



EFFECT OF MAGNESIUM SULPHATE ON SUCCINYLCHOLINE INDUCED FASCICULATION AND POST OPERATIVE MYALGIA

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ABSTRACT

Succinylcholine is a short acting Depolarising muscle relaxant known to cause fasciculation and post operative myalgia. Here magnesium sulphate is used to investigate if these effects can be reduced.

Methods: The single blind randomized clinical trial was conducted on 40 patients of ASA grade I and II. 20 Patients each were divided in two groups, one group was given magnesium sulphate and the other group was control group.

Results: The significant difference between two groups in degrees of fasciculation ($p < 0.001$). But for post operative myalgia there was no significant difference.

Conclusion: We conclude that magnesium sulphate can be effectively used to control succinylcholine induced fasciculation.

KEYWORDS: Myalgia, Fasciculation, Depolarizing muscle relaxant.

I. Introduction

Succinylcholine was introduced in 1952 by Sleff and Foldes. It possesses a unique property of rapid onset and short duration of action. But is accompanied by side effects like myalgias, masseter spasm, hyperkalemia, rhabdomyolysis, etc. It also increases intracranial pressure, intraocular pressure and intragastric pressure.[1]

The pathophysiology of fasciculations is unclear, but it may be induced by axonal depolarisation caused by connection between succinylcholine and presynaptic and cholinergic nicotinic receptors. [2] Many attempts have been made to avoid these undesirable effects which include pre treatment with non depolarizing muscle relaxant, lignocaine, calcium gluconate, nonsteroidal anti inflammatory drugs, diazepam, etc. with variable results.[3]

Magnesium sulphate reduces negative effects caused by succinylcholine and avoids the increase of potassium concentration. Magnesium sulphate is also effective in reducing pain after the administration of succinylcholine.[2] In our study, we evaluated the effect of pre treatment with magnesium sulphate on succinylcholine induced fasciculation and post operative myalgia.

II. Material and Methods

This study was conducted in an attached teaching hospital after approval by ethical committee. 40 patients were selected, ASA I and II from 20 to 60 years posted for elective procedures under general anaesthesia. The exclusion criteria included patients with hypertension, Hypermagnesemia / hypomagnesemia, Any known allergy to magnesium sulphate, Diabetes mellitus, Ischaemic heart disease, Severe hepatic, endocrine and cardiac dysfunction, Acute cholecystitis, Morbid obesity, Raised intracranial tension and intra ocular pressure, Drug or alcohol abuse, Duration of operation < 30 min, Anticipated difficult airway. Patients were randomly allocated of 20 patients each after detailed pre anaesthetic evaluation.

Group A received equivalent amount of normal saline(over 5 min, 5 min prior to induction)

Group B received 30 mg/kg body wt. 50% Inj.MgSO₄ i.v.(over 5min, 5 min prior to induction)

On arrival of patient in operating room, heart rate and blood pressure were recorded and i.v. access was secured and Inj. Ondansetron 0.8 mg/kg i.v. was given. Five minutes prior to induction, group B received 30 mg/kg 50 % MgSO₄ i.v. in 10 cc normal saline and Group A received equivalent N.S. i.v.

After pre-oxygenation for 3 minutes, anaesthesia was induced with Inj. Fentanyl 2 mcg/kg, Inj. Midazolam 0.02 mg/kg, Inj. Thiopental sodium 5-7 mg/kg followed by Inj. Succinylcholine 2 mg/kg. endotracheal intubation was done with suitable sized cuffed endotracheal tube. Anaesthesia was maintained with Nitrous oxide, oxygen and a non depolarizing muscle relaxant. Bains' circuit was

used to provide Intermittent Positive Pressure Ventilation. Routine monitoring was done.

At the end of operation, neuromuscular relaxation was reversed with Inj. Neostigmine 0.04 mg/kg and Inj. Glycopyrrolate 0.01 mg/kg.

Fasciculation was measured immediately after administering Succinylcholine with grade 0 to 3. 'No fasciculation' was termed as grade 0; 'very fine fingertip or facial muscle movement' with grade 1 or Mild; 'Minimal fasciculation on trunk and extremities' with Grade 2 or Moderate; and 'Vigorous fasciculation on trunk and extremities' with grade 3 or Severe.

Post operative myalgia was assessed after 24 hrs of surgery to be present or absent.

III. Observation and Results

In Control group, the majority of cases had fasciculation grade 2 (10 cases) and in Control Group the majority of cases had fasciculation grade 0 (13 cases). The distribution of fasciculation grade differs significantly between two study groups (P -value<0.001).

In both the study groups, the majority of cases did not have post-op myalgia (Control Group – 11 cases) and (Study Group – 13 cases). The distribution of post-op myalgia did not differ significantly between two study groups (P -value>0.05). The side effects encountered with the drug were nil.

IV. Discussion

In our study, both control group and study group were having similar characteristics. Based on the results, magnesium sulphate reduced succinylcholine induced fasciculation to a large extent. According to results, patients who were administered magnesium sulphate only 35 % patients showed fasciculation while 95 % showed fasciculation in control group.

Our results have similar results as Behzad et. al where fasciculation was observed in 8% of magnesium sulphate group and 90 % in placebo group. Similarly, Mahendra Kumar et.al. have similar findings suggesting no fasciculation after pre treatment with magnesium sulphate.

Also in our study, there was no significant difference in post operative myalgia between control and group receiving magnesium sulphate. In studies done by Mahendra Kumar et.al., 30 % patients in control group showed post operative myalgia.

V. Conclusion

Thus, we conclude that pre treatment with magnesium sulphate reduces succinylcholine induced fasciculation without any adverse effects. While, for post operative myalgia larger sample size or further studies could be carried out as our study did not show any significant results.

Table 1: The age distribution of the cases studied between two study groups (n=40).

Age Group (years)	Control Group (n=20)		Study Group (n=20)		P-value (Control v Study)
	n	%	n	%	
21.0 – 30.0	6	30.0	12	60.0	0.162 ^{NS}
31.0 – 40.0	8	40.0	3	15.0	
41.0 – 50.0	4	20.0	2	10.0	
51.0 – 60.0	2	10.0	3	15.0	
Total	20	100.0	20	100.0	

Values are n (% of cases). P-value by Chi-Square test. P-value <0.05 is considered to be statistically significant. *P-value<0.05, **P-value<0.01, ***P-value<0.001, NS: Statistically Non-Significant.

Table 2: The sex distribution of the cases studied between two study groups (n=40).

Sex	Control Group (n=20)		Study Group (n=20)		P-value (Control v Study)
	n	%	n	%	
Male	6	30.0	7	35.0	0.736 ^{NS}
Female	14	70.0	13	65.0	
Total	20	100.0	20	100.0	

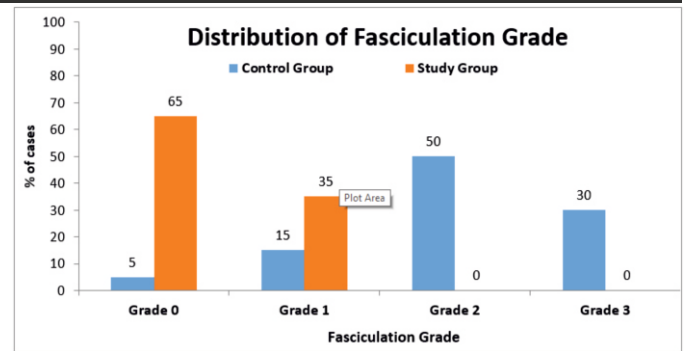
Values are n (% of cases). P-value by Chi-Square test. P-value <0.05 is considered to be statistically significant. *P-value<0.05, **P-value<0.01, ***P-value<0.001, NS: Statistically Non-Significant.

The age and sex distribution did not differ significantly between two study groups (P-value>0.05).

Table 3: The distribution of Post-op myalgia between two study groups (n=40).

Post-op Myalgia	Control Group (n=20)		Study Group (n=20)		P-value (Control v Study)
	n	%	n	%	
No	11	55.0	13	65.0	0.519 ^{NS}
Yes	9	45.0	7	35.0	
Total	20	100.0	20	100.0	

Values are n (% of cases). P-value by Chi-Square test. P-value <0.05 is considered to be statistically significant. *P-value<0.05, **P-value<0.01, ***P-value<0.001, NS: Statistically Non-Significant



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