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ORIGINAL RESEARCH

Onset and Intubating Conditions with Succinylcholine and Rocuronium

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ABSTRACT

Background: Rocuronium, like succinylcholine, has a rapid onset of neuromuscular blockade; but, unlike succinylcholine, rocuronium does not have the deleterious effects that are associated with the use of the latter. Nevertheless, its usage is restricted because of its protracted activity. The purpose of this study was to determine whether or not lowering the intubating dose of rocuronium shortened its duration of action while still providing intubating conditions that were clinically acceptable. This was a prospective, randomised, and blinded study for both participants and observers.

Material and Methods: One hundred Indian patients aged between 18 and 65 years who were scheduled for elective surgery were randomly assigned to one of the four rocuronium groups (rocuronium dose of 0.6 mg/kg intubated at 60 s or at 90 s, rocuronium 0.9 mg/kg intubated at 60 s or at 90 s) or succinylcholine group (succinylcholine dose of 1.5 mg/kg intubated at 60 s). Intubating conditions Analysis of variance (ANOVA), Chi-square test, repeated measures analysis of variance (ANOVA), and Mann–Whitney U test were the four statistical tests that were carried out.

Results: Intubating conditions were deemed clinically acceptable in 35% of subjects at 60 seconds and 60% of subjects at 90 seconds when rocuronium was administered in a dosage of 0.6 mg/kg; however, when rocuronium was administered in a dosage of 0.9 mg/kg, intubating conditions were deemed clinically acceptable in 80% of subjects at 60 seconds and 100% of subjects at 90 seconds.

Conclusion: When administered at a dose of 0.6 mg/kg, rocuronium did not produce clinically acceptable intubating circumstances at either 60 or 90 seconds, although it has a shorter duration of action. It takes approximately the same amount of succinylcholine, 0.9 mg/kg, for rocuronium to provide clinically acceptable intubating circumstances as it does for succinylcholine, 1.5 mg/kg.

Keywords: Intubating conditions, rocuronium, succinylcholine, ANOVA, surgery.

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INTRODUCTION

1751. The public's first exposure to diethyl ether's effects by Morton opened the floodgates to further anaesthetic innovations and discoveries.[1] The search for a drug that could induce jaw relaxation to aid in endotracheal intubation started after the development of balanced anaesthesia in 1926 and endotracheal anaesthesia during World War I. The inhalational method, which has been connected to problems such laryngospasm and bronchospasm, was used for the majority of intubations.[2-4] Additionally, the patient must be positioned adequately deep prior to intubation, which results in hemodynamic anomalies. The first non-depolarizing skeletal muscle relaxant, d-tubocurarine, was introduced in 1942 to address the demand for jaw relaxation. Despite having excellent muscle relaxation even at clinical levels, this medicine has additional ganglion blocking effects that result in tachycardia and hypotension. Additionally, the jaw relaxation took longer to start than usual, making it unsuitable for use in urgent situations needing quick sequence intubation. The search for a relaxant with a quick onset and short duration of action consequently started.[5-8]

A synthetic depolarizing muscle relaxant called succinylcholine chloride was first made available in 1951.[9] It was the drug of choice for endotracheal intubation after meeting all of the aforementioned requirements, especially in emergency cases necessitating rapid sequence intubation. Succinylcholine causes a number of negative side effects, including hyperkalemia, elevated intraocular, intracranial, and intragastric pressures, as well as cardiovascular repercussions [Figure1].[10-14]

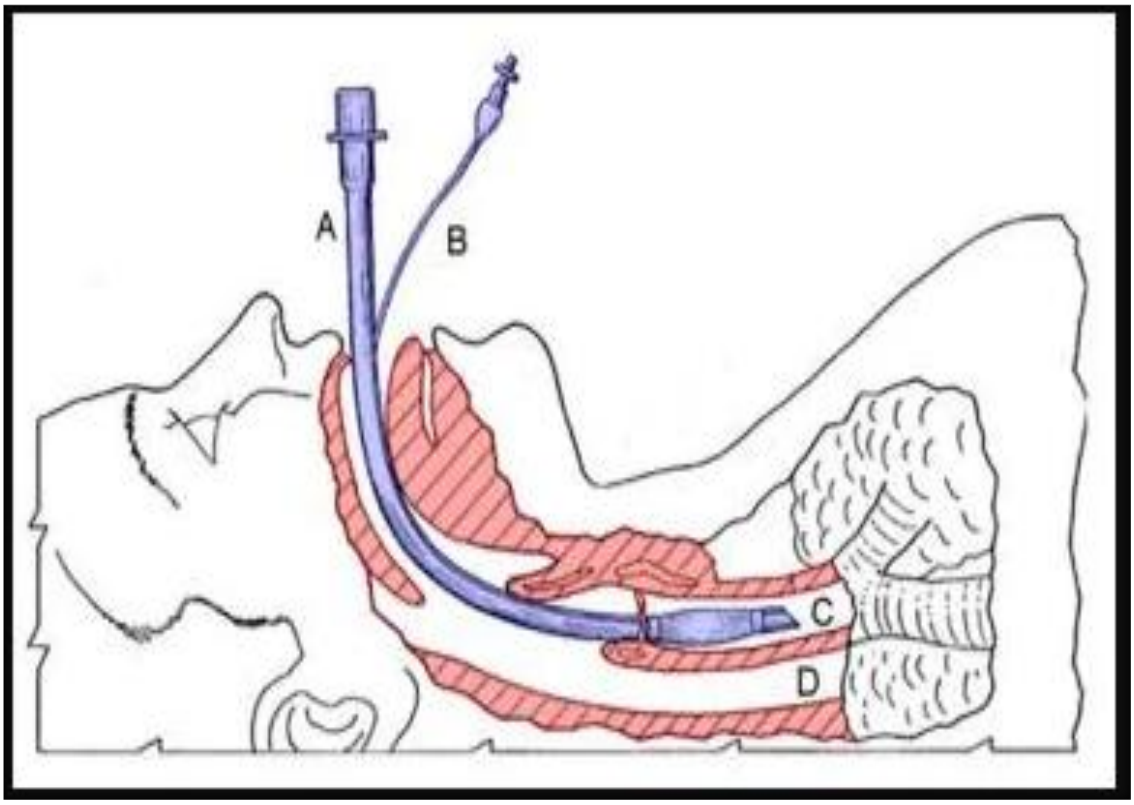

Figure 1: Intubation Method

A nondepolarizing muscle relaxant that is similar to succinylcholine chloride but without the drawbacks is the main objective of neuromuscular medication research. Rocuronium bromide, a non-depolarizing muscle relaxant introduced in 1994, has emerged as succinylcholine chloride's primary opponent.[15,16] Two to three times the ED 95 dose of rocuronium bromide is said to produce adequate to excellent intubating conditions in 60

seconds. The majority of the negative effects connected with succinylcholine chloride are also said to be absent from rocuronium bromide. Succinylcholine chloride 1.5 mg/kg vs. rocuronium bromide 0.6 mg/kg and 0.9 mg/kg body weight are being used in this study to compare and contrast intubating situations in adult patients.[17,18]

Table 1: Dosage and Duration of Rocuronium bromide

	Dosage (mg/kg)	**Duration (min)**
ED95	0.3-0.4	
Intubation (at t = 60-90 seconds)	0.6-1.0	35-75
Relaxation (N2O/O2)	0.3-0.4	30-40
Relaxation (volatile anesthetic)	0.2-0.3	30-40
Maintenance	0.1-0.15	15-25
Infusion	8-12 µg/kg/min	

MATERIAL AND METHODS

After receiving approval from an ethical committee, a clinical study comparing the onset time and intubating conditions achieved with succinylcholine chloride 1.5 mg/kg and rocuronium bromide 0.6 mg/kg and 0.9 mg/kg in adult patients was conducted at the Department of Anesthesiology, Government General Hospital, Guntur, Guntur Dist., from January 2020 to December 2021. 90 adult patients aged 20 to 60 years, of both sexes, with ASA grades I and II who were scheduled for various elective procedures at Government General Hospital, Guntur, make up the current study population. Before undergoing surgery, patients' informed permission was acquired.

Exclusion Criteria

1. Patients with anticipated difficult airway
2. Modified Mallampati airway classification III and IV
3. Pregnant women
4. Hypertension & Diabetes mellitus
5. Bronchial asthma
6. Ischemic heart disease
7. Presence of neuromuscular disease
8. Known allergy to study drugs
9. Hepatic and renal diseases.

The participants in the current study were split into three groups at random, with 30 patients in each group. Succinylcholine chloride 1.5 mg/kg body weight was administered to Group I, which consisted of 30 patients and an attempt at intubation, was made after 60 seconds. Rocuronium bromide 0.6 mg/kg body weight was administered to Group II, which consisted of 30 patients, and an attempt at intubation was made after 60 seconds. Rocuronium bromide 0.9 mg/kg body weight was administered to Group III, which consisted of 30 patients, and an effort was made to intubate them after 60 seconds. A thorough pre-anesthetic evaluation and all necessary diagnostics were carried out the day before surgery in order to rule out any systemic diseases. All patients received Tab. pantoprazole 40 mg and Tab. alprazolam 0.5 mg the night before surgery. Patients were kept off food and liquids for ten hours before to surgery.

After being taken to the operating room on the day of surgery, the patient is connected to a multichannel monitor that includes a pulse oximeter, electrocardiogram (Lead II), heart rate, non-invasive blood pressure, and capnography. At the beginning, measurements of heart rate, oxygen saturation, ECG, systolic, diastolic, mean arterial blood pressure, and capnography were taken. Injection Before receiving the induction medication, all patients got

intramuscular injections of midazolam 1 mg and glycopyrrolate 0.2 mg. All patients received pre-oxygenation for 3 minutes using a face mask and 100% oxygen. One minute after preoxygenation, injection starts. 2 micrograms of fentanyl were administered intravenously per kilogramme of body weight. Thiopentone sodium 2.5%, 5mg/kg body weight administered intravenously was used to cause them. After inducing the lack of eyelid reflex in the study group, succinylcholine chloride at a dose of 1.5 mg/kg body weight is administered intravenously. Similar to this, after the loss of the eyelid reflex, study groups II and III received intravenously 0.6 mg kg-1 and 0.9 mg/kg of rocuronium bromide, respectively. Following the administration of a muscle relaxant, oral endotracheal intubation is tried in all three patient groups, and the intubating conditions were evaluated using the following standards.[19]

Table 2: intubating conditions

Variable assessed	Excellent (Clinically acceptable)	Good (Clinically acceptable)	Poor (Not clinically acceptable)
Laryngoscopy	Easy	Fair	Difficult
Vocal cord position	Abducted	Intermediate or moving	Closed
Reaction to insertion of Tracheal tube and cuff inflation	None	Slight	Vigorous or sustained

For the purpose of evaluating the general intubating conditions, all three characteristics were taken into account. Thus, the verdict was taken into account. Using well-lubricated oral PVC cuffed endotracheal tubes with the cuff inflated, the bilateral air entrance checked, and the tube securely attached, all of the patients were intubated. No aversive stimuli were permitted during the intubation research period. An inhalational anaesthetic drug, IPPV, and a combination of 40% oxygen and 60% nitrous gas were used to maintain anaesthesia. Vital signs were recorded for 1, 3, and 5 minutes after intubation, including the electrocardiogram (Lead II), heart rate, oxygen saturation systolic, diastolic, and mean arterial blood pressure. The clinical duration of effect of the first bolus doses of succinylcholine chloride and rocuronium bromide was measured as the time from the injection of the relaxant to the first attempt at respiration. Additional NDMR doses were used to keep the muscles relaxed until the surgery was finished. Following the procedure, all of the patients received injections of glycopyrrolate 0.01 mg/kg body weight and neostigmine 0.05 mg/kg body weight. After the extubation conditions were satisfied, patients were extubated. Prior to being moved to the post-operative ward, patients were ventilated with 100% oxygen for 5 minutes following extubation. The student t-test and the ANOVA test were used to classify, evaluate, and statistically analyse all of the study's findings.

RESULTS

Demographic data:

Age distribution: Regarding age, patients in each of the three groups were comparable. [Table 3] Analysis of variance was used to compare the data (ANOVA test). The P-value was 0.075 and there was no statistical difference between the groups.

Table 3: Mean Age Distribution of the patients among the groups.

Group	Age Distribution						
	Number	Mean Age (Years)	SD	F value	P value	Min	Max
Succinyl Choline (1.5mg/kg)	30	34.31	8.111	2.673	0.075	20	48
Rocuronium (0.6mg/kg)	30	29.97	5.519			20	41
Rocuronium (0.9 mg/Kg)	30	31.37	8.315			20	49

Weight distribution: Regarding weight, patients in all 3 groups were comparable. [Table 4] ANOVA was used to compare the data. The P-value was 0.507 and there was no statistical difference between the groups.

Table 4: Mean Weight Distribution of the patients among the groups.

Group	Weight Distribution						
	Number	Mean Weight (Kg)	SD	F-value	P-value	Min	Max
Succinyl Choline (1.5mg/kg)	30	54.93	5.101	0.684	0.507	44	63
Rocuronium (0.6mg/kg)	30	55.55	4.428			44	65
Rocuronium (0.9 mg/Kg)	0	53.88	6.991			43	68

Gender distribution: There were more females than males in Group 1 and 2 and more males in group 3. The following table shows the gender distribution in the three groups.

Table 5: Gender Distribution of the patients among the groups

Gender	Succinyl Choline (1.5mg/kg)	Rocuronium 0.6mg/kg	Rocuronium 0.9 mg/Kg	Total	Chi-Square	P-value
Male	10	14	20	44	6.759	0.034
	33.30%	46.70%	66.70%	48.90%		
Female	20	16	10	46		
	66.70%	53.30%	33.30%	51.10%		
Total	30	30	30	90		
	100.00%	100.00%	100.00%	100.00%		

The onset of action in seconds: Regarding the time until an effect started to manifest, patients in all 3 groups were comparable. [Table 6] ANOVA and the post hoc Bonferroni test were used to compare the data. Between the 3 groups, there was statistically significant difference in the time until action ($P < 0.05$).

Table 6: Mean Onset of Action Distribution of the patients among the groups.

Group	The onset of Action Distribution						
	Numbers	**Mean (Sec)**	**SD**	**F-value**	**P-value**	**Min**	**Max**
Succinyl Choline (1.5mg/kg)	30	45.58	4.198	46.001	<0.01	37	54
Rocuronium (0.6mg/kg)	30	56.38	5.032			47	67
Rocuronium (0.9 mg/Kg)	30	52.59	3.966			44	65

Intubating Conditions: Patients in all the 3 groups were comparable with respect to intubation conditions. Data analyzed using Chi-Square test and noted as statistically significant with a P-value of 0.0249 (<0.05)

Table 7: Intubation Condition Distribution of the patients among the groups

Intubation Condition	Succinyl Choline (1.5mg/kg)	Rocuronium 0.6mg/kg	Rocuronium 0.9 mg/Kg	Total	Chi-Square	P-value
Excellent	27	16	23	66	11.15	0.0249
	90.00%	53.33%	76.67%	73.30%		
Good	3	10	6	19		
	10.00%	33.33%	20.00%	21.10%		
Poor	0	4	1	5		
	0.00%	13.34%	3.33%	5.60%		
Total	30	30	30	90		
	100.00%	100.00%	100.00%	100.00%		

According to the table, excellent intubating circumstances were present in 27 out of 30 patients (90.00%) who received succinylcholine chloride 1.5 mg kg-1 body weight, while good intubating conditions were present in 3 out of 30 patients (10.00%). Of the 30 patients in group II who received rocuronium bromide 0.6 mg kg-1 body weight, 16 patients (53.33%) had excellent intubating conditions, and 10 patients (33.33%) had good intubating conditions. Four patients in group II (13.34 percent) had difficult intubating circumstances, including moving vocal chords and a severe reaction to the tracheal tube insertion.

23 (76.67%) of the 30 patients in group III who received rocuronium bromide 0.9 mg kg-1 body weight had excellent intubating conditions, compared to 6 (20%) fair intubating conditions and 1 (3.33%) poor intubating conditions.

Duration of action in minutes: Regarding how long neuromuscular blocking medications lasted, patients in all 3 groups were comparable. [Table 8] The duration of action was shown to be statistically significant between the 3 groups using the ANOVA test and Bonferroni Post Hoc test, with a P-value of 0.05.

Table 8: Mean Duration of Action Distribution of the patients among the groups

Group	Duration of Action Distribution						
	Numbers	Mean (Min)	SD	F-value	P-value	Min	Max
Succinyl Choline (1.5mg/kg)	30	5.24	1.453	2895.96	<0.01	37	54
Rocuronium (0.6mg/kg)	30	23.96	2.14			47	67
Rocuronium (0.9 mg/Kg)	30	43.18	2.12			44	65

Table 9: Mean Heart Rate Distribution of the patients among the groups

Heart Rate	Succinyl Choline (1.5mg/kg)		Rocuronium 0.6mg/kg		Rocuronium 0.9 mg/Kg		F-Value	P-value
	Mean	% ↕	Mean	% ↕	Mean	% ↕		
Pre-induction	83.34±7.48		83.12±5.608		85.01±7.539		0.664	0.517
One Min After Induction	112.82±8.51	35.4	122.3±11.83	47.1	113.86±7.274	33.9	9.73	<0.001
3Min	100.2±8.7	-11.2	111.2±9.66	-9.1	101.17±7.473	-11.1	12.29	<0.001
5Min	86.19±6.63	-14	88.61±7.904	-20.3	91.15±8.359	-9.9	3.136	0.048

[Table 9] demonstrates a substantial (p 0.05) increase in mean heart rate from the basal value among Groups I, II, and III, respectively, of 35.4%, 47.1%, and 33.9%. Five minutes after intubation, this rise in the mean heart rate decreased to 14%, 20.3%, and 9.9%. None of the instances after the administration of the medications had any aberrant ECG results.

Table 10: Mean Arterial Pressure Distribution of the patients among the groups

Mean Arterial Pressure	Succinyl Choline (1.5mg/kg)		Rocuronium 0.6mg/kg		Rocuronium 0.9 mg/Kg		F-Value	P-value
	Mean	% ↕	Mean	% ↕	Mean	% ↕		
Pre-induction	94.62±5.6		92.28±5.85		92.13±5.49		1.819	0.168
One Min After Induction	112.13±9.52	18.5	118.64±9.35	28.56	115.09±7.72	24.92	4.18	0.018
3Min	107.03±8.66	-4.54	116±9.407	-2.22	111.42±7.33	-3.18	8.341	<0.001
5Min	90.99±8.37	-14.98	97.23±6.80	-16.18	93.1±4.12	-16.44	3.182	0.046

In Group I, Group II, and Group III, respectively, the mean arterial pressure increased significantly (p 0.05) from the basal value by 18.5%, 28.56%, and 24.92% at 1 minute after intubation. After being intubated for five minutes, this increase in mean arterial pressure decreased to 14.98%, 16.18%, and 16.44%. At five minutes after intubation, there was a tendency in all three groups to recover to baseline mean arterial pressure.

DISCUSSION

In recent years, focus has shifted from onset, potency, and duration to neuromuscular blocking drugs' ability to aid tracheal intubation. Intubation investigations are challenging to execute and interpret because of anaesthetic management, patient age, anatomy, equipment, and endoscopist experience. Background anaesthetic and time to laryngoscopy aren't standardised. Blinded, subjective intubation judgement.[20] Despite succinylcholine being the gold standard for quick sequence induction, rocuronium has most of the features of an ideal muscle relaxant, including nondepolarizing action, fast onset of effect, brief duration of action, quick recovery, noncumulative, cardiovascular adverse effects-free, no histamine release, and pharmacologically inactive metabolites. Succinylcholine is a depolarizing muscle relaxant having a fast onset and short duration of action. Succinylcholine can elevate serum potassium and cause bradycardia. Due of succinylcholine's depolarizing mechanism of action; researchers are looking for non-depolarizing relaxants with a rapid start and good to excellent intubating circumstances. Our study was similar to earlier ones; we compared onset time and intubating settings with succinylcholine 1.5mg/kg and rocuronium 0.6mg/kg and 0.9mg/kg IV. Below are the demographic parameters.[21]

Our analysis found no significant variation in mean age distribution across the three groups (p=0.07). In group A, the mean age was 34.31 with an 8.11 SD, in group B it was 29.97 with a 5.51 SD, and in group C it was 31.37 with an 8.3 SD. A study by Bhandari et al, Sheeba Franklin et al, and Kalpana Kulkarni et al compared medicines among youngsters and found no significant difference in mean ages. Mahalaxmi et al discovered no statistical significance between the three groups' ages.[22]

Table 11: Comparison of age distribution with reference studies

Studies	Group A (Scc 1.5)	Group B (Roc 0.6)	Group C (Roc 0.9)
Present Study (2021)	34.31±8.11	29.97±5.51	31.37±8.3
Bhandari et al (2018)	41.70±17.8	37.30±16.0	39.37±17.30
Sheeba Franklin et al (2017)	35.52±13.34	30.32±9.89	39.88±11.76
Kulkarini KR et al (2010)	4±2.5	4±2.53	4.5±2.6

Gender Distribution: In our study, the male-to-female ratio among the three groups was statistically insignificant (p = 0.034). In Group A, the ratio was 1: 2, in Group B it was 7: 8, and in Group C it was 2: 1. The overall ratio was 22: 23. Bhandari et al, Sheeba et al, Mahalaxmi et al, and Kulkarni et al observed no statistical significance in the chi-square test between the three groups' gender distributions. In our study, we observe female domination by a minor fraction from the whole population of our study. Bhandari et al. found female dominance.

Table 12: Comparison of gender distribution with reference studies

Studies	Group A (Scc 1.5)	Group B (Roc 0.6)	Group C (Roc 0.9)
Present Study (2021)	1: 2	7: 8	2: 1
Bhandari et al (2018)	12: 18	19: 11	15: 15

Kulkarini KR et al (2010)	1.17: 1	1.6: 1	1.03: 1

Weight Distribution: In our investigation, the groups' mean weight distribution was not statistically significant. Our conclusions of no statistical significance for mean weight distribution among the groups were validated by Sheeba et al. and Kulkarni et al.

Table 13: Comparison of weight distribution with reference studies

Studies	**Group A (Scc 1.5)**	**Group B Roc 0.6)**	**Group C (Roc 0.9)**
Present Study (2021)	54.9±5.10	55.55±4.42	53.88±6.9
Sheeba Franklin et al (2017)	51±8.05	51±7.12	48.40±7.19
Kulkarini KR et al (2010)	17±5.07	17±5.23	18±5.4

Onset of Action: Onset time of action for succinylcholine 1.5mg/kg was 45.584.191 seconds, rocuronium 0.6mg/kg was 56.382.03 seconds, and rocuronium 0.9mg/kg was 52.593.9 seconds, which was almost half of group II. This action was significant (p0.01) Succinylcholine 1.5 mg/kg IV provides optimal intubating conditions and speedier onset of effects, according to Weiss et al. Bhatia Pradeep Kumar et al. Bhandari et al. found that succinyl chloride has a faster beginning of action than 0.6mg/kg and 0.9mg/kg Rocuronium. They found that succinylcholine's onset of action was 47.603.76 seconds, faster than 0.6mg/kg and 0.9mg/kg Rocuronium. The result agrees with Mishra MN et al. Shukla A et al., Sluga M et al., Hemmerling TM et al., Parikh K et al., Magorian T et al., Sutradhar B et al., and Chavan SG et al. Cooper RA et al., Singh A et al., and Venkateswaran R et al. found divergent outcomes, which can be explained by dose differences. Sheeba Franklin et colleagues evaluated the three groups' onset time. Though rocuronium 0.6 mg/kg and 0.9 mg/kg had longer start times than succinylcholine (64.72 10.91 sec), the quality of the neuromuscular block at the larynx was comparable with an intubation score of 7-9. Intubation score and onset time are complimentary. All rocuronium patients were intubated with satisfactory to excellent conditions when there was no diaphragmatic activity. This may be appropriate for emergency tracheal intubation in cases where succinylcholine is contraindicated. Mahalaxmi et al observed a shorter duration for the onset of action in the succinylcholine group compared to other two groups of Rocuronium. Kulkarni KR et al validated our findings for a shorter duration of onset in the succinylcholine group. Magorian et al. discovered that doubling the rocuronium dose cut onset time in half. Similar to the current study, increasing the dose from 0.6mg/kg to 0.9mg/kg doubles clinical duration. Thus, a rocuronium dose of 0.6mg/kg or more gave satisfactory conditions 60 seconds after administration, which is consistent with the present investigation.

Table 14: Comparison of onset time with reference studies

Studies	**Group A (Scc 1.5)**	**Group B (Roc 0.6)**	**Group C (Roc 0.9)**
Present Study (2021)	45.58±4.19	56.38±5.03	52.59±3.9
Bhandari et al (2018)	47.60±3.76	77.40±5.32	58.37±4.82
Sheeba Franklin et al (2017)	64.92±10.91	195.72±34.62	111±19.13
Mahalaxmi et al (2017)	43.75±3.58	220.75±51.63	105.55±22.91
Kulkarini KR et al (2010)	56±8.5	80±11.2	59±10.4

Duration of Action: In group A, the drug lasted 5.241.4 minutes, in group B 23.962.14 minutes, and in group C 43.182.12 minutes. The drugs' mean duration of action differed statistically (p-value 0.001). The current study found a shorter duration of action, similar to Bhandari et al's 5.40 1.14 minute mean. This conclusion agrees with those of Shukla et al., Parikh et al., Chavan SG et al., Singh et al., Venkateswaran et al., and Penchalaiah et al. Cooper RA et al., Magorian T et al., and Sutradhar B et al. found inconsistent results. Sheeba Franklin et al found that rocuronium bromide is a low-potency, nondepolarizing muscle relaxant. In their investigation, succinyl had a shorter duration of action than rocuronium. Magorian et al compared rocuronium dosages of 0.6mg/kg, 0.9mg/kg, and 1.2mg/kg to 1mg/kg succinylcholine. 37 minutes, 53 minutes, 73 minutes for rocuronium 0.6mg/kg, 0.9mg/kg, and l.2mg/kg, and 9 minutes for succinylcholine 1mg/kg.Table 15: Comparison of duration of action with reference studies.

Table 15: ?

Studies	**Group A (Scc 1.5)**	**Group B Roc 0.6)**	**Group C (Roc 0.9)**
Present Study (2021)	5.24±1.4	23.96±2.14	43.18±2.12
Bhandari et al (2018)	5.40±1.4	27.70±5.32	46.60±4.27
Sheeba Franklin et al (2017)	8.64±2.23	27.64±6.74	45.60±6.87
Kulkarini KR et al (2010)	4±0.07	18±2.3	22.5±4.7

Intubation Condition: Laryngeal adductor neuromuscular inhibition affects intubating situations more than adductor policies. Laryngeal or diaphragmatic blockage may not be needed for intubation. Intubating muscles relax faster than other muscles. We were able to intubate all of our trial patients successfully using succinylcholine at 1.5 mg/kg for 60 seconds. According to the study, Group C had 76.67% effective intubations. This conclusion is similar to Mishra et al.[44] Shukla et al. K. Parikh, T. Magorian, C. Penchalaiah, K. Parikh, In Mc Court, KC et al's study, only 80% of patients had excellent intubating status. Laryngeal muscles relax before the thumb adductor pollicis, which explains intubating variances. Excellent intubating condition was substantially greater with Succinylcholine 1.5 mg/kg (100%) than any dose of Rocuronium. Rocuronium 0.9 mg/kg (95%) had a greater incidence of excellent intubating condition (30%) than 0.6 mg/kg.

Kulkarni KL et al found that 100% of patients in groups A and C and 92% in group B had adequate intubating conditions at 60 seconds. 8% of group B patients got a low score at 60 seconds, which is statistically significant at 5% probability and negligible at 1% chance. At 90 seconds, it is insignificant when comparing all three groups. Cheng Claudia AY et al,[41] found a significant difference in intubating conditions between three groups of 1-12-year-olds. Rocuronium 0.9 mg/kg provided similar intubating circumstances as succinylcholine 1.5 mg kg during modified rapid-sequence induction (P = 0.671). Insufficient Rocuronium 0.6 mg kg-1. Our observations matched studies. Increasing the dose of rocuronium to 0.9mg kg-1 reduces coughing, bucking, and aspiration. Under balanced anaesthesia, Puhringer 4 found onset times of 1mg/kg succinylcholine and 0.6mg/kg rocuronium. In children, 0.6 mg kg-1 of rocuronium with alfentanyl-thiopentone induction took 190 seconds. Bhaskaran et al. discovered that Succinylcholine 1.5 mg/kg (100%) was superior to any dose of Rocuronium. Rocuronium 0.9 mg/kg (95%) exhibited a higher prevalence of excellent intubating condition than Rocuronium 0.6 mg/kg (65%). (30 percent). There was no statistical difference between Rocuronium 0.9 mg/kg and Succinylcholine 1.5 mg/kg. R.K.Verma, Cheng C AY, and Weiss et al found comparable results. 95% of patients were ready in 60 seconds, and all were ready in 90 seconds, according to R.K. Mirakhur, A.R. Cooper, and others.

Hemodynamics: After one minute after intubation, Group A's heart rate increased by 35% compared to Group B and was practically identical to Group C, which increased by 47% and

34% respectively. This mean difference was statistically significant. All three groups began similarly. At 3 and 5 minutes, all three groups' heart rates decreased, but Group A's stayed stable, a statistically significant difference (p-value 0.01). Mean arterial pressure was not statistically significant at baseline (p=0.168), but increased 14% in group A after 1 minute after intubation, compared to 28% in group B and 26% in group C. (p-value0.01). After one, three, and five minutes, it stabilised in Group A, compared to Groups B and C, which showed statistically significant observations (p-value0.01). All three groups saw a rise in heart rate and mean arterial pressure after receiving the research drugs, according to Bhandari et al. The current study's findings were consistent with Shukla et al. and Cooper18. Penchalaiah et al. J.H. Levy et al. Booth et al. discovered that rocuronium injection raised heart rate by 36% in the first minute. According to the shelf et al., succinylcholine injection raised mean arterial pressure via stimulating autonomic neurons. Laryngoscopy and endotracheal intubation caused a clinically modest rise in hemodynamic measures, which returned to pre-medication levels 10 minutes after intubation.

CONCLUSION

Rocuronium bromide is a safe alternative to succinylcholine chloride in patients in whom succinylcholine is contraindicated and in whom there is no anticipated difficult airway. Succinylcholine chloride, with its rapid termination of action (3-7 min), is a safer agent for use in patients with anticipated difficulty in intubation. Rocuronium bromide is a safe alternative to succinylcholine chloride in patients in whom succinyl, the incidence of clinically acceptable and good intubating conditions can be improved by increasing the dose of rocuronium bromide from 0.6 mg/kg body weight to mg/kg body weight; however, this improvement comes at the expense of a prolonged action time.

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