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## Reduction in the succinylcholine induced myalgia with lidocaine

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### Abstract

**Background and aim:** There has been an increasing need to find an easily available, effective and feasible method of reducing the incidence of myalgia. Hence, the purpose of the present study is to evaluate and compare the effect of pretreatment with intravenous lidocaine in succinylcholine induced post operative myalgia.

**Materials and methods:** Total of 160 patients were included in the study. Each of the participants were informed about the study, and the informed consent was signed by all. Total of 160 patients were divided into two groups. Group A consists of 80 patients, they were administered with intravenous lidocaine 3 minutes before administering succinylcholine and the rest 80 patients were taken as control group.

**Results:** There is significant reduction in pain over time within the two treatment groups. Though the intensity of Post Operative Myalgia does not significantly reduce ( $p > 0.016$ ) from 1hr to 24hrs in any of the groups, there is a significant reduction ( $p < 0.016$ ) in the intensity of Post Operative Myalgia from 24hrs to 48hrs in all the treatment groups.

**Conclusion:** Lidocaine was found to be superior increasing the number of patients without muscle pain and decreasing the frequency of moderate and severe myalgia. Moderate and severe pain were reported only in (2.5%, 0%), (10%, 2.5%) and (5%, 0%) patients at 1hr, 24hrs and 48hrs respectively. Thus lidocaine pretreatment is concluded to be the most effective method of preventing succinylcholine myalgia.

**Keywords:** Lidocaine, Myalgia, succinylcholine

### Introduction

Succinylcholine, a popular muscle relaxant for ambulatory anaesthesia, short surgical procedures and rapid sequence induction, provides almost ideal intubating conditions<sup>[1]</sup>. Succinylcholine induced myalgia, a minor but frequent side effect with an incidence of 1.5-89%, is one of its drawbacks<sup>[2]</sup>.

Postoperative myalgia is a minor and a frequent adverse effect of succinylcholine administration. Bourne and Collier first described the phenomenon of post-operative myalgia in 1952. They attributed post-operative myalgia to occur due to the vigour of uncoordinated muscle contractions after succinylcholine injection<sup>[3]</sup>.

The reported incidence of succinylcholine-induced myalgia ranges from 1.5 to 89%. The duration of myalgia can last from 2-3 days to a week. The first postoperative day finds the patient with neck, abdomen and shoulder pain. It is self-limiting but can cause distress to the patient<sup>[4,5]</sup>.

In a meta-analysis done in 2005, it was concluded that myalgia can be best prevented with non-depolarizing muscle relaxants, lidocaine or non-steroidal anti-inflammatory drugs. The use of small doses of non-depolarizing muscle relaxants prevents fasciculations and myalgia to a certain extent but is also associated with serious adverse effects<sup>[6]</sup>.

There has been an increasing need to find an easily available, effective and feasible method of reducing the incidence of myalgia<sup>[7]</sup>. Hence, the purpose of the present study is to evaluate and compare the effect of pretreatment with intravenous lidocaine in succinylcholine induced post-operative myalgia.

### Materials and Methods

The present study was done at the medical college for the period of two years. The ethical committee was informed about the study and the ethical clearance certificate was taken.

Those who included in the study were satisfying the inclusion and exclusion criteria. Total of 160 patients were included in the study. Each of the participants were informed about the study, and the informed consent was signed by all.

Criteria for inclusion: ASA I and II physical status of either sex, Age between 18 & 50 years.

Criteria for exclusion: Major surgeries, pregnant and lactating women, presence of neuromuscular disorders, age below 18 years and above 50 years and patient refusal.

All patients were evaluated on the previous day of surgery. All patients were kept nil per oral for 8 hours with pre medication of Tab Ranitidine 150 mg orally 12 hours before surgery. Pulse oximetry, non-invasive blood pressure and ECG were monitored.

Total of 160 patients were divided into two groups. Group A consists of 80 patients, they were administered with intravenous lidocaine 3 minutes before administering succinylcholine and the rest 80 patients were taken as control group.

Patients were pre-oxygenated and induced with 5 mg/kg IV thiopentone sodium followed by 1.5 mg/kg of succinylcholine given IV. The presence, degree and duration of fasciculations were assessed visually on a four-point scale. 0- No visible fasciculations 1- mild: very fine fingertip or fascial muscle movement. 2- moderate: minimal fasciculation on the trunk and extremities 3- severe: vigorous fasciculations on the trunk and extremities.

Standardized post-operative care was given to all the participants. Pain related to the surgical procedure was treated with IV pethidine in a dose of 1mg/kg. Severity and intensity of post-operative myalgia was assessed by the investigator with a standardized questionnaire 1hour, 24 hours and 48 hours after surgery.

The data obtained was statistically analyzed after calculating mean values and the standard deviation. Chi square test was used to obtain other possible associations between two categorical variables. MS – Excel and SPSS 15.0 were the packages used for the statistical analysis.

## Results

Total of 160 patients were included in the study. They randomized of two groups with 80 patients in each group. Group A patients were administered with IV lidocaine and Group B patients were taken as control. When male to female ratio was counted it was found that male were more in number. In the group A there were 54 males and 26 females and in control group there was 46 males and 34 females.

The participants in the two groups underwent various minor surgical procedures and their distribution is as follows.

**Table 1:** Distribution of the patients in the two groups for various minor surgical procedures

Minor surgery	Group A	Group B
Sebaceous excision	8	6
Lipoma excision	14	8
Hysteroscopic D&C	4	10
Hernioplasty	12	18
Closed reduction	8	14
Circumcision	6	2
Breast lump excision	12	8
Appendectomy	16	14

When the fasciculation comparison was done in between the two group, a significant difference ( $p < 0.016$ ) in fasciculation is observed between the intravenous lidocaine and the control groups. Post-operative myalgia was compared between the three time points within the treatment groups. The results are as follows

**Table 2:** Comparison of postoperative Myalgia between two groups

Group	Post-operative Myalgia	N	Mean	P value
L	1 hr	80	0.42	0.002
	24 hr	80	0.64	
	48 hr	80	0.21	
C	1 hr	80	1.01	0.001
	24 hr	80	1.34	
	48 hr	80	0.80	

There is significant reduction in pain over time within the two treatment groups. Though the intensity of Post-Operative Myalgia does not significantly reduce ( $p > 0.016$ ) from 1hr to 24hrs in any of the groups, there is a significant reduction ( $p < 0.016$ ) in the intensity of Post-Operative Myalgia from 24hrs to 48hrs in all the treatment groups.

## Discussion

A large number of trials have identified several factors contributing to a high incidence of succinylcholine induced myalgia and several strategies have been evolved to minimize both the incidence and severity of pain [7, 8].

Our study was carried out with the aim of ascertaining the efficacy of pretreatment with IV lidocaine in decreasing the intensity and incidence of succinylcholine induced myalgia. Lidocaine was given in a dose of 1.5mg/kg IV 3 minutes before succinylcholine. Fentanyl 2µg/kg IV was used as the analgesic at induction and pethidine 1mg/kg IV was used in the post-operative period for rescue analgesia. These drugs were chosen because opioids do not have any impact on the occurrence of succinylcholine myalgia.

Lidocaine pretreatment has been noted to have a favorable effect on postoperative myalgia and it has thus been used effectively for its prevention.<sup>9</sup> The lidocaine group in our study had the least intensity of pain as compared to the control and diclofenac groups at all the three time points of study i.e., at 1 hour, 24 hours and 48 hours.<sup>10</sup> Lidocaine showed a statistically significant difference from the control in reducing the incidence and intensity of succinylcholine induced myalgia. The incidence of myalgia was higher than in the control group.

## Conclusion

While most researchers have studied the efficacy of lidocaine versus a control group or non-depolarizing muscle relaxants. Lidocaine was found to be superior, increasing the number of patients without muscle pain and decreasing the frequency of moderate and severe myalgia. Moderate and severe pain were reported only in (2.5%, 0%), (10%, 2.5%) and (5%, 0%) patients at 1hr, 24hrs and 48hrs respectively. Thus, lidocaine pretreatment is concluded to be the most effective method of preventing succinylcholine myalgia.

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