Original Research Article

A comparative evaluation of intubating conditions and haemodynamic changes with Vecuronium and Rocuronium bromide for laryngoscopy- A clinical study

Suraj Bhan[1], Ashish Nahar[2*]

[1]Assistant Professor of Anaesthesia, World College of Medical Science and Research, Jhajjar, Haryana, India
[2]Assistant Professor of Anaesthesia, American International Institute of Medical Science, Bedwas, Udaipur, Rajasthan, India

Received: 20-03-2020 / Revised: 30-05-2020 / Accepted: 15-06-2020

Abstract

Background: The present study was conducted to compare the effect on intubating conditions and haemodynamic changes using Vecuronium and Rocuronium bromide for laryngoscopy. **Materials & Methods:** The present study was conducted on 40 ASA grade I and grade II patients which were divided into 2 groups of 20 each. Group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. 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. Parameters such as onset of action, intubating conditions, heart rate and train of four monitoring was recorded. **Results:** The mean train of four monitoring was 62.4 seconds in group I and 138.2 seconds in group II, duration of action was 42.6 minutes in group I and 46.4 minutes in group II. The difference was significant (P< 0.05). Intra-operative laryngoscopy status was easy in all patients in both groups. The mean heart rate (beats/min) at baseline in group I was 82.4 and in group II was 84.2, after intubation in group I was 91.4 and I group II was 94.6 and after 10 minutes in group I was 80.6 and in group II was 83.1. The difference was significant (P< 0.05). **Conclusion:** Authors found that both Rocuronium and Vecuronium were found to be equally effective. There was no difference in intubating conditions and haemodynamic response between both agents.

Keywords: Laryngoscopy, Rocuronium, Vecuronium.

Introduction

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[1].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.

**Correspondence*
Dr. Ashish Nahar
Assistant Professor
Department of Anaesthesia,
American International Institute of Medical Science, Bedwas, Udaipur, Rajasthan, India.
E-mail: ashishnahar75@gmail.com

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[2].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[3]. 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[4]. The present study was conducted to compare the effect on intubating conditions and haemodynamic changes using Vecuronium and Rocuronium bromide for laryngoscopy.

Materials & Methods

The present study was conducted in the Department of Anesthesiology. It comprised of 40 ASA grade I and grade II patients from different surgical specialties. The study was approved form ethical committee and consent of all patients was taken. Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 20 each. Group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. 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. 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. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

Groups	Group I	Group II
Agent	Inj. Rocuronium	Inj. Vecuronium.
Number	20	20

Table I shows that group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. Each group had 30 patients.

Table 2:Comparison of parameters

Parameters	Group I (mean)	Group II (mean)	P value
Train of four monitoring (secs)	62.4	138.2	0.01
Duration of action (mins)	42.6	46.4	0.02
Intra-operative laryngoscopy status			
Easy	20	20	1
Difficult	0	0	

Table II shows that mean train of four monitoring was 62.4 seconds in group I and 138.2 seconds in group II, duration of action was 42.6 minutes in group I and 46.4 minutes in group II. The difference was significant (P< 0.05). Intra-operative laryngoscopy status was easy in all patients in both groups. The difference was non-significant (P> 0.05).

Discussion

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[5].Before discovery of muscle relaxant, intubation was difficult as anaesthesia was in primitive stage. With subsequent discovery of drugs like Succinylcholine, Gallalium, Curare derivatives intubating patient made easy. But they were associated with many side effects. Like Pancuronium is long acting muscle relaxant but have Vagolytic effect. Atracurium is short acting muscle relaxant but it has histamine releasing property though these muscle relaxants do provide good intubating conditions[6]. Prolonged apnea may be encountered in individuals with atypical Pseudocholinesterase. It may also induce malignant hyperthermia and Myoglobinuria, a grave situation in susceptible patients. Thus, it falls short of an ideal muscle relaxant due to its potentially hazardous side effects, in spite of having the advantages of rapid action and quick recovery[7,8]. The present study was conducted to compare the effect on intubating conditions and haemodynamic changes using Vecuronium and Rocuronium bromide for laryngoscopy.In this study, group I patients received Inj. Rocuronium and group II patients received Inj. Vecuronium. Each group had 30 patients. Pawar et al[9] compared the effect on intubating conditions and haemodynamic changes using Vecuronium and Rocuronium bromide for

laryngoscopy in 60 patients. All patients were randomly allocated into two groups of 30 each. All were premedicated and induced with Inj. Fentanyl and Inj. Propofol. After induction tracheal intubation was facilitated by giving either Inj. Rocuronium 0.6 mg/kg or Inj. Vecuronium 0.1 mg/kg to patients of Group A and Group B respectively. Anaesthesia was maintained on N_2O (66.6%) and O_2 (33.3%) mixture Analgesics, and either Vecuronium or Rocuronium as muscle relaxant with Sevoflurane. We found that mean train of four monitoring was 62.4 seconds in group I and 138.2 seconds in group II, duration of action was 42.6 minutes in group I and 46.4 minutes in group II. The difference was significant ($P< 0.05$). Intra-operative laryngoscopy status was easy in all patients in both groups. Robertson EN et al[10] reported that Rocuronium provide clinically acceptable intubating conditions in shorter time with least side effects as compared to succinylcholine and vecuronium.We found that mean heart rate (beats/min) at baseline in group I was 82.4 and in group II was 84.2, after intubation in group I was 91.4 and I group II was 94.6 and after 10 minutes in group I was 80.6 and in group II was 83.1. Neeraja Bharti et al[11] demonstrated that the rate of development of neuromuscular block and hence the onset of action was faster with Rocuromium than Vecuromium. Lin et al[12] 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. W.M. Schramm et al concluded that there was no significant change in the mean arterial pressure after treatment with Rocuronium (0.6 mg/kg) and Vecuronium (0.1 mg/kg).

Conclusion

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

References

1. Gramstad L, Ulleaasen P. Clinical pharmacology of Org NC45 (Norcuron) a new nondepolarizing muscle relaxant. Anaesthesiology, 1982;55(6):24.
2. Hunt R, Taveau RM. On physiological action of certain choline derivatives and new methods for detecting choline. British Medical Journal. 1906; 1788-91.
3. Baird WLM, Reid AM. The neuromuscular blocking properties of a new steroid compound, pancuronium bromide - a pilot study in man. British Journal of Anaesthesia. 1967; 39:775-80.
4. Wierda JMKH, De Wit APM, Kuizenga K, Agaston S. Clinical observations on the neuromuscular blocking action of Org 9426, a new steroidal non-depolarizing agent. BJA. 1990; 64:521-23.
5. Man TT, Cheng JK, Wong KL, Chen CC, Rau RH, Wu KH et al. Tracheal intubation – a comparison between one minute after Rocuronium combined with Atracuronium and one minute after Rocuronium combined with Atracuronium and one minute Atracuronium with Rocuronium at one minute priming interval. Acta Anaesthesiol. 2002; 40(4):179-83.
6. Bartkowski RR, Witkowski TA, Azad S, Lessin J, Marr A. Rocuronium onset of action: A comparison with Atracurium and Vecuronium. Anesth. Analg. 1993; 77:574-78.
7. Lee C. Suxamethonium in its fifth decade. Baillière's Clinical Anaethesiology. 1994; 8:417-40.
8. Hunter JM. Rocuronium: the newest Aminosteriod neuromuscular blocking drug. British journal of anaesthesia. 1996; 76(4):481-3.
9. Pawar M, Jadhav RS, Misal Ullhas, Gomsale P. Comparison of intubating conditions and haemodynamic changes using Vecuronium and Rocuronium bromide for laryngoscopy. International Journal of Medical Anesthesiology 2019; 2(2): 167-173.
10. Robertson EN, Hull JM, Verbeck AM, Booij LH. A comparison of Rocuronium and Vecuronium: the pharmacodynamic, cardio vascular and intra-ocular effects. European Journal of Anaesthesiology. 1994; (9):116-21.
11. Neeraja Bharti, Sunila Sharma, SK Goel, Rocuronium: Time course of action and intubation conditions - A comparison with Atracurium and Vecuronium. Indian J Anaesth. 2001; 45(5):363.
12. Lin PL, Liu CC, Fan SZ, Chao A, Shin SC, Tai YT et al. Comparison of neuromuscular action of Rocuronium, a new steroidal non depolarizing agent with Vecuronium. Acta Anaesthesiol Sin. 1997; 35(3):127-31.

Source of Support:Nil
Conflict of Interest: Nil