

**ORIGINAL ARTICLE****A comparative study of Vecuronium and Rocuronium bromide for laryngoscopy**

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**ABSTRACT:**

**Background:** The use of neuromuscular blocking agents (NMBA) to facilitate tracheal intubation is a widely accepted procedure. Direct laryngoscopy stimulates the oropharynx and activates oropharyngeal reflexes. The present study compared Vecuronium and Rocuronium bromide for laryngoscopy. **Materials & Methods:** 50 ASA grade I and grade II patients from different surgical specialties of both genders. Patients were divided into 2 groups of 25 each. Group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. Parameters such as onset of action, intubating conditions, heart rate and train of four monitoring was recorded. Time in seconds from injection of study drug till TOF score 0 (onset time) and duration of action were measured by intermittently noting response to TOF. **Results:** Group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. Group I had 13 males and 12 females and group II had 14 males and 11 females. The mean duration of action was 43.6 minutes in group I and 47.5 minutes in group II and train of four monitoring was 63.4 seconds in group I and 140.2 seconds in group II. Intra-operative laryngoscopy status was easy in all 25 patients in both groups. The difference was significant ( $P < 0.05$ ). The mean heart rate (beats/min) at baseline in group I was 81.4 and in group II was 83.2, after intubation in group I was 90.4 and in group II was 93.6 and after 10 minutes in group I was 81.6 and in group II was 84.1. The difference was significant ( $P < 0.05$ ). **Conclusion:** There was no difference in intubating conditions and haemodynamic response between both agents. Both Rocuronium and Vecuronium were found to be equally effective.

**Key words:** Rocuronium, Vecuronium, Laryngoscopy

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**INTRODUCTION**

The use of neuromuscular blocking agents (NMBA) to facilitate tracheal intubation is a widely accepted procedure. Direct laryngoscopy stimulates the oropharynx and activates oropharyngeal reflexes.<sup>1</sup> However, the use of NMBA will inhibit muscular contractions and improve conditions for tracheal intubation. Due to adverse effects the use of NMBA may be undesirable. Both depolarising and non-depolarising NMBA may have side effect as anaphylaxis, cardiovascular effects related to histamine release or sympathomimetic properties, bronchospasm and prolonged paralysis.<sup>2</sup> The unwanted side-effects includes: muscle fasciculations, post-operative myalgia, hyperkalemia, increased intraocular, intracranial pressures, and cardiovascular effects which include bradyarrhythmias and Asystole. The search for better drugs to meet the properties of an ideal neuromuscular blocking agent, led to the development of new non-depolarizing neuromuscular blocking drugs.<sup>3</sup> Rocuronium bromide, a newer amino-steroidal compound, is a derivative of vecuronium; Rocuronium has a rapid onset time, an intermediate duration of action and rapid recovery with cardiovascular stability. It has no significant histamine release. Onset time of a  $0.6 \text{ mg/kg}^{-1}$  dose of Rocuronium ranges from 1 to 1.5 minutes under

nitrous oxide opioid anesthesia.<sup>4</sup> Nevertheless, with this dose Rocuronium, the intubating conditions at 60 seconds are similar to those observed with Suxamethonium. This might persuade many clinicians to use Rocuronium to facilitate endotracheal intubation not only in elective cases under adequate anesthesia but also in emergency situations requiring rapid sequence intubation.<sup>5</sup> The present study compared Vecuronium and Rocuronium bromide for laryngoscopy.

**MATERIALS & METHODS**

The present study consisted of 50 ASA grade I and grade II patients from different surgical specialties of both genders. Ethical clearance was obtained from higher authorities.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 25 each. Group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. All were premedicated and induced with Inj. Fentanyl and Inj. Propofol. Parameters such as onset of action, intubating conditions, heart rate and train of four monitoring was recorded. Time in seconds from injection of study drug till TOF score 0 (onset time) and duration of action were measured by intermittently noting response to TOF. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Groups	Group I	Group II
Drug	Inj. Rocuronium	Inj. Vecuronium.
M:F	13:12	14:11

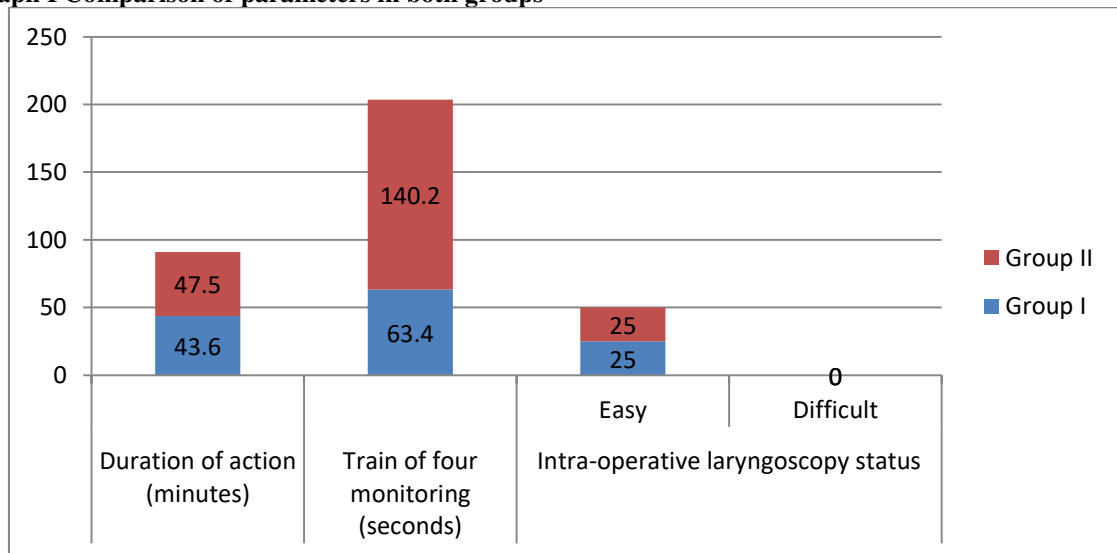
Table I shows that group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. Group I had 13 males and 12 females and group II had 14 males and 11 females.

**Table II Comparison of parameters in both groups**

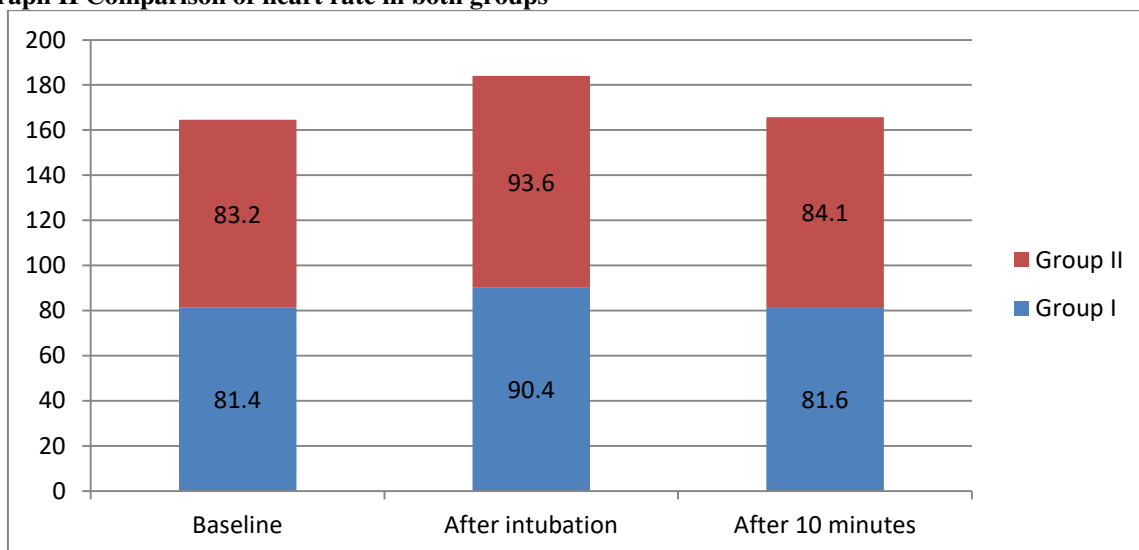
Parameters	Variables	Group I	Group II	P value
Duration of action (minutes)		43.6	47.5	0.05
Train of four monitoring (seconds)		63.4	140.2	0.01
Intra-operative laryngoscopy status	Easy	25	25	1
	Difficult	0	0	

Table II, graph I shows that mean duration of action was 43.6 minutes in group I and 47.5 minutes in group II and train of four monitoring was 63.4 seconds in group I and 140.2 seconds in group II. Intra-operative laryngoscopy status was easy in all 25 patients in both groups. The difference was significant ( $P < 0.05$ ).

**Graph I Comparison of parameters in both groups**



**Graph II Comparison of heart rate in both groups**



Graph II shows that mean heart rate (beats/min) at baseline in group I was 81.4 and in group II was 83.2, after intubation in group I was 90.4 and I group II was 93.6 and after 10 minutes in group I was 81.6 and in group II was 84.1. The difference was significant ( $P < 0.05$ ).

## DISCUSSION

The introduction of neuromuscular blocking drugs, in anaesthesia practice, the incontrovertible advantages of intubation in the safe maintenance of airway have changed the indication of intubation from specific need to almost a routine use in general anaesthesia practice. Thus, the use of muscle relaxant has become an important aspect of modern anaesthesia.<sup>6</sup> Vecuronium and Atracurium are free from various side effects encountered with Suxamethonium. However even after intubating doses, onset time is relatively slow as compared with Suxamethonium that of for rapid tracheal intubation. The use of high initial bolus dose of either Atracurium or Vecuronium shortens the onset time, but at the expense of a prolonged duration of action, which may be undesirable in certain situations.<sup>7</sup> Difficulties with tracheal intubation (DTI) by direct laryngoscopy can cause serious soft tissue damage and DTI may be the principal causes of hypoxemic death and brain damage in relation to anaesthesia. A review identified difficult airway management as the main cause of death and severe morbidity related to anaesthesia. The risk of DTI may be reduced by choosing an induction strategy including, or avoiding, NMBA for facilitating tracheal intubation.<sup>8</sup> The present study compared Vecuronium and Rocuronium bromide for laryngoscopy.

We observed that group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. Group I had 13 males and 12 females and group II had 14 males and 11 females. Neeraja Bharti et al<sup>9</sup> demonstrated that the rate of development of neuromuscular block and hence the onset of action was faster with Rocuronium than Vecuronium. Lin et al<sup>10</sup> observed that clinical durations of action were 44.2 +/- 13.2 min in Rocuronium group and 42.5 +/- 9.1 min in Vecuronium group respectively.

We found that the mean duration of action was 43.6 minutes in group I and 47.5 minutes in group II and train of four monitoring was 63.4 seconds in group I and 140.2 seconds in group II. Intra-operative laryngoscopy status was easy in all 25 patients in both groups. Robertson EN et al<sup>11</sup> reported that Rocuronium provide clinically acceptable intubating conditions in shorter time with least side effects as compared to succinylcholine and vecuronium.

We found that the mean heart rate (beats/min) at baseline in group I was 81.4 and in group II was 83.2, after intubation in group I was 90.4 and I group II was 93.6 and after 10 minutes in group I was 81.6 and in group II was 84.1. Gupta et al<sup>12</sup> in their study patients were divided into two groups, each consisting of 30 patients: group a patient's received Rocuronium bromide, 0.6 mg/kg and group B patients received Suxamethonium chloride 1.5 mg/kg. In both the groups, jaw relaxation and vocal cord relaxation were considered for atraumatic laryngoscopy at 60 seconds or, if needed, at 75 seconds and then at 90 seconds.

Intubation conditions were rated as excellent in 90% and good in 10% of the patients who received Rocuronium, and excellent in 100% of the patients who received Suxamethonium. It was concluded that intubation can be performed under good to excellent conditions at 60–90 seconds after a bolus dose of Rocuronium of 0.6 mg/kg. The result of this study indicates that this new nondepolarizing neuromuscular blocking agent may be considered as a valuable alternative to Suxamethonium for rapid tracheal intubation, i.e., within 60 seconds, even after induction with Thiopentone as the sole anesthetic agent.

The shortcoming of the study is small sample size.

## CONCLUSION

Authors found that there was no difference in intubating conditions and haemodynamic response between both agents. Both Rocuronium and Vecuronium were found to be equally effective.

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