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Original Research Paper

Anaesthesiology

"EFFICACY OF LOW DOSE CIS-ATRACURIUM AND LOW DOSE ATRACURIUM IN FACILITATING I-GEL INSERTION: A RANDOMIZED COMPARATIVE STUDY"

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ABSTRACT

Background And Objective: Cis-atracurium and Atracurium are Non depolarizing muscle relaxants used along with induction agents to overcome the excessive airway reactivity of I-gel insertion and causing relaxation of jaw muscles making insertion of this device easier. Objective of the present study is to evaluate the efficacy of low dose cis-atracurium (26.5 mcg/kg) and low dose atracurium (0.15 mg/kg) in providing adequate muscle relaxation and other satisfactory conditions for I-gel insertion. **Methods:** 80 ASA grade I/II patients, aged 18-60 years, of either sex scheduled to undergo elective surgeries under general anaesthesia with controlled ventilation will be randomly divided into Group A: atracurium (0.15mg/kg) or Group C: cis-atracurium(26.5mcg/kg). Standard monitors (pulse oximeter, ECG leads, NIBP) will be connected. Baseline vital parameters will be recorded, After administration of respective relaxant and insertion of I-gel following conditions are assessed: Jaw relaxation, ease of insertion, coughing and gagging, patients movements, number of failed attempts. HR, SPO2, MAP monitoring at 1,5,10 minutes to asses post-insertion hemodynamic status. Postoperative complications were assessed (sore throat and bleeding). **Results:** The groups were similar with respect to age, sex, number of sample, HR, MAP,SPO2, sore throat . Percentage of full jaw relaxation is significantly better in group A (95%) with $p < 0.01$. Ease of insertion was found to be significantly easier in Group A (92%) than in group C (57.5%) with $p<0.03$. In Group A , I-gel was inserted in first attempt in 92.5% patients were as only 75% in Group C indicating significant difference $p<0.02$. In Group A patient movements were almost nil (97.5%) with significant difference of $p(<0.001)$ when compared to Group C. Group A had lesser coughing and gagging percentage (100%) compared with Group C (72.5%) showing significant difference among both groups with $p<0.001$. **Conclusion:** From the results of our study, we concluded that insertion conditions of I-gel were better with low-dose of atracurium (0.15 mg/kg) than with low dose cis atracurium (26.5 mcg/kg) in terms of ease of insertion, number of attempts, patient movement, coughing and gaging.

KEYWORDS : I-gel, Atracurium, Cis-atracurium.

INTRODUCTION:

Anatomy of larynx is one of the most important skills in the field of anaesthesiology. The major responsibility of the anaesthetist is to provide adequate ventilation to the patient. It has been established that inability to successfully manage a difficult airway has been responsible for as many as 30% of death totally attributable to anaesthesia. The face mask and the endotracheal tube (ETT) have been the two traditional methods established for providing airway management for a long time. [1]

Supraglottic airway devices have become a standard fixture in airway management, in the last two decades filling a niche between facemask and tracheal tube in terms of both anatomical position and degree of invasiveness.[2] The I-gel is the most recent development in supraglottic airway devices. The seal created is sufficient for both spontaneously breathing patients and for intermittent positive pressure ventilation.[3,4]

Cis-atracurium is one of the cis-cis isomer of atracurium with similar pharmacological profile but slower onset of action. Cisatracurium in clinical practice is devoid of histamine-induced cardiovascular effects.[5] Cis-atracurium and Atracurium are Non-depolarizing muscle relaxants (NDMR) used along with induction agents to overcome the excessive airway reactivity of I-gel insertion and causing relaxation of jaw muscles making insertion of this device easier. The present study aimed to compare the efficacy of low dose cis-atracurium and low dose atracurium in facilitating I-Gel insertion.

OBJECTIVES OF STUDY :

1)To evaluate the efficacy of low dose cis-atracurium and low dose atracurium in providing adequate muscle relaxation and other satisfactory conditions for I-gel insertion. 2) To asses ease of insertion (by number of attempts required and duration of each attempt). 3) To assess Changes in hemodynamic variables (Heart Rate, SPO_2 and Mean Arterial Pressure). 4) To evaluate post- operative sore throat. 5) To compare and analyze efficacy of both the relaxing agents. 6) To document adverse events if any such as pain and PONV(Post operative nausea and vomiting).

METHODOLOGY:

The present study is a Prospective randomized study conducted from February 2021 to June 2022. Patients of ASA grade I and II were selected, within age group of 18-60 years, posted for elective surgeries under general anaesthesia procedures attending Bapuji Hospital, Chigateri District Hospital and WCH attached to J.J.M. Medical College, Davangere.

Inclusion criteria:

Age group 18-60 years, ASA grade I or II, Undergoing elective surgeries under general anaesthesia procedures, Patient willing to give informed consent.

Exclusion criteria:

Patient refusal, Pediatric and Geriatric (<18 years and >60 years), Patients with anticipated difficult airway, with full stomach, with recent upper respiratory infection (within 4 weeks).

80 ASA grade I or II patients, aged 18-60 years, of either sex scheduled to undergo elective surgeries under general

anaesthesia, were randomly divided into Group A, Group C after taking written informed consent .

Group A: Atracurium (0.1 5mg/kg)
Group C: Cis-atracurium(26.5mcg/kg)

A detailed medical history, general physical examination and preoperative investigations was done for all the patients. All patients were subjected to through pre-anaesthetic check-up and evaluation was done pre-operatively. All patients were kept nil by mouth overnight and premedicated with Tab. Alprazolam 0.5mg and Tab. Ranitidine 150mg the night before surgery.

Standard anaesthesia protocol was followed. A multiparameter monitor was attached: 3 lead ECG, Pulse Oximetry, NIBP (Non invasive blood pressure), HR, EtCO2 were recorded.

An appropriate IV access was established with 20G cannula and balanced salt solution (RL) was started at the rate of 2-4ml /kg/hr. Baseline vital parameters like heart rate, systolic, diastolic and mean BP, SpO2 and EtCO2 were recorded

All patients were premedicated with Inj. Glycopyrrolate 0.2 mg, Inj Midazolam 1 mg and Inj Fentanyl 2mcg. Induction was achieved with Inj Propofol 2.5mg kg i.v. over 60 seconds. In case of Group A: Atracurium was given 0.15mg/kg .In case of Group C: Cis-atracurium was given 26.5mcg/kg

Mask ventilation was done until conditions were suitable for insertion of I-gel. I-gel was inserted with patient in the sniffing morning air position. It was then inserted with a continuous but gentle push until resistance was felt and anaesthesia circuit was connected.

If effective airway could not be achieved, the device was removed and three attempts were permitted before failure of insertion was declared. If three attempts were unsuccessful either an alternative device was inserted or trachea was intubated with appropriate size endotracheal tube. Devices was fixed by taping the tube over the chin and from maxilla to maxilla. Successful insertion of i-gel is confirmed by chest rise, air entry and EtC02.

Anaesthesia was maintained with oxygen and nitrous oxide (30:70) and sevoflurane 1 % - 3% and patients were kept under Controlled ventilation. Monitoring of heart rate, systolic & diastolic BP, MAP, SpO2, was done 1 min, 2 min, 3 min, 4min, 5 min and every 15min thereafter insertion. Occurrence of coughing, gagging, head and limb movement, laryngospasm and bronchospasm, were noted, and treated accordingly. Towards the end of surgery sevoflurane and nitrous oxide were turned off, reversal was given with Inj Neostigmine (0.05mg/kg) and Inj Glycopyrolate (0.01mg/kg) and I-gel was removed when swallowing and spontaneous eye opening was present. Post removal, the patients were observed for any complications like breath holding, cough, hiccup, excitatory movements, laryngospasm, oedema due to trauma to lip/ tongue/ oral mucosa, presence of blood on device and any incidence of regurgitation of gastric fluid were treated accordingly. Further, any postoperative complications like sore throat pain and discomfort for 24 hours were recorded and treated accordingly.

RESULTS:

A comparative two group double blind randomized clinical study done with Atracurium 0.15mg/kg and Cis-Atracurium 26.5mcg/kg to assess insertion conditions during I-gel insertion.

In the present study there is no significant difference between Age, Gender, Mean weight of patients, heamodynamic changes and post operative sore throat in between 2 groups. The percentage of full jaw relaxation is significantly better in group A(95%) with p <0.01 which signifies that Group A achieved better jaw relaxation than group C (60%) (Table 1, graph 1).

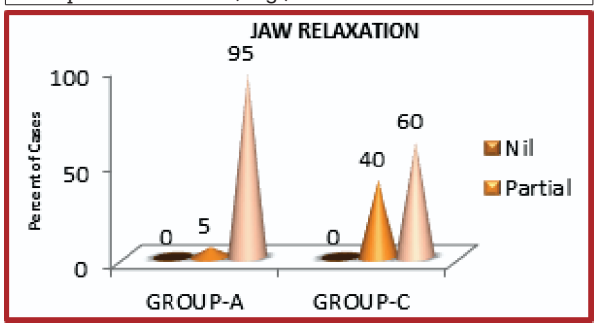
The ease of insertion was found to be significantly easier in Group A (92%) than in group C (57.5%) with p<0.03. As Group C higher percentage of difficulty in ease of insertion (37.5%) than group A (8%) (graph 2).

In 92.5% patients in Group A, I-gel was inserted in first attempt, were as only 75% in Group C were inserted I-gel in 1st attempt. Indicating significant difference among both groups in terms of ease of insertion with p<0.02. Significant difference among both groups in terms of patient movements is noticed with p(<0.001).

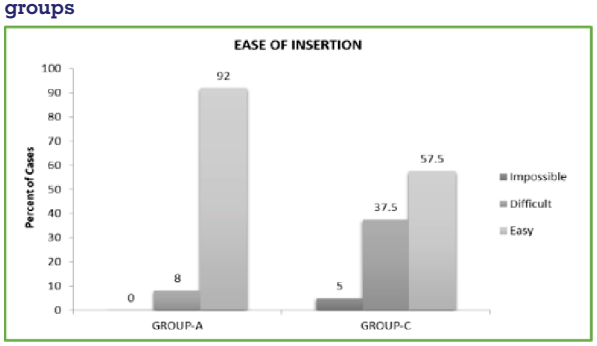
Group A had lesser coughing and gagging percentage (100%) compared with Group C (72.5%) with no coughing and (27.5%) had mild coughing and gagging, showing significant difference among both groups with p<0.001.

Table 1: Comparison between jaw relaxation between two groups

Jaw relation	Group A		Group C	
	N	%	N	%
Nil	0	0	0	0
Partial	2	5	16	40
Full	38	95	24	60
Total	40	100	40	100
Chi square test P<0.01(Sig)				



Graph 1: Comparison between jaw relaxation between two groups



Graph 2 : Comparison of ease of insertion between both groups

DISCUSSION :

Cis-atracurium is a relatively newer drug, not widely available in our country. Thus, in our study, we put to test; Atracurium and Cis-atracurium. The present study was conducted on 80 patients divided randomly into 2 groups of 40 each. Group A received atracurium of 0.15mg/kg and Group C received Cis-atracurium of 26.5mcg/kg before insertion of I-gel.

The decision to choose and compare lower doses of

atracurium and cis-atracurium was taken after reviewing previous studies; where different doses drugs were used to compare the efficacy. El-Kasaby *et al*., (2010)[5] concluded that at the same dose (2×ED95 dose) atracurium(0.5mg/kg) is more effective neuromuscular blocking agent than lower dose of cis-atracurium(0.1mg/kg).

In our study, the groups were compared with respect to age distribution, weight distribution and also sex distribution. It was however found that there doesn't exist any significant difference between the three, thus obviating any bias whatsoever that may arise because of age, sex and weight of the patient.

In our prospective double blinded study, we have also compared insertion conditions such as jaw relaxation, ease of insertion, patient movements, coughing and gagging at the time of I-gel insertion, it was found that low dose of atracurium (0.15mg/kg) favoured better insertion conditions compared to low dose cis-atracurium (26.5mcg/kg) which is in accordance with the study done by Nasseri K, *et al*.[6]

CONCLUSION

Based on all findings in discussion of our present study, we concluded that insertion conditions of I-gel such as jaw relaxation, ease of insertion, number of attempts, patient movement and coughing and gagging were better with low-dose of atracurium (0.15 mg/kg) than with low dose Cis-atracurium (26.5 mcg/kg).

We also conclude that the hemodynamic parameters were maintained and postoperative complications were not significantly different in both the groups.

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