-GEL INSERTION CONDITIONS USING DEXMEDETOMIDINE-PROPOFOL VERSUS FENTANYL- PROPOFOL – A RANDOMISED DOUBLE-BLIND STUDY

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ABSTRACT **BACKGROUND AND AIM :** To avoid laryngospasm, choking, or limb movements during i-gel® insertion, appropriate anaesthesia depth is required. We wanted to contrast propofol induction under i-gel® insertion circumstances with pre-treatment with dexmedetomidine or fentanyl. **MATERIALS AND METHODS** Groups D (n = 40) and F (n = 40) were randomly assigned to 80 ASAI/II patients receiving general anaesthesia. Group D got 5 ml of 0.9% normal saline (NS) over two minutes after receiving 1 µg/kg of dexmedetomidine over the course of ten minutes. Group F had 10 ml of 0.9%NS administered over 10 minutes, followed by 2 minutes' worth of 1 µg/kg of fentanyl. After the study medication, 2 mg/kg of propofol was administered. I-gel® was placed 90 seconds after propofol was administered. The Modified Scheme of Lund and Stovener was used to evaluate the overall insertion circumstances. At baseline, after the study medication and propofol induction, and 1, 3, 5, and 10 minutes after the insertion of the i-gel®, heart rate (HR) and mean arterial pressure (MAP) were recorded. Apnea times and respiratory rate were noted. **RESULTS AND DISCUSSION:** Both groups' insertion conditions were comparable. There were more patients in Group F who had a moderately relaxed jaw, coughed, and moved around. Group F (18/40) had a considerably higher incidence of apnea than did group D (3/40) (P 0.0001). Group F's mean apnea duration (284.5 11.19 sec) was noticeably longer than group D's (217.17 16.48 sec). After propofol, group F experienced a greater percentage decline in MAP compared to baseline (10.3%) than group D (5.6%). MAP after induction was comparable across groups F and D, but considerably lower in group F (P = 0.002) following i-gel® insertion, at 1, 3, 5, and 10 minutes after insertion. Dexmedetomidine had a considerably reduced HR after propofol (P = 0.003) and i-gel® insertion (P 0.001). **CONCLUSION:** When combined with propofol, dexmedetomidine and fentanyl offer equivalent i-gel® insertion conditions.

KEYWORDS : Dexmedetomidine, fentanyl, i-gel® insertion, premedication, and propofol are IV anaesthetics.

INTRODUCTION

I-gel [IntersurgicalLtd] is one of the second generation supraglottic airway devices, and compared to other SGADs, it is reported to be easier to insert.

In order to insert I-gel into a patient who is not paralysed and achieve enough jaw relaxation as well as avoid adverse symptoms as coughing, gagging, laryngospasm, and limb movements, sufficient depth of anaesthesia is required. When used as the only induction drug for SGAD insertion, propofol, which is known to decrease pharyngo-laryngeal reflexes, may cause dose-dependent cardio-respiratory depression. To make device insertion easier, lower the dose of propofol and its side effects, co-induction drugs such opioids have been utilised with propofol. Dexmedetomidine is a highly selective, rapidly acting 2-receptor agonist that also has sedative, anxiolytic, and analgesic properties that are dose dependant.

AIM OF THE STUDY

Compare the circumstances of i-gel insertion with those of propofol induction following dexmedetomidine or fentanyl pretreatment

MATERIALS AND METHODS

After receiving the institutional ethical committee's clearance, this prospective randomised controlled double-blinded study was carried out over the course of three months with the participants' signed informed consent.

Inclusion criteria :

- Patients of either sex and aged between 18 and 60 yrs
- ASA class I/II patient
- Patients undergoing general anaesthesia for short surgical procedures

Exclusion criteria :

- Patients with reduced mouth opening
- Neck and facial burns
- MPG>3
- BMI >30 kg/m2
- Thyromental distance <6 cm
- Known allergy to study drugs

PROCEDURE

An absolutely relaxed jaw's incidence varied significantly between pre-treatment with dexmedetomidine (96.7%) and fentanyl (70%) under propofol anaesthesia, with a difference of 26.7% being statistically significant.

Assuming the same, a sample size of 36 for each group was needed to detect a significant difference at a two-sided type 1 error of 0.05% and a power of 90%.Each group had 40 patients studied, accounting for a 10% dropout rate.

Upon entering the operating room, the patients' initial baseline HR, BP, RR, and SpO2 were recorded. 20G cannula was used to secure the IV access, and the RL solution was initiated.

A nasal cannula was used to deliver oxygen at a rate of 2L/min. Iv glycopyrrolate 0.01 mg/kg was administered as a pre-medication.Group D received, Dexmedetomidine 1g/kg diluted to 10 ml with NS by an infusion pump over 10 minute. Group F recieved 1mcg/kg of fentanyl diluted to 5ml over 2 minutes.

Using 2 mg/kg of inj. propofol iv over 30 seconds, anaesthesia was achieved 30 seconds after the study medication administration. I-gel insertion was tried 90 seconds after injecting propofol, and the time was decided based on the patient's weight in the "sniffing morning air" position. An efficient airway through i-gel was confirmed by the square wave capnogram, b/l symmetrical chest movement, auscultation of equal breath sounds, and normal saturation. Following that, O2,N2O (50:50) & sevoflurane 1.5 volume percent were used to maintain anaesthesia. No muscle relaxant was given to study participants.

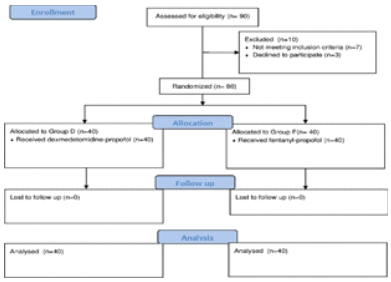
In addition to the i-gel insertion settings, HR and blood pressure changes were observed during i-gel insertion at intervals of baseline, after study drug infusion, after propofol induction, and at 1, 3, and 5 and 10 minutes after i-gel insertion.When the patient was able to open their mouth on order at the conclusion of operation, the i-gel was withdrawn, and they were checked for blood stains.Aside from being noted and appropriately handled, adverse events such bradycardia, hypotension, coughing, laryngospasm, bronchospasm, or desaturation were also observed.

By measuring the degree of jaw relaxation attained using the "Young's Criteria," the ease of insertion of the i-gel was determined.

Jaw is completely relaxed - grade I

Jaw is only slightly loosened-grade II
Jaw not fully relaxed - grade III

According to a computer-generated randomization procedure, 80 patients were divided evenly into two groups, D&F, and the random group assignments were kept secret inside a sealed envelop. In order to prepare the research medicines, an anesthesiologist who was not involved in data collecting opened the sealed envelope.



Software called SPSS (Statistical Packages for the Social Sciences) version 16.0 was used to examine the data. Mean and standard deviation were used to represent continuous data. For intergroup comparisons of HR and MAP at each time point, the unpaired t-test was utilised. Utilizing t tests with repeated measurements, intragroup analyses were carried out. The Mann Whitney-test and Fisher-exact test were used to analyse the demographic data.Fisher-exact or chi-square tests were used to analyse ordinal categorical data such as i-gel insertion conditions and the number of attempts. Statistical significance was defined as P 0.05.

RESULTS

Comparison of demographic variables and modified mallampatti test between groups D & F

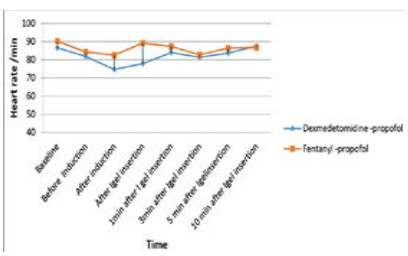
Parameter	Group D (40)	Group F (40)	P
Age (yrs)	31.32±13.57	31.92±10.33	0.832
Sex M/F	7/33	6/34	0.762
Body mass index	23.74±2.68	23.27±1.815	0.39
Modified Mallampatti class I/II/III/IV	26/14/0/0	19/20/1/0	0.207

Comparison of overall insertion conditions by Modified Scheme of Lund and Stovener

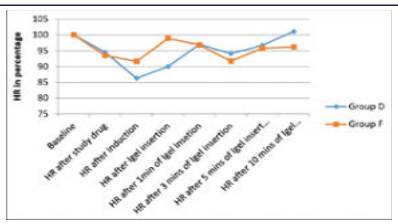
Insertion conditions	Group D	Group F	Total	Chi-square test P
Excellent	26 (65.0%)	25 (62.5%)	51 (63.8%)	0.162
Good	15 (37.5%)	11 (27.5%)	26 (32.5%)	
Poor	0 (0%)	3 (7.5%)	3 (3.8%)	

Excellent	No gagging or coughing, no laryngospasm, no patient movement
Good	Mild to moderate gagging or coughing, no laryngospasm, mild to moderate patient movement
Poor	Moderate to severe gagging or coughing, no laryngospasm, moderate to severe patient movement
Unacceptable	Severe gagging or coughing, laryngospasm, severe patient movement

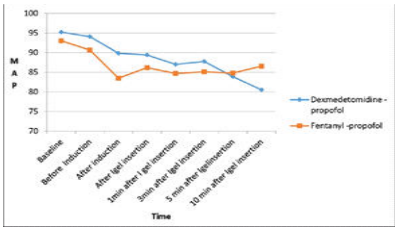
Comparison of heart rates between group D & F



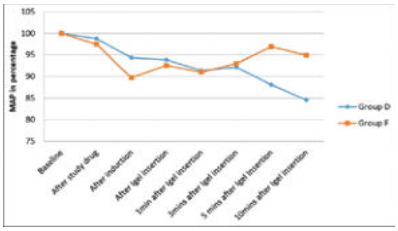
Comparison of percentage drop in heart rates from baseline in groups D & F



Comparison of mean arterial pressure between groups D & F



Comparison of percentage drop in mean arterial pressure from baseline in groups D & F



DISCUSSION

According to this study, which had 80 patients undergoing general anaesthesia with i-gel insertion, 1 g/kg dexmedetomidine and 2 mg/kg propofol offer comparable i-gel insertion circumstances to those offered by 1 g/kg fentanyl and 2 mg/kg propofol. Dexmedetomidine delivered superior jaw relaxation according to Young's criterion with 97.5% of patients as compared to 87.5% with fentanyl, even though the overall insertion conditions as summarised by the modified Lund and Stovener scheme were comparable in both groups.

Fentanyl and dexmedetomidine have both been shown to lower the need for propofol in SGAD. However, due to insufficient jaw relaxation, coughing, and movement in our trial, patients in the fentanyl group needed more extra boluses of propofol. Because of this, fentanyl considerably increased the mean total dose of propofol (P-0.02). According to a research by Lande SA et al., who compared dexmedetomidine with fentanyl for LMA placement, 96.6% of patients had completely relaxed jaws after receiving dexmedetomidine.

In this study, we discovered that pre-treatment with dexmedetomidine at 1 mg/kg given intravenously for 10 minutes reduced bradycardia and hypotension while providing favourable i-gel insertion circumstances with less propofol use.

Limitation: A propofol research group wasn't included. Study objectives: MMT I and II patients participated in this study. To determine the impact of pretreatment with these medicines on the circumstances surrounding i-gel implantation in individuals with greater MMT or problematic airways, additional research is necessary.

CONCLUSION

Propofol and 1 g/kg of dexmedetomidine or fentanyl pre-treatment gave equivalent and adequate insertion circumstances for i-gel.

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