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Original Research Article

Comparative Study on I Gel Insertion Conditions using Dexmedetomidine-Propofol versus Fentanyl Propofol

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Abstract

Introduction: The hypothesis posited that the use of dexmedetomidine and propofol would yield superior i-gel® insertion conditions when compared to the combination of fentanyl and propofol. The objective of the study was to assess and compare i-gel insertion conditions.

Methods: It was a hospital based prospective double-blinded randomised control study, conducted in Rangaraya Medical College. Individuals of both gender posted for short surgical procedure under general anaesthesia aged 18 – 60 years, ASA grade I & II and MPG I & II were included. The study was explained, pre anaesthetic evaluation was carried as per the protocol. Randomly, participants were divided two groups; group D members received 1mcg/kg Dexmedetomidine and Fentanyl 1 mcg/kg for group F members. After successful administration of medicament i gel was inserted; the ease of insertion was assed as per the guidelines, removed at the end of surgery. Heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and mean arterial blood pressure (MAP) were monitored, recorded at baseline, after study drug infusion, propofol induction and 1, 3, 5 and 10 minutes after insertion: Student t-test and chi square test was used, $P< 0.05$ was considered statistically significant.

Results: As per the degree of jaw relaxation (DOJ), the acceptability was 90% and 100%, respectively in the groups, statistically there was no significant difference. In group F, 36 members had grade 1 movement, and it was 38 in group D; statistically there was no significant difference. Statistically there was no significant difference between in coughing, gagging, overall conditions and number of i gel insertion. Statistically there was significant difference in the mean HR, SBP, DBP, MAP.

Conclusion: The combination of Dexmedetomidine with propofol offers superior insertion conditions for the i-gel compared to the combination of fentanyl with propofol. This is accompanied by stable hemodynamics and minimal adverse effects.

Introduction

Currently, two categories of devices, namely endotracheal tubes and supraglottic airway devices (SADs), are employed in general anesthesia (GA) procedures. The i-gel represents a second-generation SAD, known for its simplified insertion process and reduced potential for airway trauma compared to other SGDs. The variation in structural design and the pressure applied to the pharyngolaryngeal area among different SGADs leads to differing requirements for their insertion. [1] Specifically, when inserting the i-gel in non-paralyzed patients, achieving sufficient depth of anesthesia is crucial to ensure proper jaw relaxation and to prevent occurrences such as coughing, gagging, as well as unwanted head or limb movements. [2]

Propofol is often combined with opioids such as fentanyl; however, this combination is linked to delayed recovery from anesthesia, muscle rigidity, and postoperative apnea, especially following GA. [3] Dexmedetomidine is a highly selective, short-acting agonist of the α2-receptor. With dose-dependent analgesic, sedative, and anxiolytic effects, it proves to be a valuable adjuvant in GA. [4]

The hypothesis posited that the use of dexmedetomidine and propofol would yield superior i-gel® insertion conditions when compared to the combination of fentanyl and propofol. The objective of the study was to assess and compare i-gel insertion conditions following the induction of an-

esthesia using Dexmedetomidine-Propofol versus Fentanyl-Propofol in patients undergoing surgeries of less than one-hour duration while maintaining spontaneous ventilation.

Methods:

It was a hospital based prospective double-blinded randomised control study. The study was conducted in Rangaraya Medical College, Kakinada between April 2020 to 2021. Study protocol was approved by the Institutional Ethical Committee. An informed written consent was taken from all the participants. Individuals of both gender posted for short surgical procedure under GA aged 18 – 60 years, ASA grade I & II and MPG I & II were included in this study. Non cooperative individuals, ASA grade III & IV, pregnant women, those with respiratory obstruction, cardiovascular diseases were not considered in this research.

After recruiting the participants, the study was explained and all the doubts were cleared. Pre anaesthetic evaluation was carried as per the institutional protocol and after shifting to operation theatre premedication was also administered. Randomly, the participants were divided into group D and F. Group D members received 1mcg/kg Dexmedetomidine diluted to 10 ml with 0.9% normal saline (NS) over 10 minutes, followed by 5 ml of NS over 2 minutes. Group F members received 10 ml of NS over 10 minutes followed by injection Fentanyl 1 mcg/kg diluted to 5 ml with 0.9% NS over 2 minutes. The medicament was prepared by the anaesthesiologist who was not involved in the study and dispensed in an unlabelled manner to ensure double-blinding.

After successful administration of medicament i gel was inserted; the ease of insertion was assed; the ease of insertion was evaluated by the degree of jaw relaxation by using the Young's criteria [5[and the overall insertion as per the Modified Scheme of Lund and Stovener. [6] After successful placement of i gel, anaesthesia was maintained on oxygen, nitrous oxide (50:50) and sevoflurane 1.5 to 2 volumes percent and patient was maintained on spontaneous respiration. No muscle relaxant was administered during the study. Patient was observed for any side effects throughout the surgery. At the end of surgery, i-gel was removed when the patient was able to open mouth on command and was inspected for blood stains. Heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and mean arterial blood pressure (MAP)were monitored continuously and recorded at baseline, after study drug infusion, propofol induction and 1, 3, 5 and 10 minutes after insertion:

Statistical Analysis: The data were analysed using SPSS software, version 21.0. The data were expressed in mean, standard deviation (SD), numbers and percentages. Student t-test was used to compare the parametric data and chi square test for non-parametric data. P value < 0.05 was considered statistically significant.

Results

In this research, 40 (100%) members were included in each group. As per the degree of jaw relaxation (DOJ), in group F, 29 showed grade 1, 7 were grade 2 and 4 had grade 3. In group D, 36, 4 and 0 were the grades, respectively (Table 1); as per the DOJ the acceptability was 90% (36) and 100%, respectively in the groups, statistically there was no significant difference. In group F, 36 members had grade 1 movement, one had grade 2, 0 had grade 3 and 3 members had grade 4 movement. Whereas movement grading was 38, 2, 0 and 0, respectively in group D; individuals those were in grade 4 movement were not acceptable and statistically there was no significant difference between the groups. Statistically there was no significant difference between the groups in coughing, gagging, overall conditions and number of i gel insertion. Statistically there was significant difference in the mean HR, SBP, DBP, MAP between the groups. Whereas there was no significant difference in oxygen saturation (SPO_2) and side effects.

Table 1: Degree of jaw relaxation (DOJ) among the study participants; n (%)

DOJ	Group F	Group D	Total
Grade 1	29 (72.5%)	36 (90%)	65 (81.25)
Grade 2	7 (17.5%)	4 (10%)	11 (13.7)
Grade 3	4 (10%)	0	4 (5)
Total	40 (100)	40 (100)	80 (100)

Discussion

Achieving an ample depth of anesthesia is essential for successful i-gel insertion, as it helps in suppressing upper airway reflexes and promoting optimal relaxation of the jaw muscles to facilitate proper mouth opening. In the past, volatile anesthetic agents such as Sevoflurane and Thiopentone were commonly favored for inducing i-gel insertion. However, presently, Propofol stands as the predominant choice for the induction drug in facilitating the insertion of i-gel. [7]

In the current study, when the DOJ was considered, in group F, 72.5% of the study members showed grade 1, 17.5% showed grade 2 and 10% showed grade 3and in group D, it was 90%, 10% and 0, respectively. Grade 1 and 2 were only considered

to be acceptable for i gel; the non acceptability was 4 members and 0, respectively in groups (Table 1); statistically there was no significant difference. In a study led by Ramasamy AH et al. [8] findings revealed that in group D, all participants were categorized as Grade I, in contrast to 98% of participants in group F. Jaw tightness was observed in 2% of individuals in group F, but this observation was deemed statistically insignificant. Similar findings were reported by other investigators. [9, 10]

In the present investigation, within group F, 32 study participants exhibited grade 1 coughing, while 3 subjects displayed grade 2, and another 3 showed grade 3. In comparison, there were 2 study participants in group F with grade 4 coughing. On the other hand, in group D, 37 study subjects demonstrated grade 1 coughing, and 3 exhibited grade 2 coughing. Since only grades 1, 2, and 3 were deemed acceptable, 2 patients in group F experienced unacceptable coughing, whereas none of the subjects in group D exhibited coughing of grade 4. Totally, 95% of participants in group F exhibited acceptable grades of coughing. Conversely, in group D, all study members demonstrated acceptable grades. Notably, this observation was determined to be statistically not significant, as the obtained p-value was 0.55. A study led by Sabry Mohammed Amin et al. [11] revealed that 96% of participants in group D were categorized as grade I, with 4% graded as II. In contrast, in group F, 92% were graded as I, and 8% were graded as II. Notably, none of the study subjects in both groups were deemed unacceptable.

In the present study, within group F, 92.5% of study subjects demonstrated acceptable grades, while 7.5% exhibited unacceptable patient movements. Conversely, in group D, all study subjects displayed acceptable grading. Notably, this observation was determined to be statistically insignificant, as the obtained p-value was 0.35. The acceptability grades were reported to be 96% and 100% in the literature. [12]

In the present study, 80% of study subjects in group F exhibited acceptable conditions for i-gel insertion. Conversely, in group D, all demonstrated acceptable i-gel insertion conditions. This finding was deemed statistically significant (P = 0.01). A study conducted by Desai RR et al. [1], revealed that within group F, 92.5% exhibited acceptable i-gel insertion conditions, while 7.5% experienced unacceptable conditions. In contrast, in group D, all study subjects displayed acceptable i-gel insertion conditions. Another study conducted by Rustagi PS et al. [13] reported that 7.5% of study subjects in group F had poor overall insertion conditions compared to none in group D. In this research, the i gel insertion acceptability was 80% and 100%, respectively in the groups. It was 92.5%, 100 as per Desai RR et al. [1]

Both study drugs led to a reduction in MAP. However, in both groups, this decrease from baseline was not found to be statistically significant. This contrasts with the results reported by Uzumcugil et al. [14] observed a significant fall after the loading infusion of drugs over 2 minutes. This disparity might be attributed to the more rapid rate of drug administration in their study. We observed a higher percentage decrease from baseline in HR with dexmedetomidine. The sympatholytic and preserved baroreflex effects of dexmedetomidine contribute to a dose-dependent reduction in HR during anesthesia. [15]

In this study, the combination of Dexmedetomidine with propofol offers superior insertion conditions for the i-gel compared to the combination of fentanyl with propofol. This is accompanied by stable hemodynamics and minimal adverse effects.

References:

1. Riya R Desai, Bhavna H Sojitra, Divyang V Shah. Comparison of I gel insertion conditions using Dexmedetomidine-Propofol versus Fentanyl-Propofol: An Observational Study. Nat J Med Res. 2021; 11 (1): 18 – 22.
2. Suja KC, Sethunath R, Elizabeth joseph, Susan T Cheeran. Comparative evaluation of the effects of Dexmedetomidine-Propofol and Fentanyl-Propofol on various parameters during i gel insertion. Asian J Pha Clin. Res. 2023; 16 (8):49 – 52.
3. Benoît Plaud, Christophe Baillard, Jean L B, et al. Guidelines on muscle relaxants and reversal in anaesthesia. Anaesthesia Critical Care & Pain Medicine. 2020; 39 (1): 125 – 42.
4. Chen Z, Liu Z, Feng C, Jin Y, Zhao X. Dexmedetomidine as an Adjuvant in Peripheral Nerve Block. Drug Des Devel Ther. 2023; 17: 1463 – 84.
5. Saloi DK, Bharali P, Das I, Basumatary J Sr, Mahanta P Sr. To Compare the Intravenous Bolus Dose of Propofol with an Equipotent Dose of Intravenous Thiopentone for the Facilitation of Laryngeal Mask Airway Insertion. Cureus. 2022; 14(11): e31917.
6. Senapati LK, Battini KP, Padhi PP, Samanta P. Effect of Non-depolarizing Muscle Relaxants Rocuronium Versus Vecuronium in the Assessment of Post-Succinylcholine Complications in Surgeries Under General Anesthesia: A Randomized Double-Blind Study at a Tertiary Care Hospital. Cureus. 2021; 13(11): e19 793.
7. Cho SA, Sung TY, Cho CK, Jee YS, Kang PS. Optimal propofol dosage for i-gel® insertion in healthy paralyzed patients. Korean J Anesthesiol. 2018; 71(1): 22 – 9.

8. Ramaswamy AH, Shaikh SI. Comparison of dexmedetomidine-propofol versus fentanyl-propofol for insertion of laryngeal mask airway. J Anaesthesiol Clin Pharmacol. 2015;31 (2):217 – 20.
9. Sowmya Jayaram A, PJanakiSubhadra, M. hanumantha Rao. Comparison of Dexmedetomidine combined with Propofol versus Fentanyl combined with Propofol for laryngeal mask insertion. J Clin Sci Res 2014; 3: 228 – 36.
10. Prashanth Vadigeri, Ramesh babu, Mohan, Sunil Kumar, Rajashekar Mudaraddi. A prospective randomised comparative study of efficacy of combination of inj. exmedetomidine–propofol and inj.fentanyl-propofol for the insertion conditions of proseal laryngeal mask airway. MedPulse International Journal of Anesthesiology. 2019; 9(2): 152 – 6.
11. Amin SM, Mohamed RM. Optimizing the condition for i-gel® insertion: dexmedetomidine versus nalbuphine. A double-blind randomized study. AAMJ. 2014; 12(3): 32 – 8.
12. Yoo JY, Kwak HJ, Kim YB, Park CK, Lee SY, Kim JY. The effect of dexmedetomidine pretreatment on the median effective bolus dose of propofol for facilitating laryngeal mask airway insertion. J Anesth. 2017; 31: 11 – 7.
13. Rustagi PS, Shalaka Sandeep Nellore, Amala Guru Kudalkar et al., Comparative evaluation of I- gel® insertion conditions using dexmedetomidine-propofol versus fentanyl-propofol - A randomised double-blind study. Indian J Anaesth. 2019; 63(11): 900 – 7.
14. Uzümcügil F, Canbay O, Celebi N, Karagoz AH, Ozgen S. Comparison of dexmedetomidine-propofol vs. fentanyl-propofol for laryngeal mask insertion. Eur J Anaesthesiol. 2008; 25:675–80.
15. Hall JE, Uhrich TD, Barney JA, Arain SR, Ebert TJ. Sedative, amnestic, and analgesic properties of small-dose dexmedetomidine infusions. Anesth Analg. 2000;90: 699 – 705.