Magnesium and Migraine Critically Appraised Topic (CAT)

**PICOT Question:**
In patients with migraine, does treatment with intravenous magnesium sulfate alleviate headache?

**Clinical bottom line based on literature appraisal below:**
There is no evidence that intravenous magnesium sulfate improves pediatric migraine headache. However, one small, adult study demonstrated migraine headache improvement in those patients with acute migraine with aura (Bigal, Bourdini, Tepper, & Speciali, 2002). [GRADE = Strong recommendation / Low-quality evidence]

**Search strategy implemented:**

**Search outcome:**
2 articles were identified and are reviewed here.

**Synthesis of relevant studies:**

<table>
<thead>
<tr>
<th>Author, date, country, and industry of funding</th>
<th>Patient Group</th>
<th>Level of Evidence (Oxford) / Strength of Evidence (GRADE)</th>
<th>Research design</th>
<th>Significant results</th>
<th>Limitations</th>
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</thead>
<tbody>
<tr>
<td>Mauskop, A., Altura, B.T., Cracco, R.Q., &amp; Altura, B.M. (1995). Intravenous magnesium sulfate rapidly alleviates headaches of various types. Headache 36:154-160.</td>
<td>40 adult patients, 11 male, headache distributed as follows 16 migraine without aura 9 cluster headaches 4 chronic tension type headache</td>
<td>Level 4 Case control</td>
<td>Case control comparison Infused 1 gram of magnesium sulfate Consecutive enrollment-some came to clinic to be enrolled, some happened to have a HA at clinic visit. iMg2+ levels were lower in all HA subjects than control. iMg2+ levels of initial responders were lower than controls Those who had no return of HA had even lower initial iMg2+ levels. Non responders to Mg infusion had: initial Mg2+ levels that were not different than controls. iCa2+/iMg2+ ratio was greater than healthy controls and non responders.</td>
<td>Subject recruitment was biased. A case control is not a good way to test for efficacy. No follow up blood work was done</td>
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<td>11 chronic migranous headache 60 healthy controls</td>
<td>Blood sample was tested for iMg₂, TMg, iCa. Treatment administered. HA intensity was measured on a verbal 1-10 prior to and 15 minutes after the infusion. Positive response 50% reduction in pain intensity</td>
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<td>Bigal, M.E., Bourdini, C.A., Tepper, S.J., &amp; Speciali, J. G. (2002) Intravenous magnesium sulphate in the acute treatment of migraine without aura and migraine with aura. A randomized, double-blind placebo-controlled study. Cephalalgia. 22: 345-353.</td>
<td>Adults, &gt; 18 years age. HX migraine with and without aura in moderate to severe pain. 2 centers in Brazil 1997-1999. 1b Randomized by lot. Power determined by another study. Placebo: IV injection of 10 ml of normal saline. Treatment: IV injection of 1 gram magnesium sulphate diluted to 10 ml of normal saline. 1. Pain intensity was significantly less in the Mg group at 60 minutes. 2. Patients without aura showed no benefit from Mg when compared with placebo. 3. Patients with aura had significant improvement in both HA response and pain free endpoints at both 30 and 60 minutes.</td>
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**Literature synthesized by:**
Nancy H Allen MS RD LD CNSD

**Clinical Bottom Line developed by Migraine CPG team.**

**Date created:**
September 8 2009

**References:**