

ORIGINAL

PROF-719

MAGNESIUM SULPHATE INFUSION; A NOVEL APPROACH TO TREATMENT OF TETANUS

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ABSTRACT

Objectives: The effective control of seizure needs continuous use of muscle relaxant. Role of magnesium sulphate infusion in this context is new in the management of tetanus seizures and needed to be studied . **Study Design:** Prospective Observational **Setting:** DHQ. Hospital Faisalabad. Tetanus Ward. **Patients and Methods:** All patients during nine months (May 2002 to Jan 2003) were treated according to our protocol using adequate doses of magnesium sulphate (titrating it with deep tendon reflexes). **Results:** Total 32 cases were collected with median age 33. Male to female ratio was 2:1. Average incubation period was 15 days. Twenty one patients recovered from the illness. Mortality was more in females(18.75 %) as compared to males (15.62 %). The highest risk factor in female resistant to therapy was tetanus due to septic abortions. Eleven patients were found refractory to the treatment and required ventilatory support and I.C.U. coverage, ultimately expired. **Conclusion:** Magnesium sulphate infusion was found helpful in the reduction of spasm in tetanus patients. It minimized the nursing monitoring and proved to be cost effective therapy.

Keywords: Tetanus” “spasm” . “Lock Jaw”

INTRODUCTION

Tetanus is significant cause of mortality and morbidity in many developing countries. Tetanus is known to mankind since 14th century when John of Ardenne, an English surgeon, described a case of tetanus following gardening injury¹.

The incidence of tetanus in free world has declined dramatically to merely no new case report. The case fatality rate is still about 20-30 % and increase to 50 % for those older than 60 years of age^{2,3}.

Ideally the tetanus is treated in intensive care unit .It is true to

say that tetanus is a disease of third world but requires the first world technology in the form of sedation, vaccination and ventilatory support which are not available in developing countries.

A role of magnesium sulphate in the management of tetanus has been postulated by many authors. As early as 1906, Black described two cases of tetanus treated with intrathecal injection of magnesium sulphate⁵. Magnesium sulphate inhibits muscle contraction by competing with calcium for entry into the cell. There is less intracellular free calcium to participate in actin myosine interaction of muscle contraction. Females have significantly higher magnesium level than

males and no difference has been observed in magnesium level of male smokers and non smokers.⁶ We started a prospective study using this drug and now we are presenting our results.

SUBJECTS & METHODS

The tetanus is diagnosed clinically. One bed side diagnostic test is known as spatula test⁷. The single test involves touching the oro pharynx with spatula or tongue blade . Normally the test elicits a gag reflex and the patient tries to expel the spatula (a negative test) . In tetanus, patients develop a reflex spasm of masseters and bite the spatula (a positive test).

A clinical sign of significance to titrate the dose of magnesium sulphate infusion is the presence of deep tendon reflexes⁸ . As long as these are active, it is probable that the patient will not develop respiratory failure .Serum magnesium level of every patient was obtained in order to observe the toxicity of the drug . All cases along with daily progress report was recorded on the study protocol.

Evidence of hypocalcemia was sought using clinical sign (chvostek's and trousseau sign⁹) and measurement of total serum calcium .

RESULTS

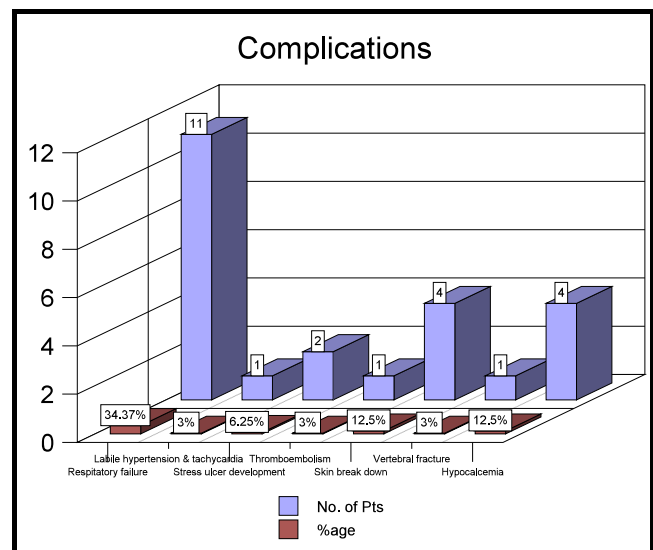
Thirty two cases of tetanus were treated by magnesium sulphate . Twenty two males and ten females (male to female ratio 2:1). Magnesium sulphate was given in a loading dose of 5 gram over 20 minutes and was followed by an infusion of 2 gram per hour.

The rate of infusion was increased by 0.25-0.5g till control of spasm were achieved , as long as patellar reflex could be elicited . Patellar reflex was assessed over half an hour interval in the first four hours and after commencing the infusion whenever the dose was increased , and then less frequently thereafter.

The best response of magnesium was noted during the first week of treatment in the form of reduction in sympathetic overactivity, reduced generalized muscle spasm and decreased incident of reflex convulsion. Patients were more alert and 60% of the patients started taking oral diet in the

second week.

S#	Complications	No. of Pts	%age
1	Respiratory failure	11 (5M, 6F)	34.3%
2	Labile hypertension and tachycardia	1	3%
3	Stress ulcer development	2 (male)	6.25%
4	Thromboembolism	1	3%
5	Skin break down	4 (male)	12.5%
6	Vertebral Fracture	1	3%
7	Hypocalcemia	4 (3M, 1F)	12.5%



Magnesium reduced the use of sedation which were given in different combinations in our tetanus ward.e.g.Diazepam was given in continuous infusion (total daily dose of 40-200 mg as divided doses) alternating with Chlorpromazine. The other combination was Phenobarbitone 50 to 400 mg six hourly iv alternating with Chlorpromazine⁹. We never used morphine or its derivatives. The average hospital stay reduced up to two weeks as compared to four weeks. No variations in blood pressure or pulse were noted during magnesium sulphate. The eleven patients (5 males and 6 females) were found resistant to therapy. These patients belonged to high risk criteria (all six ladies with septic abortion and three males suffering from injuries due to road traffic accidents and two

suffering from agricultural injuries). This group of patients was put on ventilatory support but they ultimately expired. The unique aspect of this study was that treatment was cheaper, easily available and easy to monitor clinically, reducing the role of artificial ventilation which is the main stay of treatment.

DISCUSSION

Tetanus remains a severe disease occurring primarily among persons who were unvaccinated or inadequately vaccinated. The incidence of disease varies according to standard of living and customs of society. The developed nations face this threatening disease in rarity and usually due to lack of immunity. Therefore, adults greater than or equal to sixty years continue to be at highest risk for tetanus and for severe disease in developed countries¹⁰. Management of the disease involves a team approach and aims at eradicating the focus of infection, neutralizing the toxin, controlling the spasm and providing the I.C.U. coverage. The developing countries usually lack high dependency units and treatment is not cost effective. Magnesium sulphate infusion is an alternative for ventilatory support where such facilities are not available¹².

The use of magnesium sulphate has been reported before surgery for pheochromocytoma and has the potential advantage over traditional method of blood pressure control in that it is thought to inhibit the release of catecholamines from Pheochromocytoma as well as producing smooth muscle relaxation¹³. Magnesium produces sedation and possesses anti-convulsive properties. All these effects have established magnesium use in severe Preclampsia /Eclampsia¹⁴. The role of magnesium in the management of hypertension has also been suggested¹⁵. Magnesium sulphate infusion has been studied in civil hospital Karachi as a pharmacological inhibitor of labour¹⁶. Magnesium sulphate in a dosage titrated to the preservation of patellar reflexes and maintaining serum concentration within the therapeutic ranges could be used as the sole agent to control the spasm of tetanus¹⁷.

Our study is unique in a sense that 32 cases were given trial of therapy and proves the efficacy of magnesium for use in poor countries where I.C.U. facilities are not available. There is no recent study reflecting the old-fashioned treatment results. Our previous study of one year showed mortality rate of 40%.¹⁸ We have fared better mortality wise as well as hospital stay is reduced. Seizure control and nursing convenience is also remarkably better.

CONCLUSION

Autonomic dysfunction in tetanus is most lethal and treatment should be more focused on it. We tried to control sympathetic over activity, but para sympathetic over activity needs to be explored. This is a cost effective therapy and needs more trials in our country.

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CORRECTION

The amendment of The Professional Vol: 10, No.3 (PROF-713) Page 175 is as under.

INCORRECT

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PROF-713

MANAGEMENT OF LIVER INJURIES IN ABDOMINAL TRAUMA

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