

A Study on Relation Between Attacks of Migraine Headache and Serum- Magnesium Level

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Abstract

Migraine is one of the common varieties of headache. It involves 4 to 6 percent of men and 13 to 16 percent of women under 30 years in more than 80% of cases. Some studies have shown that in 50% of patients serum magnesium level decreases during attacks of headache and using magnesium tablets and intravenous magnesium sulfate is more effective for treatment of migraine attack, than placebo. This is a cross sectional, analytical study on 50 patients referring to private neurology clinics and Shahid Beheshti Hospital of Kashan University of Medical Sciences (KAUMS). Serum magnesium level studied during the attack of headache and in remission in each of 50 patients. All predisposing factors such as age, sex, cigarette smoking, trauma and family history of migraine and so on were searched. Forty – five of 50 patients (90%) were female and 5 (10%) were male. Thirtyfour (68%) of cases were between 31 and 45 years old. In this age range 30 (60%) were female and 4 (8%) male. Seven (14%) had history of trauma. Five (10%) cigarette smoker, 44 (88%) had history of stress, and 30 (60%) had history of migraine in their family. Serum magnesium level was 2.1 in remission phase, and 1.7 during attack ($P=0.001$), although both are in normal range ($N=1.6 - 2.7$). Serum magnesium level decreases during the attacks of migraine headache, so using magnesium containing drugs may be useful in its control.

Keywords: *Migraine, Serum magnesium level, Kashan, Iran*

Introduction

Migraine headache is one of the common forms of headache(1, 2). It is a unilateral, recurrent, pulsatile headache associated with nausea, vomiting, visual and olfactory, disturbances(2, 3). Investigations has revealed that 4-6% of men, 13-16% of women are afflicted with migraine. Although it may be seen from childhood, however it usually begins in adolescence. In more than 80% of cases it begins before the age of 30(4). Stress, trauma, sleep disorders, smoking, dietary regimens, family history are important in beginning or aggravation of migraine headache. (1, 2, 3, 5). Various pathophysiologic mechanisms have been described for migraine. Some believe in vascular mechanisms and describe the aura phase to intracranial vasospasm, and headache attacks to extracranial vasodilation. Others correlate it with vasomotor activity, resulting in vasodilation or vasoconstriction of either intra or extracranial arteries secondary to release of

vasoactive neuropeptides in trigeminal peripheral nerve endings (2, 6). Another opinion is similar to convulsion and during migraine attacks electrical discharges or neural storms happen in brain (2). Nowadays it is said that serotonin and magnesium have important role on the begining of headache. It has been shown that at the begining of migraine headache platelet serotonin level decreases, and that only drugs releasing serotonin affect migraine attacks (7- 9). It has also been shown that decreased Mg levels cause neural and neuromascular excitability. It may cause hyperventilation and hypersensitize cerebral arteries to the effects of hypocarbia(10). Pharmacological doses of Mg can diminish neurological deficits after brain injury. It may play a role in migraine headache(6). Recent researches on serum Mg levels show that in more than 50% of patients serum Mg level has decreased during headache attack. In some patients injection of Mg relieved headache

rapidly. Some studies suggest that oral use of Mg in long term may diminish frequency of migraine headache (11). Use of 600 mg of Mg daily has been successful in migraine prophylaxis (12, 13, 18). In another study it has shown that migraine particularly in women is associated with low serum and brain Mg and IV use of magnesium sulfate has been effective in pain control (14,15). Several other studies, also have revealed that IV use of Magnesium sulfate comparing with placebo is effective in both aura and headache (10, 11, 16, 4). Considering all these facts we decided to conduct a study on migraine patients in Kashan and measure serum Mg level between and during attacks.

Materials and Methods

This is an analytical study on 50 patients afflicted with migraine headache referring to private neurology clinics and Shahid Beheshti Neurology Clinics of Kashan University of Medical Sciences during 2000-2001. Serum magnesium level was measured with spectrophotometry technique and the same laboratory during attacks of migraine and pain free interval. In addition patients age, sex, family history, cigarette smoking, history of trauma were inquired. Results analyzed with T test.

Results

Forty five (90%) of patients were female and 5 (10%) male. The youngest patient was 15 years old and the oldest 90. Most of the patients were in age range of 31-45 with mean age of 34. In this age range 30 (60%) were female and 4 (8%) male. (Table 1). Seven (14%) of patients had past history of trauma, 42 (84%) were housewife, 5 (10%) were smoker and 44 (88%) had history of emotional stress. Thirty (60%) of patients had familial history of migraine. (Table 2). Mean serum Mg level during attack of headache was 1.7 (1.7±0.18) and in pain free interval 2.1 (2.1±0.29). Although there was a significant difference between serum Mg level

during attacks and pain free interval ($P=0.001$) however both of these were within normal range.

Table 1: Distribution of patients according to age and sex

Age(year)	Female (N-%)	Male (N-%)	Total (N-%)
15 – 30	8 (16)	1 (2)	9 (18)
31 – 45	30 (60)	4 (8)	34 (68)
46 – 50	2 (4)	-	2 (4)
> 50	5 (10)	-	5 (10)
Total	45 (90)	5 (10)	50 (100)

Table 2: Distribution of patients on the base of family history of migraine and sex

Family History	Male (N-%)	Female (N-%)	Total (N-%)
Positive	3 (6)	27 (54)	30 (60)
Negative	2 (4)	18 (36)	20 (40)
Total	5 (10)	45 (90)	50 (100)

Discussion

According to literature, three fourth of patients afflicted with migraine headache are female and 80% begin under the age of 30. Sixty to 80% had positive familial history. Trauma, stress and stimulants are predisposing factors for migraine attack (1, 2, 15, 16). In our study mean serum Mg level was 1.7 during headache and 2.1 in pain free period. In a study on 19 patients with tension headache (4 males and 15 females) and 30 migraineurs (3 males and 27 females) without aura it has shown that low serum Mg level aggravates migraine headache (6). It is shown that decrease Mg level in brain neurons and serum causes decreased physiologic threshold for migraine attack (12). In a study showed decreased Mg level during migraine

attack in 50% of migraineurs (11). In some patients parenteral use of Mg resulted in rapid and prolonged recovery. They concluded that oral use of Mg in long term may reduce migraine headache frequency (11). In another study showed low serum Mg in childhood migraineurs(1). It seems that treatment with Mg - pidolate for 20 days may raise Mg level to normal in 90% of cases (1). In a study accentuated on the role of Mg on pathogenesis of migraine and suggested that daily dose of 600 mg (50 meq) of Mg may be effective on prevention of headache (12, 13). In another study compared the result of IV injection of 1 gr magnesium sulfate in 15 min with 10 ml of NaCl in 30 migraineurs, 15 in each group. Thirteen patients in study group had complete recovery and 2 partial improvement of pain. In control group only partial recovery encountered. They concluded that parenteral use of 1 gr of magnesium sulfate is an effective treatment for acute attack of migraine (14). In another study have shown that low Mg level causes excitability of neurous and neuromuscular junctions (10). It may also result in hyperventilation which can aggravate the effects of hypercarbia. Mg may regulate neuronal excitability and affect migraine headache (10). At the end we suggest to consider oral and parenteral Mg drugs as a new therapeutic way for prevention and treatment of acute migraine headache.

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