



Treatment of Tetanus Using Magnesium Sulphate Infusion

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Abstract

Objectives: The control of seizures effectively requires muscle relaxation continuously. Magnesium sulphate is a very effective drug in this regard to control seizures in tetanus.

Study Design: Prospective Observational study.

Setting: Medicine ward of Bahawal Victoria Hospital Bahawalpur Punjab Pakistan.

Patients And Methods: All patients from may 2015 to Jan 2016 were treated according to our protocol using magnesium sulphate infusion and titrating it with deep tendon reflexes.

Results: Total 40 cases were studied with median age of 36 years. 25 were males and 15 were females. Male to female ratio was 1.6:1. Average incubation period was 16 days. Twenty patients recovered from the disease. Mortality was more in females (20%) as compared to males (8%). The highest risk factor causing resistance in females to the therapy was septic abortions. Seven patients were found resistant and admitted in ICU and required ventilator support ultimately expired.

Conclusion: Magnesium sulphate is very effective in reducing muscular spasm in patients having tetanus. It is cost effective treatment.

Keywords: Tetanus, spasm, Lock Jaw.

Introduction

Tetanus is a significant cause of morbidity and mortality in developing countries. Tetanus is known to mankind since the age of John of Ardenne, an English surgeon who described first case of tetanus got after gardening injury.¹

Its incidence in free world has declined much and now only few cases are reported. The case fatality rate is still 20-30% and may increase to 60% in those having age more than 60 years.^{2,3}

Ideally tetanus is treated in ICU. It is called a disease of third world but it requires the technology of first world to treat it in the form of sedation, vaccination and ventilator support which are not easily available in developing countries. Magnesium sulphate role in treating tetanus has been postulated by many authors. As early as 1906, Black described two cases of tetanus which were treated by intra thecal injection of magnesium sulphate.⁵ It inhibits muscle contraction by competing with calcium entry into the cells. There is low amount of calcium intracellular to cause

actin myosin interaction of muscle contraction. Females have high magnesium level than males. No difference reported between magnesium level of smokers and non-smokers males.⁶

Subjects and Methods

The diagnosis of tetanus is made clinically. One best test to diagnose it bed side is spatula test.⁷ In this method we touch oropharynx by tongue blade or spatula. Normally patient develops gag reflex so test is negative. In tetanus, patients develop spasm of masseters and bite the spatula so test is positive. The significance of titrating magnesium sulphate infusion is the sign of deep tendon reflexes.⁸ As long as these are active, patients are less likely to develop respiratory failure. Serum level of magnesium of each patient was obtained to determine toxicity of the drug. All cases with daily progress report were noted on study protocol.

Hypocalcemia was determined using clinical signs chvostek's and trousseau signs and measuring serum calcium level.

Results

Forty patients were studied having tetanus and they were treated with magnesium sulphate solution. There were 25 males and 15 females. Ratio of male to female was 1.6:1. 5 gram of loading dose of magnesium was given to the patients in 20 minutes and then 2 gram per hour given.

Rate of infusing magnesium was increased upto 0.25 to 0.5 gram until muscular spasm was controlled. Initially patellar reflex was checked after every 30 minutes in first 5 hours after starting the infusion and then whenever dose was increased. In the first week of treatment magnesium showed best response and spasm of muscles was controlled and sympathetic over activity was also reduced. It also reduced convulsions in the patients. Patients were enough alert and 50% of them became oral free in 2nd week. Use of magnesium decreased the need of sedative drugs which were being used in much doses previously. For this sake diazepam and chlorpromazine were used in a combination. Other combination of phenobarbitone and chlorpromazine was also used.⁹ But morphine was

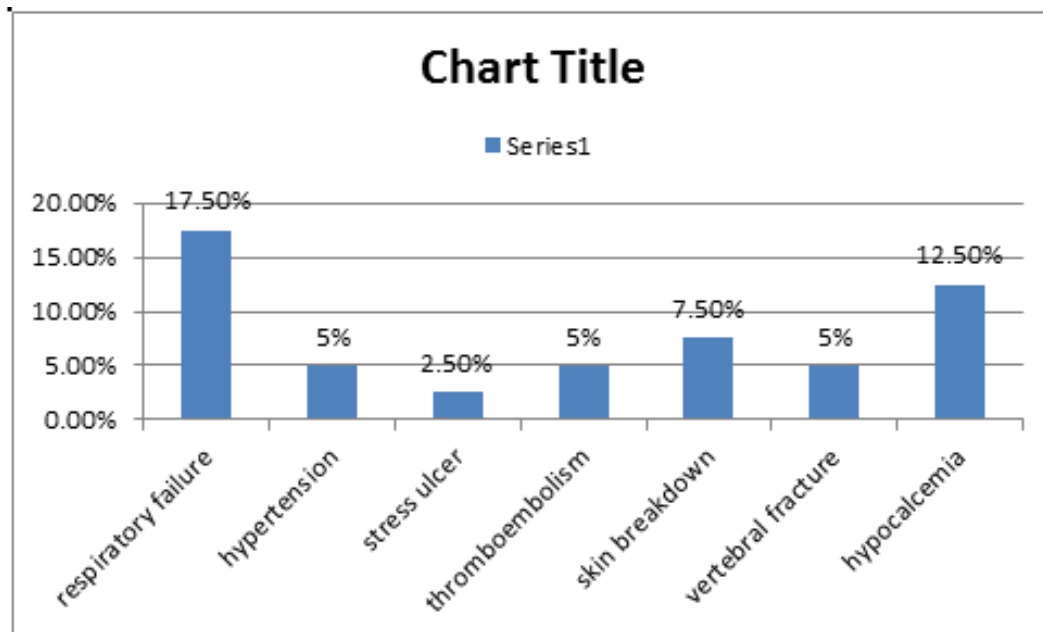


never used, neither its derivatives used. This therapy of magnesium reduced hospital stay upto 2 weeks as compared to 4 weeks before it. During this therapy no change in pulse or B.P noticed. Seven patients were resistant to this treatment. These were high risk patients. All 2 ladies had

septic abortions, two males had road side accidents and three males had agricultural injuries. These cases were put on ventilator but they did not survive. Most important thing of this treatment was that it was not costly, monitoring was easy and need of ventilator support reduced.

Table Complications

S#	Complications	No. of Pts	%age
1	Respiratory failure	7 (5M, 2F)	17.5%
2	Labile hypertension and tachycardia	2	5%
3	Stress ulcer development	1 (male)	2.5%
4	Thromboembolism	2	5%
5	Skin break down	3 (male)	7.5%
6	Vertebral Fracture	2	5%
7	Hypocalcemia	5 (2M, 2F)	12.5%



Discussion

Chances of tetanus are more in those people who are not properly vaccinated. Disease incidence is different in different custom of societies and living standards. In developed countries it is a rare disease. But in developing countries it is significant

disease. People more than 60 years of age are more susceptible to this due to decreased immunity.¹⁰ A team work is required to treat the disease, to reduce muscular spasm and to give ICU care.¹¹ In developing countries facility of ICU is limited and that is why treatment is costly there. In such places





where ventilators are not provided use of magnesium sulphate is best.¹² It was used before the surgery for pheochromocytoma was practiced. It controls blood pressure, decreases release of catecholamines from pheochromocytoma and also causes relaxation of smooth muscles.¹³ It causes sedation and acts as anti convulsant. It is used in the treatment of Eclampsia and Preclampsia.¹⁴ It also plays an important role in hypertension.¹⁵ A studied has been done in civil hospital Karachi about use of magnesium sulphate for inhibiting labour.¹⁶ When magnesium sulphate is given in titrated dosage to maintain serum level, it reduces spasm of muscles in tetanus.¹⁷

This study is unique as 40 patients were given this mode of treatment and it was proved very useful in those countries where I.C.U care is not available. A previous study has shown 40% mortality.¹⁸ In our study mortality rate is reduced as well as stay in the hospital. Control of seizures was also achieved.

Conclusion

In Tetanus cases autonomic abnormality is very dangerous and specific treatment should be given for it. We tried to reduce sympathetic over activity but over activity of parasympathetic system is needed to be understood. This is a cheaper therapy but still needs more trials.

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