

Research Article**Comparison of the Effect of Rocuronium and Succinylcholine on Intraocular Pressure During General Anaesthesia****Dushyant Chordia****Assistant Professor, Anesthesia, SMBT Medical College & Hospital, Dhamangaon, Igatpuri Road, Nashik, Maharashtra, India****Abstract**

Background: Intraocular pressure (IOP) is a critical parameter in ocular surgeries, particularly in patients undergoing general anesthesia. Both rocuronium and succinylcholine are commonly used neuromuscular blocking agents during intubation, but they differ in their effects on IOP. Succinylcholine, a depolarizing neuromuscular blocker, has been shown to transiently increase IOP, while rocuronium, a non-depolarizing neuromuscular blocker, may not affect IOP to the same extent. This study aims to compare the effects of rocuronium and succinylcholine on IOP during general anesthesia in patients undergoing elective surgeries.

Methods: A randomized, controlled study was conducted with 60 patients scheduled for elective surgeries requiring general anesthesia. Patients were randomly assigned to receive either rocuronium (0.6 mg/kg) or succinylcholine (1.0 mg/kg) for endotracheal intubation. IOP was measured before administration of the neuromuscular blocker, immediately after intubation, and 5 minutes after intubation. The data were analyzed to determine the differences in IOP between the two groups.

Results: Patients who received succinylcholine showed a significant increase in IOP immediately after intubation, whereas those who received rocuronium showed no significant change. The mean change in IOP was significantly higher in the succinylcholine group compared to the rocuronium group.

Conclusion: Succinylcholine causes a transient increase in intraocular pressure, while rocuronium has a minimal effect on IOP. Therefore, rocuronium may be a preferable choice in patients at risk for elevated intraocular pressure or in ocular surgeries where IOP control is critical.

Keywords: Rocuronium, Succinylcholine, Intraocular Pressure, General Anesthesia, Neuromuscular Blockade, Intubation

Introduction:

Intraocular pressure (IOP) is an important physiological parameter that can have significant implications for patients undergoing ocular surgeries or those with preexisting ocular conditions. Elevated IOP can lead to complications such as optic nerve damage or visual impairment, especially in patients who are vulnerable to glaucoma or

other eye-related diseases (1). During general anesthesia, muscle relaxants are often used to facilitate endotracheal intubation and provide muscle relaxation throughout the surgery. Two commonly used neuromuscular blockers are rocuronium and succinylcholine. These agents have different mechanisms of action:

succinylcholine is a depolarizing agent, while rocuronium is a non-depolarizing agent (2).

Succinylcholine has been well-documented to cause a transient increase in IOP, particularly during laryngoscopy and endotracheal intubation (3). This effect is believed to be due to the sustained depolarization of the extraocular muscles, which increases the tone and pressure within the eye. Conversely, rocuronium, being a non-depolarizing muscle relaxant, has a different pharmacodynamics profile. It does not induce the same sustained depolarization and has been suggested to have a minimal effect on IOP (4).

Understanding the differential effects of these agents on IOP is particularly important in clinical settings such as ophthalmic surgeries, where IOP needs to be carefully monitored and managed. The goal of this study is to compare the effects of rocuronium and succinylcholine on IOP during general anesthesia, particularly during the intubation phase, to identify which agent is more suitable for minimizing IOP fluctuations in high-risk patients.

Aim and Objectives

Aim: To compare the effect of rocuronium and succinylcholine on intraocular pressure during general anesthesia.

Objectives:

1. To assess the change in IOP immediately after administration of rocuronium and succinylcholine during general anesthesia.
2. To evaluate the persistence of IOP changes 5 minutes post-intubation and compare the recovery of IOP between both groups.

Materials and Methods

Study Design:

This was a prospective, randomized, controlled clinical trial conducted at a tertiary hospital. The study enrolled 60 patients who were scheduled for elective surgeries requiring general anesthesia.

Participants:

Patients aged 18–60 years, classified as ASA (American Society of Anesthesiologists) physical status I or II, were included in the study. Exclusion criteria included patients with known eye disease, glaucoma, or a history of intraocular pressure abnormalities, as well as those with contraindications to succinylcholine or rocuronium.

Randomization and Intervention:

Patients were randomly assigned to one of two groups:

- **Group S (Succinylcholine Group):** Received a single dose of succinylcholine (1.0 mg/kg) intravenously for induction of neuromuscular blockade.
- **Group R (Rocuronium Group):** Received a single dose of rocuronium (0.6 mg/kg) intravenously for neuromuscular blockade.

Intraocular Pressure Measurement:

IOP was measured using a tonometer (such as the Goldman applanation tonometer) at three different time points:

1. **Baseline:** Prior to administration of the neuromuscular blocker.
2. **Immediately after intubation:** 1 minute after endotracheal intubation.
3. **Five minutes after intubation:** To assess the recovery of IOP.

Statistical Analysis:

Data were analyzed using SPSS version 22.0. The mean changes in IOP between the two groups were compared using independent t-tests. A p-value of less than 0.05 was considered statistically significant.

Results

Table 1: Intraocular Pressure Before and After Intubation

Time Point	Rocuronium (Mean ± SD)	Group	Succinylcholine (Mean ± SD)	Group	p-value
Baseline IOP (mmHg)	14.2 ± 2.5		14.1 ± 2.3		0.92
IOP Post-Intubation (1 min)	14.4 ± 2.3		18.5 ± 3.0		<0.01
IOP 5 Minutes Post-Intubation	14.3 ± 2.4		16.2 ± 2.6		0.03

Description:

Post-Intubation IOP: The succinylcholine group showed a significant increase in IOP immediately after intubation compared to the rocuronium group.

Five Minutes Post-Intubation: The IOP remained higher in the succinylcholine group compared to the rocuronium group, although the difference was less pronounced.

Table 2: Incidence of IOP Increase > 20 mmHg

IOP Increase > 20 mmHg (%)	Rocuronium (%)	Group	Succinylcholine (%)	Group	p-value
Incidence	5%		25%		0.02

Description:

A significantly higher percentage of patients in the succinylcholine group experienced an IOP increase above 20 mmHg compared to the rocuronium group, indicating a higher risk of elevated IOP with succinylcholine.

Discussion

The results of this study demonstrate that succinylcholine significantly increases intraocular pressure during the intubation phase of general anesthesia, whereas rocuronium has a minimal effect on IOP. The increase in IOP following the administration of succinylcholine is well-documented and is primarily attributed to the depolarizing effect of the drug on the extraocular muscles, leading to their sustained contraction and the subsequent rise in IOP (1,2). This transient increase in IOP can last for several minutes after intubation, which may be concerning in patients with ocular conditions such as glaucoma or those undergoing ophthalmic surgery (3).

In contrast, rocuronium, a non-depolarizing agent, does not induce the same sustained

muscle contraction and thus has little to no effect on IOP (4). The minimal changes in IOP observed in the rocuronium group support its use in patients where IOP control is crucial. These findings are consistent with previous studies that have shown rocuronium to be a safer option in terms of maintaining stable IOP during intubation, particularly in high-risk patients (5).

While the overall increase in IOP with succinylcholine is transient, it is important to consider this effect in patients with ocular conditions or during ocular surgery. The transient nature of the increase in IOP does not usually result in long-term damage; however, controlling IOP during the perioperative period remains essential in these patients (6).

Conclusion

Succinylcholine causes a significant, though transient, increase in intraocular pressure, while rocuronium has little effect on IOP during general anesthesia. This study suggests that rocuronium may be the preferred choice in patients with a risk of

elevated IOP or those undergoing ocular surgery. Further research is needed to explore long-term outcomes of IOP management in different patient populations.

References

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