



ORIGINAL RESEARCH PAPER

Anaesthesiology

A COMPARATIVE STUDY OF THE INTUBATING CONDITION OF TWO PRIMING TECHNIQUES WITH ROCURONIUM BROMIDE

KEY WORDS:

Dr T. Kanagarajan	M.D.,D.A, Associate professor, Department of Anaesthesiology, Government Medical college & ESI Hospital,Coimbatore-15.
Dr R.Ganesan*	M.D., Senior assistant professor, Department of Anaesthesiology, Government medical college hospital, Pudukkotai. *Corresponding author.
Dr B.Jeyarani	M.D.,D.A, Associate professor, Department of Anaesthesiology, Government medical college hospital,Pudukkotai.

ABSTRACT

AIM:
To compare the intubating conditions of two priming techniques (Two priming intervals) with Rocuronium bromide

MATERIALS AND METHODS:
50 ASA I and II patients of all age groups, who were scheduled for elective surgical procedures requiring tracheal intubations were included in this study. They were randomly assigned to two groups. Group-1 received priming dose (0.06mg/kg of Rocuronium) 2 minutes before intubating dose (0.54mg/kg of Rocuronium). Group-2 received priming dose (0.06mg/kg of Rocuronium) 3 minutes before intubating dose (0.54mg/kg of Rocuronium).Laryngoscopy started 45 seconds after completion of intubating dose of Rocuronium. Intubating conditions were assessed according to those described in the good clinical practice international criteria.

RESULTS:
Results were analysed by using Z TEST. In Group - 1 patients, excellent intubating conditions were observed in 28% of the patients in group1 & 36%in group -2. In 72% intubating conditions were assessed as good in 72% of patients in group 1 & 64%in group 2 patients. No intubating condition is observed as poor in both the groups. Over all intubating conditions were considered to be adequate (excellent and good) in all patients (100%), in both the groups.

CONCLUSION:
From this study it is concluded that two minutes priming interval and three minutes priming interval of Rocuronium bromide produces equally adequate intubating condition. Reduction in priming interval may be very useful where rapid sequence induction is contemplated.

INTRODUCTION:

Endotracheal intubating condition depends on patient’s airway anatomy, experience of the anaesthesiologist, and drugs used for induction. In an elective nonemergency situation the choice of muscle relaxant depends on the patient’s physical status and associated co-morbid conditions. In rapid sequence induction, Suxa methonium hydrochloride is still the most frequently used depolarizing muscle relaxant. Because of its well known side effects like increased intraocular pressure and intracranial pressure, arrhythmias, post operative myalgia, it needs to be avoided in conditions like patients with head injury, ophthalmic surgeries, and patients at risk of developing potential arrhythmias. In these situations it is essential to use the non depolarizing muscle relaxant with very short onset time without any side effects.

In order to reduce the onset time it is necessary to increase the intubating dose of Rocuronium or use priming principle. Increasing the dose of Rocuronium is associated with prolonged recovery time. So application of priming technique is the best option to reduce the onset time of Rocuronium bromide.

It is postulated that ideal priming dose (PD) for non depolarizing muscle relaxant is 20% of ED95, or 10% of intubating dose. If this dose is increased, increased proportion of patients will experience profound weakness (twitch depression of almost 40%). So Optimal priming dose is 20% of ED95, and priming interval is 3 minutes for Rocuronium.

The priming interval, i.e. the time between priming and intubating dose, is as important as the priming and intubating doses themselves. We studied the influence of various priming intervals on intubating condition.

AIM OF THE STUDY:

To compare the intubating conditions of two priming techniques (Two priming intervals) with Rocuronium bromide

MATERIALS AND METHODS:

This study was conducted at Thanjavur medical college Hospital,

during the period of July 2007 and September 2007.After institutional ethical committee clearance and obtaining the informed consent, 50 ASA I and II patients of all age groups, who were scheduled for elective surgical procedures requiring tracheal intubations were included in this study. All patients underwent preanaesthetic evaluation to ascertain medical and physical fitness.

EXCLUSION CRITERIA:

- Patients with anticipated difficult airway for tracheal intubations.
- Patients with neuromuscular disorder.
- Patients with known history of allergy to muscle relaxant or other drugs.
- Pregnant patients and patients who are breast feeding.
- Patients undergoing emergency procedure.

ANAESTHETIC TECHNIQUE:

All patients included in this study were given no premedication. Routine monitoring (e.g. ECG, NIBP, SPO2) was instituted. All 50 patients were randomly allocated into two groups. (Group-1 and group-2)

After preoxygenation for 3 minutes anaesthesia was induced in all patients with Inj. Fentanyl 2µg kg-1 and Inj.Propofol 2mg kg-1 intravenously. After loss of consciousness and confirming the mask ventilation,

Patients in group1 (n=25) received a priming dose of Rocuronium0.06mg/kg followed 2 minutes later by Injection Rocuronium 0.54 mg/kg. Patients in group-2 (n=25) received a priming dose of injection Rocuronium 0.06mg/kg followed 3 minutes later by Inj. Rocuronium 0.54 mg/kg.

Laryngoscopy started 45 seconds after completion of intubating dose of Rocuronium and all patients were intubated at 60 seconds. The laryngoscopist (The anesthesiologist with more than 3 years of experience in intubations) was blinded to nature of priming dose. Intubating conditions were assessed according to those

described in the good clinical practice international criteria. (Table-2)

	Excellent	Good	Poor
Laryngoscopy	Easy	Fair	Difficult
Vocal cord			
Position	Abducted	Intermediate	Closed
Movement	None	Moving	Closed
Reaction to insertion			
Movement of limb	None	Slight	Vigorous
Coughing	None	Diaphragm	Sustained >10sec

Table-2 Assessment of the intubating condition

Excellent- all qualities are excellent
 Good - all qualities are excellent or good
 Poor - presence of single quality listed under poor.

Laryngoscopy:

Easy -jaw relaxed, no resistance to blade in the course of laryngoscope.

Fair -jaw not fully relaxed, slight resistance to blade.

Difficult -poor jaw relaxation, active resistance of the patient to Laryngoscopy.

OBSERVATIONS AND RESULTS:

The study was conducted on 50 patients of ASA grade I and II of all age groups ranging from 15 to 60 years who were posted for elective surgery. They were randomly assigned to two groups.

Group-1 received priming dose (0.06mg/kg of Rocuronium) 2 minutes before intubating dose (0.54mg/kg of Rocuronium).

Group-2 received priming dose (0.06mg/kg of Rocuronium) 3 minutes before intubating dose (0.54mg/kg of Rocuronium). Results are tabulated as follows; results were analyzed by using Z TEST

INTUBATING CONDITIONS:

Variables	Group-1 n=25	Group-2 n=25
Laryngoscopy	24	25
• Easy	1	0
• Fair	0	0
• Difficult		
Vocal Cord Position	16	18
• Abducted	9	7
• Intermediate	0	0
• Closed		
Vocal Cord Movement	20	20
• None	5	5
• Moving	0	0
• Closed		
Reaction To Intubation		
Movement Of The Limb	18	20
• None	7	5
• Slight	0	0
• Vigorous		
Coughing	17	20
• None	8	5
• Diaphragm		0
• Sustained (>10sec		

Table-1

INTUBATION:GROUP-1

INTUBATION	FREQUENCY	PERCENT	VALID PERCENT
EXCELLENT	07	28.0	28.0
GOOD	18	72.0	72.0
POOR	0	0	0
TOTAL	25	100.0	100.0

Table-2

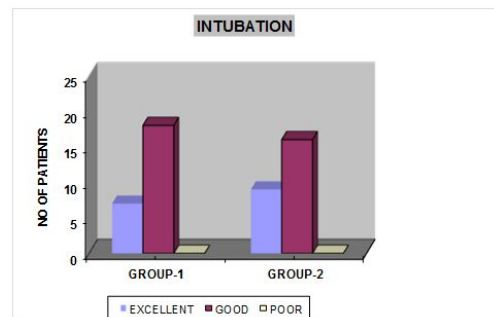
Excellent intubating conditions were observed in 28% of the patients. In 72% intubating conditions were assessed as good. No intubating condition is observed as poor. Over all intubating conditions were considered to be adequate (excellent and good) in all patients (100%)

GROUP-2

INTUBATION	FREQUENCY	PERCENT	VALID PERCENT
EXCELLENT	9	36.0	36.0
GOOD	16	64.0	64.0
POOR	0	0.0	0.0
TOTAL	25	100.0	100.0

Table-3

Excellent intubating conditions were observed in 36% of the patients. In 64% intubating condition was assessed as good. No intubating condition is observed as poor. Over all intubating conditions were considered to be adequate (excellent & good) in all patients (100%).



GRAPH-1

Fig-5 shows intubating conditions in both groups. Number of patients showing excellent intubating condition in group -1 was 28%, in the group -2 was 36 percent. Though there is an observed significance, there is no statistical significance.

Age, sex and weight distributions have no significant impact on assessment of intubating condition in both the groups and is statistically not significant. (p>0.05)

DISCUSSION:

It was observed that the intubating conditions in both priming intervals (2 minutes and 3 minutes) were adequate (excellent and good). Intubating condition graded as excellent was 28% in 2 minutes interval group as compared with 36% in 3 minutes group. Intubating condition graded as good was 72% in 2 minutes interval group as compared with 64% in 3 minutes interval group. The priming interval appears to influence the intubating conditions. (onset time of neuromuscular blockade.)

Priming with Rocuronium was investigated in previous studies. Naguib3 et al found onset time of 73seconds and 90seconds respectively after a 0.06mg/kg priming dose of Rocuronium and a 3 minutes interval or a 0.60mg/kg single dose of Rocuronium.

It is concluded that priming a Rocuronium with Rocuronium resulted in a neuromuscular block comparable to that of Succinylcholine in both onset of action and intubating condition.

Griffith and colleagues studied a group given a priming dose of 0.06 mg/kg Rocuronium followed after 2 minutes by an intubating dose of 0.54mg/kg. The control group received a bolus dose of 0.60mg/kg of Rocuronium 2 minutes after a saline injection. They reported that the onset time with priming rocuronium (34 ± 6s) were significantly shorter than those without priming (59±14s). Intubating conditions were similar in both groups.

L. Aziz, S.M. Jahangir, S.N.S. Choudhury, K.Rahman et al in their study recommended that priming may not be a safe approach in elderly patients, because they found that priming dose of Vecuronium and Rocuronium produced greater decrease in

oxygen saturation and pulmonary function in the elderly(aged 65 to 73 years) than their younger(25-35 years) counterparts.

14) Stoelting M.D. Pharmacology and physiology in anaesthesia practice (IV Th Edition).

In our study mean age of the patients in group-1 is 36.08 ± 12.06 and in group-2 is 39.24 ± 11.09 . So in this patients are well within the safety limits. J.A. Perczak-Bados et al in their " comparative study of intubating conditions at the first minute with different priming techniques of Rocuronium", concluded that priming Rocuronium with $0.1 \times ED_{95}$ of Rocuronium is effective and safe technique and did not increase the risk of pre curarization in healthy patients. In their study the intubating dose of Rocuronium was preceded 4 minutes earlier by $0.1 \times ED_{95}$ dose.

Donati argued that maximum safe priming dose of nondepolarizing muscle relaxant should be equivalent to 10% of the ED_{95} ($0.1 \times ED_{95}$). But the authors recommend PD as large as 30% of ED_{95} .

Aaron concluded that with the priming dose of 20% of ED_{95} , one patient in 20 will exhibit measurable decrease in twitch height thereby weakness. So in our study we reduced the priming interval to 2 minutes with $0.2 \times ED_{95}$ (10% of intubating) dose. In our study no patient had weakness or regurgitation

B.Yavascaoglu , et al (2002) in their study of " comparison of two priming techniques on the onset time and intubating condition of Rocuronium" concluded that priming Rocuronium with $0.2 \times ED_{95}$ dose, (0.06mg/kg) 3 minutes before intubating dose (0.54mg/kg) decreases the onset time (63 ± 18 seconds), when compared to priming Rocuronium with $0.2 \times ED_{95}$ dose, (0.06mg/kg) 2 minutes before intubating dose (0.54mg/kg). In the later group the onset time is 79.5 ± 22.4 seconds.

The priming interval appears to influence the onset time of neuromuscular blockade. Increasing the priming interval of Rocuronium from 2 minutes to 3 minutes shorten the onset time. But the intubating conditions with reference to Laryngoscopy, vocal cord position and movement and reaction to intubation were similar in both groups.

We studied the intubating conditions with reference to Laryngoscopy, vocal cord position and movement and reaction to intubation were slightly better in group-2 (3 minutes priming interval) than group-1 (2 minutes priming interval). But overall intubating condition in both groups was equal.

CONCLUSION:

From this study it is concluded that two minutes priming interval and three minutes priming interval of Rocuronium bromide produces equally adequate intubating condition. Reduction in priming interval may be very useful where rapid sequence induction is contemplated.

BIBLIOGRAPHY:

- 1) White PF. Rapacuronium: Why did it fail as a replacement for Succinylcholine. Br J of Anaesthesia 2002; 88:163-165.
- 2) Siber TJ, Zibenden AM, Curatolo M, Shorten GD. Tracheal intubation with Rocuronium using the timing principle. Anaesthesia Analgesia 1998; 86:1137-1140.
- 3) Glass PS, Wilson w, Mase JA, Wagoner R. Is the priming principle both effective and safe? Anaesthesia Analgesia 1989; 68:
- 4) Lee's Synopsis of Anaesthesia, 13th edition; 175-200127-134.
- 5) Folders F. Rapid tracheal intubation with nondepolarizing agents; Priming principle (Letter) Br J of anaesthesia 1984; 56:663.
- 6) Griffith KE, Joshi GP, Whitman PF, Garg SA, priming with rocuronium accelerates the onset of neuromuscular blockade J Clin Anesth 1999 ;9:204-7
- 7) Azizl, Jahangir SM, Choudhry SN, Rahman K, Ohta Y, Hirakava M. The effect of priming with vecuronium and rocuronium on young and elderly patients Anesth Analg 1997; 85: 663-6
- 8) Naguib M Different priming techniques including mivacurium accelerates the onset of rocuronium. Can J Anaesth 1994 ;41:902-7.
- 9) Meistelman C, Plaud B, Donati F. Rocuronium (ORG 9426) Neuro muscular blockade at the adductor muscles of the larynx and adductor pollicis in humans. Can J Anaesth 1992 ;39:665-9.
- 10) Rao HM, Venkatraman A, Malleswari R, Comparison of intubating conditions between rocuronium with priming and without priming; Randomized and double blind study. Indian J Anaesth 2011 ; 55:494-8.
- 11) Ronald D. Miller, Miller's Anaesthesiology, Vlt edition. Volume I; 860-867.
- 12) Meistelman C, Plaud B, et al Rocuronium neuromuscular blockade at the adductor muscles of the larynx and adductor pollicis in humans. Can Jr Anes 1992; 39:665-9.
- 13) Van den Broekl, et al. Clinical pharmacology of Rocuronium: study of the time course of action, dose requirement, reversibility and pharmacokinetics. Clin Anaes 1994; 6:288-296.