



Comparison of succinylcholine and rocuronium for rapid sequence intubation in cesarean section

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ABSTRACT

Objectives: To compare efficacy in term of intubating condition between rocuronium and succinylcholine for rapid sequence induction in cesarean section

Methodology: This randomized controlled trial was conducted at anesthesia department of our hospital at Nawabshah from January to December 2016. A total of 124 full term patients with Mallampati I & II and American Society of Anesthesiologists (ASA) physical status class I and II were randomly allocated into two groups. Group A (62 patients), was treated with succinylcholine chloride and Group B (62 patients) received rocuronium bromide for intubation. Intubating conditions were assessed by jaw relaxation, movement of vocal cords and bucking. Efficacy was labeled as 'Yes' when score 8 and 9 (excellent) otherwise 'No' if score was less than 8 "good and poor". Blood pressure, heart rate, and SpO₂ were monitored.

Results: - The average age of the patients was 32.37 ± 1.98 y. Overall rate of excellent intubating conditions at one min was observed in 103 (83.1%) patients, good in 17 (13.7%) and poor in 4 (3.2%). The frequency of clinically acceptable intubating conditions (i.e. excellent) was 87.1% in group A and 79.03% in group B which is not statistically significant.

Conclusion: Rocuronium can be safely used for rapid sequence induction in caesarean sections and the intubating conditions are similar to those of succinylcholine.

Key words: Endotracheal intubation; Succinylcholine; Rocuronium; Cesarean section

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INTRODUCTION

Succinylcholine is the most commonly used and a cost effective neuromuscular blocking agent available in Pakistan for endotracheal intubation. It has been in the core anesthetic practice for more than 60 y and is usually preferred if there is a fear of prolonged or failed intubation.^{1,2} No other drug can compete with it in quality of muscle relaxation, rapidity of onset and short duration of action; that is why despite its limitations and side effects, succinylcholine is still being used for endotracheal intubation.³ However,

since its introduction into clinical practice, its side effects related to skeletal muscular activity and biochemically manifested in the form of a rise in serum creatine kinase and serum potassium have been recognized.^{4,5} Although many relaxant agents can be used for this intubation;⁶ succinylcholine is still the most popularly used agent in our setup.^{1,7,8}

This study was designed to compare efficacy in term of intubating condition between rocuronium and succinylcholine for rapid sequence induction in cesarean section. The rationale of this study was to find out whether rocuronium produces equally

good intubating conditions when compared to succinylcholine in RSI in elective caesarean sections.

METHODOLOGY

This randomized controlled trial was conducted at Department of Anesthesia, SICU & Pain Center, People's Medical College Hospital Nawabshah from January 2016 to December 2016

A sample size was calculated by using the Rao software to be 124 patients. All full term parturients, ages between 30-35 years of Mallampati I & II and ASA physical status class I and II were included while patients with cervical spine abnormalities were excluded from the study.

This study was performed after the permission of ethical committee of hospital and written informed consent for the study was obtained from every patient. Patients were randomly divided into 2 groups of 62 patients each group. All patients received aspiration prophylaxis like inj dexamethasone 8 mg IV, inj metoclopramide 10 mg and inj ranitidine 50 mg IV diluted slowly.

Pre-operative vital parameters including pulse rate, systolic and diastolic blood pressures, mean arterial pressure and oxygen saturation was recorded. Venous access was established and connected to IV fluid. After pre-oxygenation with 100% oxygen for 5 min anesthesia was induced with inj propofol 1.5 mg/kg and suxamethonium 1 mg/kg or rocuronium 1 mg/kg to patients of Group A and B respectively.

Intubating conditions were assessed after one minute by jaw relaxation, movement of vocal cords and any bucking, and graded by awarding points to each parameter as excellent (3 points), good (2 points) or poor (1 point). A score of 8-9 was considered Excellent, 6-7 as good and 3-5 as Poor. Pre-operative vital parameters including pulse rate, systolic, diastolic and mean arterial pressures and pulse oxygen saturation were monitored.

The data was analyzed by using Statistical Package for Social Science (SPSS) software, version 16. Chi-square test was applied to compare the efficacy in term of intubating condition between groups. $p \leq 0.05$ was considered as significant.

RESULTS

The average age of the patients was 32.37 ± 1.98 y. Mean age of the patients was significantly higher in Group B than Group A (Table 1).

Table 1: Comparison of mean age and ASA status between groups

Parameter	Group A (n = 62)	Group B (n = 62)	p-value
Age (Mean \pm SD)	32.87 \pm 1.94	31.87 \pm 1.91	0.005
ASA-I	39 (62.9%)	34 (54.84%)	0.36
ASA-II	23 (37.10%)	28 (45.16%)	0.36

Regarding ASA status, 73(58.9%) was in ASA-I and 51(41.1%) in ASA-II collectively. ASA-I and II status were equivalent in two groups.

Overall rate of excellent intubating condition was observed in 83.1% (103/124) patients, was good in 13.7% (17/124) and poor in 3.2% (4/124). Comparative intubating conditions in Group A and B are given in Table 2.

Table 2: Comparison of intubation conditions between two groups

Intubation condition	Group A n = 62	Group B n = 62	Total
Excellent	54 (87.1%)	49 (79%)	103 (83.1%)
Good	7 (11.3%)	10 (16.1%)	17 (13.7%)
Poor	1 (1.6%)	3 (4.8%)	4 (3.2%)

$Chi-Square = 1.77$ $p = 0.41$

The frequency of clinically acceptable intubating conditions (ie excellent) was 87.1% in Group A and 79.03% in Group B; the difference not being statistically significant ($p = 0.23$) (Table 2). The results of our study showed that both drugs produced equivalent intubating conditions. The hemodynamic parameters were found to be equivalent in both groups without any statistically difference.

DISCUSSION

In this study the average age of the patients was 32.37 ± 1.98 years. Mean age of the patients in group B and Group A being 32.87 ± 1.94 vs. 31.87 ± 1.91 y ($p = 0.005$) respectively. In Farhat et al. study the mean age of Group A patients was 39.97 ± 1.833 y and of Group B was 36.63 ± 1.791 y.⁸

Succinylcholine has been for a long time the NMBA of choice for rapid intubation, because of quick onset along with excellent intubation conditions.⁹ As an alternative to succinylcholine, the non-depolarizing NMBA rocuronium can be used for RSI.^{1,4} In present study the difference between frequency of clinically acceptable intubating condition (i.e. excellent) was not statistically significant in both drugs. Similar study was also reported by Lauren EG, et al. They concluded that both succinylcholine and rocuronium produced a faster onset and reliable paralysis for rapid

succinylcholine and rocuronium in cesarean section case report

sequence intubation.¹⁰

Studies comparing rocuronium and succinylcholine in the onset time and quality of intubation have yielded varying results.^{1,4,9} Williamson et al. had shown that with rocuronium (0.6 mg/kg) and succinylcholine (1.5 mg/kg), the time to achieve maximum blockade was 87.94 and 65.59 sec, respectively¹¹ Jones et al. concluded that priming rocuronium with either rocuronium or mivacurium resulted in neuromuscular blockade comparable to that of succinylcholine in both the onset of action and intubating conditions.¹²

Ishigaki et al. found that the priming interval of 4 min allowed the fastest onset time compared with the 2- and 6-min priming intervals.¹³ de Caen et al. has proved that priming with the 3-min priming interval was more effective than the 2-min priming interval when rapid tracheal intubation with rocuronium was necessary.¹⁴ Several previous studies have been performed to assess the onset of action of different doses of rocuronium.¹⁵⁻¹⁸ In this study, assessment of the onset of action of neuromuscular-blocking agents was carried out with clinical methods in the form of the onset of apnea and cessation of chest movements, which may explain the short onset time of a small dose of rocuronium. Several scientists reported in agreement with the present results that the onset of action of neuromuscular blockade of 1.2 mg/kg rocuronium was still longer than that of succinylcholine.^{19,20,21} In contrary to the results of these studies, our study showed that the at one min after

injection of NMBA, both drugs produced equivalent relaxation in the stated doses, even when no priming was done for rocuronium. Although most of the cesarean sections are being carried out under spinal anesthesia the world over, parturients belonging to certain sectors of our population still insist that they should be put to sleep during surgery. Many other patients have to be operated under general anesthesia due to various reasons. Hence, we tested both drugs in full term parturients at our hospital.

CONCLUSION

Rocuronium can be safely used for rapid sequence induction in cesarean sections and the intubating conditions are similar to those of succinylcholine at one minute. It produces equally good intubating conditions when compared to succinylcholine. Careful consideration should go into the use of a drug such as succinylcholine in the ICU, and rocuronium is a very attractive alternative.

Conflict of interest: None declared by the authors

Authors' contribution:

AA: Conduction of study, data collection

MSK: Concept, Manuscript editing

IL: Statistical analysis

MM: Manuscript writing

RI: Manuscript editing

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