Original Article

Magnesium Level in Migraineurs

Serum Magnesium Level in Migraineurs Versus Non Migraineurs

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ABSTRACT

Objective: The objective is to observe relationship between low serum magnesium level and Migraine.
Study Design: Prospective Observational.
Place and Duration of Study: This study was conducted in Dow University Hospital, Dow University of Health Sciences, Karachi from 1st January 2013 to 31st December 2014.
Materials and Methods: One hundred and fifty patients attending the medical and Neurology OPD at Dow University Hospital were included in study. They were diagnosed according to International Headache Society (IHS) criteria for migraine headache.
Results:150 patients were enrolled in study 49 (32.7%) were male and 101 (67.3%) were female patients mean age was 28 (±6.2) years , After excluding other causes migraine was diagnosed in 102 (68%) patients. Out of 102 patients 71 (69.7%) were have low serum magnesium level. In the remaining patients with non migrainous headache, only 6 patients (12.5%) have low serum magnesium level because of some other causes for example medications.
Conclusion: Migraine is frequently associated with Serum low level of Magnesium compare to patient with non migrainous headache.
Key Words: Serum Magnesium, Headache, Migraine

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INTRODUCTION

Migraine is a neurological disorder that usually occurred with the constitutional symptoms like nausea, vomiting and photophobiathat disturb patients' daily routine activities. The prevalence of migraine in women is 3-20%, and in men is 4-6%. About 50% patients came to neurology OPD with complains of Headache have migraine.

The exact pathology of migraine is not clear. Various researches had been done that indicate the change in the vascular tone and increase brain irritability can cause migraine headache.

There are various factors have been suggested for increased irritability of brain. One of the factors is low serum magnesium level. Low serum magnesium level can cause opening of calcium channels, leads to increased intracellular calcium, which in turn leads to release of glutamate, and increased concentration of extracellular potassium, which lastly causes brain depression in migraine[1]. It has been proposed that low serum magnesium is involved in pathogenesis of migraine by vasodilation, preventing platelet aggregation, and the stabilization of cell membranes[2].The conclusion of this study was, low serum magnesium levels and to some extent low salivary magnesium levels indicate the deficiency of brain extracellular magnesium, which usually seen in patients with migraine either during or between the acute headache[2].

Magnesium deficiency is related with release of excitatory neurotransmitters such as acetylcholine and serotonin[3].

The purpose of our study was to determine serum magnesium levels in patients with migraine in this part of world.

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MATERIALS AND METHODS

The data was collected by face to face history taking, clinical examination including optic fundoscopy and baseline laboratory investigations. Brain imaging was also done in all the suspected cases to rule out other causes of headache. The blood samples to assess serum magnesium levels were collected between 8 a.m. to11 a.m. The reference value of 1.8-3.6 mg/dL or1.5-3.0m Eq/L was considered normal serum magnesium level.

Inclusion Criteria: One hundred and fifty migraine patients will randomly be selected. All patients were more than 18 years and they had first episode of headache before the age of 50 years. The patients were selected by using International Headache Society criteria for migraine[4]. Serum magnesium level will

measure with spectrophotometry technique during Headache free period. The patients are selected who had not taking prophylactic medications like beta blockers, calcium channel blockers, ortopiramate for 1 month or more. The patients were included who were headache free for 1 week.

Exclusion Criteria: Patients who concurrently suffered from other types of headache for example headache due to hypertension, raised intracranial pressure, sinusitis, or who were on certain medications which increase the renal excretion of magnesium for example aminogly-coside, furosemide, acetazolamide, and thiazidesetc. were excluded from the study.

Data analysis: All the statistical analyses were performed using SPSS version 18.0.

RESULTS

Between 1st January 2014 to 31 December 2014, the patients, who visited outpatient clinics of Neurology and medicine, at Dow University Hospital with the complain of headache were included in this study. 150 patients were selected with Primary Headache for this study. They were investigated for secondary causes if headache and were diagnosed according to International Headache Society criteria for Migraine.

Age Distribution: The mean age was found 28 (±6.2) years, when migraine found to be most prevalent. (Table: 1)

Gender Distribution: Out of 150 patients, 101 (67.3%) patients were female. Migraine was diagnosed in 76 (75.2%) females and in 26 (53.1%) male patients. 25 (24.8%) females had non migrainous headache. (Table 2).

Table No.1: Age Distribution

Age of Patients (Years)	Frequency (n=150)	Percentage (%)
<30	92	61.3
>30	58	38.7

Mean Age: 28 (±6.2) years

Table No.2: Gender Distribution

Total Number of Patients n=150	Male n=49 (32.7%)	Female n=101 (67.3%)
Migraine	26 (53.1%)	76 (75.2%)
Non Migraine	23 (46.9%)	25 (24.8%)

Table No.3: Serum Magnesium Deficiency

Total Number of Patients n=150	Low Serum Magnesium	Normal Serum Magnesium
Migraine Headache n = 102	71 (69.7%)	31 (30.3%)
Non Migraine Headache n = 48	06 (12.5%)	42(87.5%)

Serum Magnesium and Migraine: Out of 102 patients who were diagnosed as a case of migraine, 71 (69.7%) patients have low serum while 31 (30.3%) patients have normal serum magnesium levels. Six Patients with non migrainous headache for example cluster headache, chronic daily headache or hemicrania had low serum magnesium level because of some other causes. (Table 3) Forty two (87.5%) patients had normal serum magnesium level and they had non migrainous headache.

DISCUSSION

This study focus on the low level of serum Magnesium in patients with migraine in comparison with headache other than migraine. According to a study published in 2011, serum hypomagnesaemiawas frequently seen in migraine patients than the normal persons and associatedwith the increase frequency of migraine attacks, which support the use of oral or intravenous magnesium both in prevention and treatment of acute migraine[5].

Another study published in Cephalgia, showed that oral magnesium can be given as a prophylaxis of Migraine[6].

Serum magnesium in migraine patients found in significantly lower concentration than the normal peoples and related to the increase frequency of headache, supporting the prophylactic use of magnesium and to abort the acute headache (Mahdavi R, Tarigat EA)[7].

Sarchielli and his associates[8] studied that the patients with classical or commonmigraine and those who hadtension-type of headache showed considerably lower levels of serum and salivary magnesium concentrations in the inter-ictal periods than a group of healthy young individuals. This study also signifies that serum magnesium levels further decreased during the acute headache in almost all the migraineurs. Similar results were found in our study which showed 69.7 % patients had significantly low serum magnesium level, as compare to patients with non migrainous type of head ache, who had only 12.5% positive result.

Some studies also shown that patients with migraine or cluster headache have low levels of magnesium[9]. In contrast, our study showed low serum magnesium level mostly in migraine patients, though some of the patients found to have cluster headache.

A study published in Cephalgia, showed about 50% reduction in intensity and duration of Migraine headache after the prophylaxis therapy with Magnisium[10]. According to American Headache Society, Magnesium can be used for migraine prophylaxis.

Another study done in Italy suggested hyper-excitability of Neurons because of low level of serum magnesium in patients with migraine[11,12].

Oral or parenteral magnesium can be used as a therapeutic drug for the prophylaxis and treatment of acute migraine headache[13].

CONCLUSION

Migraine is frequently associated with decrease serum level of magnesium. So according to our hypothesis, replacing serum magnesium either orally or parentally will be a better measure to control migrainous headache, either alone or in combination with other prophylactic medications, for example beta blockers, calcium channel blockers or sodium valproate.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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