

Role of Magnesium Sulphate in Patients Presenting with Tetanus

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ABSTRACT

Aim: To determine the efficacy of efficacy of Magnesium Sulphate in patients presenting with tetanus.

Study Design: It was a descriptive cross sectional study.

Place of study: Department of Medicine, PNS Shifa Hospital, Karachi.

Duration: From Jan 2012 to Jan 2015.

Method: A total of 50 diagnosed cases of tetanus between 18-80 years of both gender were included in the study.

Results: In our patients, mean age of the patients was recorded as 41.54±6.34, 34(68%) were male and 16(32%) were females. Efficacy of magnesium sulphate was recorded in 56% of the cases.

Conclusion: The magnesium sulphate may be used as first line therapy for the management of tetanus cases, its efficacy is not significantly higher but achieving an acceptable level, however, the protocols should be followed carefully for avoidance of its side effects.

Keywords: Tetanus, magnesium sulphate, efficacy

INTRODUCTION

Tetanus has become rare disease in developed countries, it is now considered as third world disease and requiring modern intensive care management¹. Though in developed countries it become rare but it is a threat to all unvaccinated individuals, especially in developing countries. Even after the availability of high efficient vaccine, approximately 1 million cases of tetanus die worldwide each year².

In the United States, during 2001-2008, 233 cases of tetanus were reported showing 95% reduction of the morbidity since 1947 and since then 99% of the deaths were decreased. Among vaccinated individuals, no doses of tetanus toxoid were received in 40.2%, out of 195 cases, 15.4% had history of diabetes mellitus while out of 176 cases, 15.3% had history of I/V drug abuse³.

A recent study⁴ indicated that in our country health care system failed to provide sufficient efforts for vaccination leading to higher rate of neonatal and adult tetanus.

In Karachi, only 25% general practitioners had appropriate knowledge regarding pre-exposure while 13% had pre and post exposure tetanus immunization⁵.

This is a painful and protracted morbidity characterizing higher muscle tone, spasm of muscles, while severe condition comprising cardiovascular instability secondary to autonomic dysfunction. Inhibitory pathways of the motor and

autonomic nervous systems release the toxin blocks neurotransmitter leading to unrestrained neuronal activity of both of pathways⁶.

Very few studies revealed that antitoxin and antibiotics—penicillin or metronidazole improve the outcome.^{7,8} However, except these disease-specific drugs, more appropriate management of the respiratory compromise and cardiovascular instability leading to the severe form of the morbidity remains uncertain.¹ Supportive management controls the spasms of muscles, maintain and protect the upper airway and provide ample ventilation, and limit the complications of autonomic dysfunction.

Around 100 years ago Magnesium sulphate for the management of tetanus was used for the first time and muscle relaxation being an attractive therapeutic property was recorded which may further control spasms and cardiac ischemic diseases⁹.

On the other hand, conventional treatment for the management of spasms is diazepam. More than 50% of the mortalities are resulted due to heavy sedation and artificial ventilation. However, the search continued to control spasms without using heavy sedation and artificial ventilation.¹⁰ Previous studies are of the view that magnesium sulphate alone may be used for controlling muscle spasm without sedation and mechanical ventilation in tetanus cases¹¹.

In this review we want to clarify the controversy regarding frequency of efficacy of Magnesium sulphate, as big variation among our local studies¹⁰⁻¹¹ and international study¹² exists, so that we may have updated and results based knowledge while using this drug for the management of tetanus patients coming to our hospital.

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MATERIAL AND METHODS

A total of 50 diagnosed cases of tetanus between 18-80 years of both gender were included in the study from Emergency Department of PNS Shifa Hospital, Karachi. We excluded those cases who were having compromised renal function (creatinine >1.2mg/d) and heart block cases. Patients were informed regarding inclusion of their data in this research. Initial physical examination of the patients was done, trismus, or lockjaw, and the facial spasms called risus sardonicus, change of posture (opisthotonus) and apparent convulsions were examined. In case of fits or difficulty in respiration, tracheostomy was performed. A loading dose of intravenous magnesium sulphate 4g (57mg/kg)diluted in 20 ml of 5% dextrose saline was given over 20 min, followed by an infusion of 2 g per hour. The rate of infusion was increased by 0.25–0.5g 8 hourly till control of spasm was achieved. Infusion was reduced if the patients were stabilized. In the event of magnesium overdose above 4mmol/Liter or 8meq/liter magnesium therapy was temporarily discontinued followed by forced diuresis and decrease in dose to half. Toxicity was avoided by strict following of guidelines. Deep tendon reflexes, respiratory rate, urine output and serum concentrations were the most commonly followed variables. Ventilatory support was given if the tidal volume <5ml/kg or respiratory rate is >35/min. Additional sedation, injection diazepam 10mg in incremental doses, were given for the immediate treatment of muscle spasms or fits if patient was not responding to Magnesium sulphate. The frequency of final outcome i.e., efficacy was noted in terms of relieving of symptoms of the tetanus (Ablett grade 1-4) after administration of Magnesium Sulphate upto 4mmol/liter it was assessed on weekly bases, up to 6 weeks (day 42).

We used SPSS Version 17 for data analysis. Age of the patients was recorded and presented by mean±sd, gender of the patients and efficacy of the drug was presented through simple frequency and percentages. No test of significance was required, as the study was not comparative.

RESULTS

Mean age of the patients was recorded as 41.54±6.34, 34(68%) were male and 16(32%) were females. Efficacy of magnesium sulphate was recorded in 56% of the cases.

Table 1: Gender distribution (n=50)

Gender	n	%age
Male	34	68
Female	16	32

Table 2: Frequency of the efficacy of magnesium sulphate in patients presenting with tetanus(n=50)

Efficacy	n	%age
Yes	28	56
No	22	44

DISCUSSION

In developing world, an intensive interest regarding management of tetanus is increasing, due to the limited data regarding alternate therapies over conventional management. The use of magnesium in tetanus is replacing conventional management while trials regarding its efficacy are showing variant results.

In our study, we recorded more than 50% of the cases who got relieve from the symptoms of tetanus.

Sikender and others¹⁰ recorded 51.1% of the cases who were symptoms free of tetanus while using magnesium sulphate. Khan MA and others¹¹ recorded 65% of the cases who were treated effectively, this efficacy is slightly higher than our study but it is not a significant difference.

Another study¹³ recorded 52.4% of the cases who were treated effectively, our findings are in agreement with these findings.

We are agreed with the hypothesis that infusion of I/V magnesium sulphate is helpful for controlling the severe and mild spasms in patients presenting with tetanus while in most severe form of tetanus, additionally a sedative drug is required. Attygalle et al¹⁴ revealed that unacceptable cardiovascular effects arrive while severe tetanus patients are administered with magnesium sulphate, surprisingly, no case of such complaints were recorded in our study, it may be due to the reason that we strictly followed protocols for avoidance of any complications and recorded maximum effect of the drug for spasm control. Attygalle et al¹⁴ concluded and recommend that magnesium as possible first line therapy in the routine management of tetanus.

Menelaos Karanikolas and others¹⁵ claimed that in comparison with previous trials, their case series contributed the meaningful additional information including I/V magnesium therapy used on patients already requiring mechanical ventilation while remained effective for up to 26 days, it was significantly longer than in previous reports. They reported that the overall outcome was good in all their patients. However, the optimal dose, optimal duration and maximum safe duration of intravenous magnesium therapy were unknown which requires some other trials.

The results of our study in accordance with other studies, we are of the view that the magnesium sulphate may be used as first line therapy for the

management of tetanus cases, its efficacy is not significantly higher but achieving an acceptable level, however, the protocols should be followed carefully for avoidance of its side effects.

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