



Comparison of Intubating Conditions After Rocuronium and Suxamethonium With Thiopentone (A Study of 60 Cases)

KEYWORDS

Rapid Sequence Induction, Rocuronium

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ABSTRACT *Classically, all these years, Rapid Sequence Intubation has been used in cases of full stomach patients and in emergency situations. This is achieved with the use of rapid onset depolarizing muscle relaxant Succinyl Choline. But, due to side effects and complications associated with use of Sch, there has been search for a rapid onset non depolarizing muscle relaxant. In this spectrum, Rocuronium is being tried as an option. In this double blind randomized controlled trial we have tried to compare the intubating conditions of succinyl choline and Rocuronium.*

INTRODUCTION:

The goal of rapid sequence induction is to secure the patients airway quickly minimizing the chances of regurgitation and aspiration of gastric content. It is indicated in the presence of full stomach, emergency situations and in other situations where there is increased risk of regurgitation.

To provide rapid and adequate muscular relaxation for facilitation of endotracheal intubation, the succinyl choline has been the "gold standard" short acting depolarizing neuromuscular relaxant for rapid sequence induction of anaesthesia.

But due to inherent disadvantages eg. Fasciculations, post-operative myalgia, hyperkalemia, rise in intragastric and intraocular pressure, precipitating malignant hyperthermia, alteration in heart rate and rhythm i.e. bradycardia similarly its use is contraindicated in many conditions including burns and certain neurological diseases.

Hence search is going on to find out a rapid onset non-depolarizing muscle relaxant. Amongst the currently available non depolarizing neuromuscular blocking agents Rocuronium is an intermediate acting non depolarizing muscle relaxant having the most rapid onset of action taking 60 to 90 sec for complete block to develop and facilitate the rapid sequence induction to secure patients airway quickly.

Different authors had used different doses and studied effective time to satisfactory intubation conditions after administration of rocuronium in adults.

The present study is an effort to compare the intubating conditions obtained with Succinyl choline and Rocuronium.

MATERIAL AND METHOD:

This is randomized control study. The patients were randomly divided into two groups of 30 each.

Group 1: Patient intubated with Succinyl choline 1.5 mg/kg

Group 2: Patient intubated with Rocuronium 1 mg/kg

Inclusion criterion:

ASA I and II

Elective surgical procedure

Age 16 to 60 yrs

Both sexes

EXCLUSION CRITERIAS :**Extremes of ages**

Associated systemic problems like renal , hepatic ,neuro-muscular diseases.

Esophageal refluxes

Patients taking medicines which interfere with the neuro-muscular transmission.

Patients with anticipated difficult intubation.

All the patients were thoroughly examined on previous evening. During the examination, the patients airway assessment was done by examining the oral cavity in sitting position. Only those patients with visible faucial pillars and uvula were included in the study [Mallampatti class I and II].

A complete general and systemic examination was carried out. Weight of the patient was noted. All routine investigations like haemogram, TLC , DLC , urine examination, kidney function test, blood sugar were performed. All the patients were kept nil by mouth overnight.

On the day of surgery pulse rate, blood pressure both systolic and diastolic were recorded on operation table. Intravenous line was established.

All the patients were premedicated with IV midazolam 1mg, pentazocain 0.5 mg/kg, emeset 4 mg, glycopyrolate 0.04mg/kg.

Premedication followed by preoxygenation for 3 mins. Then all the patients were induced with IV Thiopentone 5 mg/kg slowly over 15 to 20 seconds. Iv line flushed with rapidly running ringer lactate. Then

Group 1 : IV Succinyl choline 1.5 mg/kg given.

Group II : IV Rocuronium 1 mg/kg given.

Laryngoscopy was performed 60 seconds after giving intubating dose of muscle relaxant by a single experienced anaesthesiologist in all cases; after ventilating patients lungs with 100% oxygen after onset of apnea.

We used the criteria of Lund and Stovner [1], Young, Clark and Dundee[2] with some modifications.

Jaw relaxation: Poor [score: 1] , Incomplete [score :2] ,Good [score:3]

Cord relaxation: Poor- cords opposed firm pressure required to pass the tube [score:1], Slight-Almost adducted [score: 2] , Fair – Gentle pressure required to pass tube [score – 3], Good – wide abduction [score – 4].

Reaction to intubation: Marked [score- 1] , Slight [score – 2] ,Nil [score – 3] .

Each variable was given a score as above and total score was obtained for each patients.

The intubating conditions were graded as follows:

Intubating conditions	Score
Excellent	9 – 10
Good	7 – 8
Fair	4 – 6
Poor	< 4

Anaesthesia was maintained with isoflurane and oxygen/nitrous oxide. At the end of surgery residual neuromuscular blockade was reversed with intravenous Neostigmine 0.05 mg /kg and glycopyrolate 0.08mg /kg.

The hemodynamic profile was recorded in form of pulse rate and blood pressure. These were recorded before induction, after induction, and every one minute after intubation upto 5 min. Other parameters like SPO2, ETCO2, urine output, blood loss monitored throughout the surgery.

Statistical analysis: Unpaired ‘t’ test to compare age, weight between two groups and Chi square test to compare the distribution of sex, jaw relaxation, cord relaxation, reaction to intubation and intubating conditions at 60 seconds.

Changes in PR, BP in between groups at various stages were compared by using unpaired t test.

OBSERVATIONS AND RESULT

Two groups were statistically similar regarding age, sex and weight.

Mean pulse rate and mean systolic blood pressure before induction in both groups were statistically comparable.

CHANGES IN MEAN PULSE RATE AT VARIOUS STAGES

TABLE : 1

Group	Stages						
	Before Induction	After Induction	T3-T7 Every one minute after intubation Up to 5 minutes				
	T1	T2	T3	T4	T5	T6	T7
I	79.1	80.8	88.6	88.3	85.2	83.5	81.8
	+/-	+/-	+/-	+/-	+/-	+/-	+/-
	4.9	5.2	5.20	5.49	4.4	4.7	4.8
II	77.06	80.26	90.3	90.63	87.7	85.5	83.06
	+/-	+/-	+/-	+/-	+/-	+/-	+/-
	6.8	6.3	6.3	5.9	6.4	6.4	6.6
	p=	p=	p=	p=	p=	p=	p=
	0.914	0.726	0.2611	0.1209	0.0834	0.1797	0.44

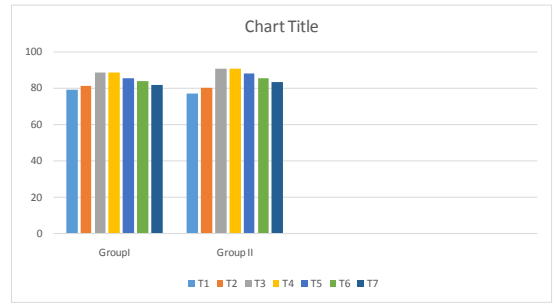


Chart 1-

There is no statistical difference between the changes in pulse rate at various stages in two groups(p<0.05).Changes in heart rate after intubation were significantly greater as compared to base line in two groups.

TABLE : 2
MEAN SYSTOLIC BLOOD PRESSURE AT VARIOUS STAGES

Group	Stages						
	Before Induction	After Induction	T3 – T7 Every one minute after intubation up to 5 minutes				
	T1	T2	T3	T4	T5	T6	T7
I	119.2	119.67	128.13	127.13	125.67	122.93	122
	+/-	+/-	+/-	+/-	+/-	+/-	+/-
	5.9	6.2	6.2	5.8	5.2	5.4	5.6
II	116.67	118.06	128	127.27	123.5	121.27	199.6
	+/-	+/-	+/-	+/-	+/-	+/-	+/-
	8.3	7.9	7.6	7.25	7.5	7.6	7.7
	p=	p=	p=	p=	p=	p=	p=
	0.1794	0.38728	0.9410	0.9367	0.3628	0.3351	0.3225



Chart 2-

There is no statistical difference between the changes in mean systolic blood pressure at various stages in two groups.

COMPARISON OF JAW RELAXATION IN TWO GROUPS AT 60 SECONDS

TABLE : 3

GROUP	JAW RELAXATION		
	GOOD (SCORE3)	INCOMPLETE (SCORE 2)	POOR (SCORE 1)
I	30 (100%)		
II	29 (96.66%)	1(3.34%)	

P=0.3132

Thus the incidence of jaw relaxation in group I and II were comparable at 60 seconds

COMPARISON OF CORD RELAXATION IN TWO GROUPS AT 60 SECONDS

TABLE : 4

GROUP N=30	CORD RELAXATION%			
	GOOD (SCORE4)	FAIR (SCORE3)	SLIGHT (SCORE2)	POOR (SCORE1)
I	12(40%)	18(60%)		
II	11(36.67%)	17(56.66%)	2(6.66%)	

P=0.355

Thus the incidence of good and fair cord relaxation is statistically comparable at 60 seconds in both groups.

COMPARISON OF INTUBATING CONDITIONS ACCORDING TO TOTAL SCORE

TABLE : 5

SCORE	GROUP I N (%)	GROUP II N (%)
Excellent (score 9-10)	24 (80.0)	20 (66.66)
Good (score 7-8)	6 (20.0)	9 (30.0)
Fair (score 4 – 6)	-	1 (3.33)
Poor (score < 4)	-	-

P=0.243

Thus the incidence of acceptable intubating conditions (excellent + good) in group I and II were statistically comparable ($p < 0.05$). But the incidence of excellent intubating conditions were more often seen with Suxamethonium group than Rocuronium group ($p = 0.02$).

Adverse Reactions : none in both group

DISCUSSION :

Rocuronium bromide is a fast onset, intermediate acting , nondepolarising N-M blocking agent acts by competing for nicotinic choline receptors at the motor end plate and antagonized by anticholine esterase like Neostigmine ,endrophonium ,and pyridostigmine.

Magorian et al (1993)[3]advocated higher doses of Rocuronium for rapid sequence induction as 0.9mg/kg and 1.2mg/kg and found onset time was similar to Suxamethonium.

T Fuchs Buder et al (1996)[4] used two doses of Rocuronium 0.6 mg/kg and 0.9 mg/kg for RSI after 60 seconds found excellent grade intubating conditions more with 0.9 mg/kg dose of Rocuronium. AP Dobson(1999)[5] showed after induction with fentanyl 1 microgm/kg and thiopentone 5mg/kg and Rocuronium 0.6mg/kg ,one should wait atleast 60 sec. for achieving acceptable intubating conditions.

TM Hemmerling et al (2000)[6] compare effect of Succinyl choline 1 mg/kg with two doses of Rocuronium 0.6 mg/kg and 0.9 mg/kg at laryngeal muscles by surface laryngeal EMG and showed that Rocuronium 0.9 mg/kg is used to produce onset time equivalent to succinyl choline 1 mg/kg and can replace the same for RSI.

In the present study patients received either Rocuronium 1 mg/kg or Suxamethonium 1.5 mg/kg and intubation started at 60 sec. and intubating conditions were assessed at 60 sec.

Thus from inferences from above studies ,A dose of 1 mg/kg of the Rocuronium is recommended for facilitation of tracheal intubation for rapid sequence induction after which the adequate intubation conditions are established within 60 sec. in nearly all patients.

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