



# MAGNESIUM SULPHATE AS AN ADJUNCT TO TREATMENT OF TETANUS IN CHILDREN

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## INTRODUCTION

- Tetanus remains an important cause of morbidity and mortality in low and middle income settings.
- Treatment in these settings is often complex.
- Lack of access to mechanical ventilation and other advanced intensive care facilities contributes to morbidity and mortality.
- Respiratory depression, which can occur as a side effect of benzodiazepines, remains a challenge.
- Magnesium sulphate (MgSO<sub>4</sub>) has been reported as an adjunct to treatment with benzodiazepines in tetanus.
- However, there was no Médecins Sans Frontières (MSF) protocol to guide its use within MSF facilities at the time of the study.
- We present a case series in which magnesium sulphate was used as an adjunct to treatment in children with tetanus in West Africa across a one-year period.

## ETHICS

This case series met exemption criteria for ERB review. Approval for submission to MSF Paediatrics Days was obtained from the deputy director, Operational Centre Paris.

## CASE DESCRIPTION

- Eleven children between four and twelve years of age were treated for clinically diagnosed tetanus between 2019 – 2020 at MSF Paediatric Hospital, Monrovia – Liberia.
- Presence of patellar reflex was used to determine dose related side effects of MgSO<sub>4</sub>.
- Vitals signs were monitored meticulously.
- Patients treated with MgSO<sub>4</sub> received a loading dose of 75mg/kg intravenously, followed by hourly dosing, following WHO guidelines.
- Dosing of diazepam followed MSF guidelines.

**Table 1. Patient characteristics of case series.**

TOTAL NO. OF PATIENTS	AGE RANGE (YRS)	NO. OF PATIENTS WHO RECEIVED DIAZEPAM ONLY	NO. OF PATIENTS WHO RECEIVED DIAZEPAM AND MgSO <sub>4</sub>	NO. OF DEATHS
11	4 - 12	5	6	2

- Both deaths were attributable to severe tetanus with intractable autonomic dysfunction complicated by lack of access to intensive care.

## CONCLUSION

- No major side effects from the use of magnesium sulphate were experienced, although the case series is small.
- This case series illustrates feasibility of use of magnesium sulphate in children with tetanus in MSF settings.
- This is the first documented use of magnesium sulphate in children with tetanus in MSF settings and has informed the development of an MSF protocol.

## DISCUSSION

**Table 2. Average diazepam and MgSO<sub>4</sub> doses over 5 days treatment.**

Case no.	Age (years)	Treatment of Spasm	Day 1 Dosage	Day 2 Dosage	Day 3 Dosage	Day 4 Dosage	Day 5 Dosage
1	4	Diazepam	1.2mg q4hrly				
2	6	Diazepam	1.8mg q4hrly				
3	7	Diazepam	2.1mg q4hrly				
4	5	Diazepam	1.5 mg q4hrly				
5	9	Diazepam	2.7 mg q4hrly				
6	8	Diazepam + MgSO <sub>4</sub>	2.4mg q4hrly + 2g/hr	2.4mg q4hrly + 2g/hr	1.2mg q4hrly + 2g/hr	1.2mg q4hrly + 2g/hr	0.8mg q4hrly + 2g/hr
7	10	Diazepam + MgSO <sub>4</sub>	3.0mg q4hrly + 2g/hr	3.0mg q4hrly + 2g/hr	1.5mg q4hrly + 2g/hr	1.5mg q4hrly + 2g/hr	1.0mg q4hrly + 2g/hr
8	5	Diazepam + MgSO <sub>4</sub>	1.5mg q4hrly + 2g/hr	1.5mg q4hrly + 2g/hr	1.0mg q4hrly + 2g/hr	0.5mg q4hrly + 2g/hr	0.5mg q4hrly + 2g/hr
9	6	Diazepam + MgSO <sub>4</sub>	1.8mg q4hrly + 2g/hr	1.8mg q4hrly + 2g/hr	1.8mg q4hrly + 2g/hr	0.9mg q4hrly + 2g/hr	0.9mg q4hrly + 2g/hr
10	4	Diazepam + MgSO <sub>4</sub>	1.2mg q4hrly + 2g/hr	1.2mg q4hrly + 2g/hr	0.6mg q4hrly + 2g/hr	0.6mg q4hrly + 2g/hr	0.3mg q4hrly + 2g/hr
11	12	Diazepam + MgSO <sub>4</sub>	3.6mg q4hrly + 2g/hr	3.6mg q4hrly + 2g/hr	1.8mg q4hrly + 2g/hr	1.8mg q4hrly + 2g/hr	1.8mg q4hrly + 2g/hr

**Figure 1. Mean diazepam dosing with and without adjunct MgSO<sub>4</sub>.**

