Role of Intravenous Magnesium Sulphate in Acute Status Migranous

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ABSTRACT

Objective: To look for the role of intravenous magnesium sulphate in acute status migranous among the patients reporting at neurological emergency.

Study Design: Prospective longitudinal study.

Place and Duration of Study: Pak Emirates Military Hospital Rawalpindi, from Jan to Jun 2019.

Methodology: A total of 51 patients were enrolled in the study presenting with acute headache in the neurological emergency and diagnosed as suffering from acute status migranous by the consultant neurologist. Pain was measured by using the visual analogue scale (VAS 10) at the time of arrival and other symptoms were also noted. 1gm Intravenous Magnesium sulphate was administered over 15 minutes and pain and other symptoms were noted again after half an hour of administration of magnesium sulphate.

Results: 20 (39.2%) patients were males and 31 (60.8%) were females. Mean age of the patients was 34.2 ± thirty minutes after the infusion of magnesium sulphate was 2.31 ± 1.113. There was a statistically significant difference in the visual analogue scale score before and after the administration of intravenous magnesium sulphate.

Conclusion: Magnesium sulphate emerged as an effective tool when administered intravenously with a dose of 1gm for relieving the symptoms of acute status migranous. It not only worked for headache but also proved to be effective for the associated symptoms.

Keywords: Acute status migranous, Effective, Magnesium sulphate.

How to Cite This Article: *Hassan Z, Kazmi S, Gilani A, Alamgir W, Liaqat J, Hasmat A. Role of Intravenous Magnesium Sulphate in Acute Status Migranous. Pak Armed Forces Med J 2022; 72(Suppl-2): S118-121. DOI: https://10.51253/pafmj.v72iSUPPL-2.3131*

INTRODUCTION

Migraine is one of the most common headaches which demand an intervention from the neurologist.[1] It has been prevalent in all parts of the world including the sub-continent.[2] Migraine previously considered just as a headache disorder, now believed to be a multi -symptom disease which can present with variety of symptoms which demand intervention accordingly.[3] Acute status migranous is one of the most debilitating forms of migraine presentations and linked with marked disability among the patients requiring immediate effective management plan in order to relieve the symptoms.[4]

Acute status migranous present with severe headache attack lasting for more than seventy hours may be with or without the aura.[5] Irritability, nausea and photophobia are some of the symptoms which can be found among these patients in addition to the headache. It is regarded as a neurological emergency.[6] Various agents have been tried to overcome this condition. Some of them included magnesium sulphate, corticosteroids, non-steroidal anti-inflammatory drugs, paracetamol, anti-emetic drugs, anti-convulsant drugs, anti-emetics and intra venous fluids.[7] Still research is going on in this aspect and no treatment has been declared ideal for this condition.

Use of magnesium sulphate has been advocated in many neurological disorders. It is believed that it has a stabilizing effect on the central nervous system which can be used to cure many problems linked to hyper excitability.[8] A study done in turkey concluded that this is a well-tolerated safe and efficacious drug which has a definitive role in reduction of symptoms of acute migraine attack.[9] Another recent study replicated same finding for the headache experienced by the pediatric population which further strengthened the safety in addition to the efficacy for this condition.[10]

Disabling headache which persists for more than three days becomes really troublesome for the patient in terms of increasing the number of his disability days. Migraine is a life-long condition in most of the cases and patients can face repeated attacks of such headache during the course of illness. This can affect their quality of life adversely as ours is not a welfare state and each person has to earn his livelihood himself on daily basis and if the patient is sole bread earner of

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Received: 28 Jul 2019; revision received: 13 Feb 2020; accepted: 20 Feb 2020

his family situation even becomes worse. Therefore, an adequate and quick relief should be available for the patients so that they can recover from this condition and carry out their daily activities. This study was planned with the rational to look for the role of intravenous magnesium sulphate in acute status migranous among the patients reporting at neurological emergency at PEMH Rwp.

METHODOLOGY

This prospectivelongitudinal study was conducted at the neurology department of Pak Emirates Military Hospital Rawalpindi, from January 2019 to June 2019. Sample size was calculated by WHO Sample Size Calculator by using the population prevalence proportion of 90%.[7] Non probability Consecutive sampling technique was used to gather the sample.

Inclusion Criteria: All patients between the age of 12 and 60 years who presented with the acute status migranous diagnosed by the consultant neurologist in the neurological emergency department were included in the study. Patients who were referred from other military, public sector and private hospitals in the neurological emergency of our department were also included in the study.

Exclusion Criteria: Patients withless than twelve year of age or those with any uncontrolled chronic illness like DM, HTN, asthma, RA, recent stroke etc. Patients with bleeding disorders, leukemia and lymphomas were also part of the exclusion criteria. Immunocompromised patients, autoimmune disorder patients and patients on long term steroids were also not included. Pregnant women, diagnosed psychiatric patients and illicit drug users were also not approached to participate in the study or were excluded at the first step. Patients with chronic migraine, currently not in status migranus or those with other causes of primary or secondary headaches were also not included in this study. Those having known allergy to the drug used in this study were also excluded from the analysis.

After ethical approval from the ethical review board committee and written informed consent from potential participants, patients who presents with acute status migranous diagnosed by the consultant neurologist after application above mentioned inclusion and exclusion criteria were included in the study. Status migraous was diagnosed on the basis of the diagnostic criteria of international classification of headache disorder, third edition (ICHD-3) (Headache Classification Committee of the International Headache).[11-13] All other primary and secondary causes of headaches were ruled out by detailed history taking, general physical and systemic examination and relevant investigations if required. Visual analogue scale (VAS-10) was applied in order to quantify the headache by the patient himself. Zero was the score for no or minimal headache and,[10] was the score for maximum headache.[14,15] This scale was applied soon after the diagnosis of acute status migranous was made. After that 1gm MgSO4 was administered to the patient over fifteen minutes. VAS score was applied half an hour after the drug has been administered. All other symptoms were also noted at the same time before and after the administration of the drug under study. A specialized profroma was designed incororating the VAS scale and all the possible symptoms which can occur in such patients.

All statistical analysis was performed by using the Statistics Package for Social Sciences version 24.0 (SPSS-24.0). Frequency and percentages for gender, and all the type of symptoms faced by the patients along with the headache during the study were calculated. Mean and standard deviation for age and VAS score before and after the administration of MgSO4 was also calculated in all the patients. Student t-test was applied to look for the difference between the mean VAS score before and after the use of drug under study. The *p*-value ≤0.05 was considered as significant to ascertain the efficacy of drug used in this analysis.

RESULTS

A total of 58 patients were initially approached to get them included in the analysis. Two refused participation. One had sinusitis in addition to the migraine. Two were known cases of multiple sclerosis while two had a psychiatric diagnosis for past two years. Twenty (39.2%) patients were males and 31 (60.8%) were females. Mean age of the patients was 34.2 ± 3.178years (Table-I).

Table-I: Characteristics of study participants with acute status migranousn=51.

Age (years)	
Mean ± SD	34.2 ± 3.178 years
Range (Min-Max)	15 - 60 years
Gender	
Male	20 (39.2%)
Female	31 (60.8%)
Symptoms in Addition to Headache	
Nausea	33 (64.7%)
Vomiting	10 (19.6%)
Irritability	08 (15.7%)
Photophobia	08 (15.7%)
Phonophobia	03 (5.8%)
others	01 (1.9%)

Mean VAS score in the patients before the administration of magnesium sulphate was 8.12 ± 1.121 while thirty minutes after the infusion of magnesium sulphate was 2.31 ± 1.113. There was a statistically significant difference in the VAS score before and after the administration of intravenous magnesium sulphate. *p*-value was less than 0.001which showed that there was a statistical difference between the headache scores before and after administering the treatment (Table-II). All other symptoms like nausea and photophobia vanished completely in all the cases.

Table-II: Visual analagoue scale (VAS) score before and after the administration of MgSO4.

Parameter	Before Treatment	After Treatment	*p*-value
Mean Visual Analogue Scale Score	8.12 ± 1.121	2.31 ± 1.113	<0.001

DISCUSSION

Migraine is a chronic debilitating disorder which is notorious to produce the acute attacks after complete remission of the symptoms.[16,17] It demands an accurate diagnosis to label the patient of headache with migraine. Neurology is an emerging specialty in our country with very less number of consultants for a vast majority of population suffering from various neurological disorders including the migraine.[18] This deficiency not only affects the patient care but also is a big hurdle in clinical research of various diagnostic and treatment modalities linked to this field. Status migranous has been one of these neglected areas. Prompt diagnosis and early treatment may serve to treat this condition with minimum disability but very few clinicians other than neurologist have been trained to pick this diagnosis. Treatment modalities have also not been tested in our own population and we have to follow or generalize the guidelines made in west. Therefore, we planned this study with the rationale to look for the efficacy of magnesium sulphate given via intravenous route to the patients suffering from status maigranous.

All the study participants who were administered intravenous magnesium sulphate either showed significant improvement in their headache or recovered completely. This finding has been reported in the past as well. One placebo controlled trial conducted by Choi *et al*, in 2014 concluded that this treatment was far superior to the placebo in controlling the acute head-ache linked to status migranous.[11] Another study done by Zidverc-Trajković *et al*, in 2011 comparing intrave-nous magnesium sulphate and subcutaneous sumatriptan concluded that though sumatriptan was slightly superior in efficacy but magnesium sulphate should be considered as an effective alternate to this route.[19] Similar randmized control trials in our population can clear this phenomenon and take us to the conclusion of best medication for the treatmet of acute status migranous.

Nausea was the commonest associated symptom in our target population followed by the vomiting. Photophobia and irritability was also found in considerable number of patients. Study done in the past by Gertsch *et al*, in 2013 on similar subject had shown results comparable to our findings.[10] These findings are part of the whole spectrum of migraine and contribute in making the quality of life of the patient miserable in addition to the symptom of headache. Therefore, when search for the ideal treatment for acute migraine attack is discussed, addressing these symptoms becomes e1ually important for the researchers as well as the treating physicians.

One of the most interesting findings of this study was the elimination of these associated symptoms in all the patients. Headache was the primary outcome of our study which was quantified on a scale as well but when patients were asked about these associated symptoms they were completely relieved in all the patients. Studies done in the past by Choi *et al* and Shaik *et al*, respectively have revealed similar results.[11,12] Another study by Gertsch*et al*,with a similar sample size to that of ours has already mentioned this phenomenon.[10] All the patients who were given MgSO4 reported remission of the symptoms like nausea, vomiting and photophobia. This fact clearly highlights the superiority of this treatment in providing an overall relief to the patient and not merely addressing his headache.

Strengths of this study include the strict inclusion criteria especially regarding the co-morbids and other types of headaches. Therefore, the results reflect the effect of the under study drugs on the symptom relief of the target population. Even patients with ambiguous diagnosis were also not included to ascertain the relationship of prescribed drugs only with the control of acute status migranous.

LIMITATIONS OF STUDY

Design of the study was the main limitation. It should have been a placebo control trial but ethical issues and institutional review board committee of the hospital did not allow pursuing a randomized placebo control trial. Sample size was also small as inclusion/exclusion criteria were very

strict and patients who were not seen and diagnosed by the consultant neurologist were not included. Moreover, VAS score is a crude method to measure and quantify the headache among the patients. Patients can under or over rate the symptoms on such self-rated tools. Adverse effects related to MgSO4 were not noted as patients were not followed up after the recovery. More studies in future incorporating large number of patients from multiple centers with a better study design may generate the results that could be more generalizable as compared to the results of our study.

CONCLUSION

Magnesium sulphate emerged as an effective tool when administered intravenously with a dose of 1gm for relieving the symptoms of acute status migranous. It not only worked for headache but also proved to be effective for the associated symptoms. Neurologist should consider this drug when encounter the patient of acute status migranous.

Conflict Of Interest: None

Authors' Contribution

ZH: Direct contribution, SK:, AG, WA:, JL:, AH: Intellectual contribution.

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