

Comparison of The Effects of Rocuronium Bromide And Cis-Atracurium Besylate on Intubating Conditions And Haemodynamic Response

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Abstract--- *Background/rationale: Safe and rapid endotracheal intubation is of cardinal importance in general anaesthesia. The ease of endotracheal intubation depends on a multitude of factors like degree of muscle relaxation, depth of anaesthesia and skill of the intubating anaesthesiologist. The haemodynamic effects like tachycardia, hypertension^[1] is initiated within 5 s of laryngoscopy, peaks in 1–2 min and returns to normal levels by 5 min. It can incite harmful effects such as myocardial ischaemia, ventricular dysrhythmias, ventricular failure and pulmonary oedema which is attenuated by the use of drugs like Lignocaine, Dexmedetomidine.^[2,3,4,5,6] Cisatracurium besylate is a bisbenzyl-tetrahydro-isoquinolinium, in the category of non-depolarizing neuromuscular intermediate in its onset and duration of action. Cisatracurium degrades spontaneously at physiological pH via Hofmann elimination to yield an active laudanosine and the quaternary monoacrylate.^[7] The recommended maintenance dose of Cis-atracurium is 0.03 mgkg⁻¹, following 40-50 min after the intubating bolus dose of 0.15 mgkg⁻¹. Rocuronium bromide is structurally a 2 morpholino 3-disacetyl 16 N-allyl pyrrolidino derivative of thenon depolarizing muscle relaxant, vecuronium. The recommended intubating dose in general anaesthesia is 0.6mg per kg body weight, after which clinically acceptable intubation conditions are established within 60 seconds in nearly all patients. The recommended maintenance dose is 0.15mg per kg body weight but in the case of use of inhalational anaesthesia for a long duration, this should be reduced to 0.075-0.1mg per kg body weight. Neostigmine or Suggamadex can be used as the reversal agent. Objectives: The objectives are to compare the intubating conditions of rocuronium and cis-atracurium and haemodynamic stability of these agents during intubation. Any side effects are noted*

Keywords--- Intubation, haemodynamic response, pressor response, cisatracurium, rocuronium

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I METHODS:

The study design is cross sectional ,observational

The study will be carried out in the department of Anaesthesia AVBRH Sawangi, a unit of Jawaharlal Nehru Medical College Sawangi Wardha, during the period of time August 2018 – July 2020. 70 patients belonging to ASA physical status I and II posted for surgical procedures to be done under general anaesthesia in the age group 20-60 are divided into groups of 2- Group R and Group C. Group-R: will receive rocuronium bromide 0.6mg kg⁻¹ intravenously Group-C: will receive cis-atracurium 0.15mg kg⁻¹ intravenously over 5 seconds through rapidly running infusion placed in forearm. Intubation will be attempted at predetermined interval of 90s by a skilled and experienced anaesthesiologist. Intubation will be done if the intubating condition is acceptable (excellent or good), and it will be re-attempted every 30 sec if it is poor or inadequate. Evaluation and comparison of the intubating conditions in both will be assessed according to four point scale of Cooper et al and will be graded as excellent if score is 8-9, good if score is 6-7, fair if score is 3-5 and poor if score is 0-2. Intra-operative base level vital signs like pulse rate, blood pressure will be recorded at the onset of anaesthesia (0 sec), then at 60 sec, 90 sec, 120 sec, 150 sec, 180 sec, 240 sec after injecting the drugs. Patients with anticipated difficult intubation are excluded from the study. [8,9,10,11]

Data will be expressed as mean + SD. Statistical analysis will be performed with SPSS for windows (SPSS Inc., Chicago, IL, USA), version 17.0 for the analysis of demographic data and comparison of groups, χ^2 , unpaired student's t-test and paired-t-test will be applied. P value of $p < 0.05$ will be considered as statistically significant.

The sample size formulae used are as follows:

$$n_1 = \frac{(\sigma_1^2 + \sigma_2^2 / \kappa)(z_{1-\alpha/2} + z_{1-\beta})^2}{\Delta^2}$$

$$n_2 = \frac{(\kappa * \sigma_1^2 + \sigma_2^2)(z_{1-\alpha/2} + z_{1-\beta})^2}{\Delta^2}$$

The notation for the formulae are:

n_1 = sample size of Group 1

n_2 = sample size of Group 2

σ_1 = standard deviation of Group 1

σ_2 = standard deviation of Group 2

Δ = difference in group means

κ = ratio = n_2/n_1

$Z_{1-\alpha/2}$ = two-sided Z value (eg. Z=1.96 for 95% confidence interval).

$Z_{1-\beta}$ = power

Mean cisatracurium of first group=93.25

Mean cisatracurium of second group=64.56

σ_1 =SD of first group=37.01

σ_2 =SD of second group=33.75

For detecting mean difference of 2% i.e $\Delta=93.25-64.56=28.69$

$N_1=(37.01*37.01+33.75*33.75)(1.96+0.84)^2/(28.69*28.69)$

=23.89 =25 samples each is required in two groups

II EXPECTED OUTCOMES/RESULTS:

Clinically acceptable intubating conditions are anticipated at 60seconds in Group R when given an intubating dose of 0.6mg kg⁻¹ while in Group C at 90 seconds when given an intubating dose of 0.15 mgkg⁻¹ . Rocuronium is anticipated to have a faster onset in comparison to Cisatracurium without compromising on the intubating conditions. Adverse reactions related to Histamine release will be observed.

III DISCUSSION:

A number of related studies with different aspects were reviewed ^[12-71]. Clinically acceptable intubating conditions are anticipated in both Group R and Group C at 60 seconds and at 90 seconds respectively. No significant variation in haemodynamic stability is expected between the two groups. Patients undergoing emergency surgeries and subjects with anticipated difficult intubation and ASA physical class III and IV are excluded from the study, thus posing limitations.

IV TABLES

Table 1: Demography

Parameter	Group 1	Group 2	P value
Age(yrs) M ±			
Weight(kg) M ±			
Gender(Male/Female)			
Duration of surgery			

Table 2: Intubating conditions

Sl no	Intubating condition	Excellent	good	Fair	Poor
1	Jaw relaxation	Easy	moderate	difficult	Impossible
2	Vocal cords Position Movement	Abducted None	Intermediate mild	Near adduction moderate	Adducted Vigorous
3	Reaction to intubation	None	mild	moderate	Vigorous
4	Coughing	None	diaphragmatic	mild	Sustained>10secs

Total score : Excellent (8-9), Good (6-7), Fair (3-5), Poor (0-2)

Table 3: Changes in Heart rate after intubation in different groups

Time(sec)	Group I M $\pm$	Group 2 M $\pm$	P value
0			
60			
90			
120			
150			
180			
240			

Table 4: Changes in Systolic blood pressure after intubation in different groups

Time(sec)	Group I M $\pm$	Group 2 M $\pm$	P value
0			
60			
90			
120			
150			
180			
240			

Table no 5 : Changes in Diastolic blood pressure after intubation in different groups

Time(sec)	Group I M $\pm$	Group 2 M $\pm$	P value
0			
60			
90			
120			
150			
180			
240			

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