What is the correct magnesium supplement?

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To the Editor,

It is with astonishment that we read the article by Shechter et al. [1] In their introduction they state that “... the aim of the current study was to investigate the impact of supplemental oral magnesium citrate versus magnesium oxide...” in healthy volunteers. There are several inconsistencies in this study that invalidate the conclusions by the authors that magnesium oxide is superior to magnesium citrate as a magnesium supplement.

1. Most importantly the authors compared a daily dose of 520 mg magnesium given as oxide to a dose of 300 mg magnesium given as citrate. The rationale behind this is obscure – how can a comparison be made if not the same absolute magnesium dose is given? The authors do not comment on why these different dose regimen were investigated or how they could influence the conclusions.

2. The authors claim that magnesium oxide, but not magnesium citrate, reduced cholesterol. This is overinterpretation of the data, as the level of cholesterol was elevated only in the magnesium oxide group (201 ± 37 versus 186 ± 27 mg/dL), but was just reduced to the lower level that was already evident in the citrate group (187 ± 28 versus 187 ± 25 mg/dL). The same applies for LDL cholesterol.

3. The authors emphasize that magnesium oxide (520 mg magnesium), but not magnesium citrate (300 mg magnesium) reduced hs-CRP, and cite as support a study by Nielsen et al. [2]. However, in the study done by Nielsen et al. a daily dose of 320 mg magnesium given as citrate was used which was not mentioned by Shechter et al. [1].

4. The authors claim that “While more patients in the Diasporal group had abdominal pain and diarrhea compared with Magnox, more patients from the Diasporal group had resting leg pain, headache and weakness.” This conclusion is also quite obscure. The data in Table 3 show that for the “side effects” of abdominal pain and diarrhea, the numbers were 0 and 7 in the oxide group and 4 and 7 in the citrate group (meaning the same number after 30 days intake!!); for leg pain, headache and weakness the numbers were 27 and 19 in the oxide group and 23 and 22 in the citrate group. It would be interesting to know on what statistical basis 23 and 22 is more than 27 and 19. Table 3 also shows that overall side effects were fewer in the citrate compared to the oxide group!

5. What is the reason behind the question “Did the current medication improve your condition?” in a population of healthy volunteers, and how was the information used?

6. The argumentation concerning differences in sublingual tissue magnesium concentration after magnesium oxide or magnesium citrate because of different stability constants is not possible. Magnesium is absorbed as an ion and there is no difference in the magnesium transport in plasma, whether given as oxide or citrate.

7. Several parameters were significantly improved by 300 mg magnesium given as magnesium citrate. It could thus be equally well concluded that this preparation is superior to magnesium oxide as it works already at a lower dose.

As a matter of “style”, we would like to add that it is very unusual to use brand names of magnesium supplements to define treatment groups.
Overall, there are several inconsistencies in this paper and the conclusions are not backed by the data. All differences can be explained by the higher magnesium dose in the oxide group. It is also difficult to understand what this study adds to the already known effects of magnesium supplementation in healthy subjects. It does not add anything to the knowledge of the efficacy of magnesium supplementation from various magnesium salts.

References


Reply to the letter: “What is the correct magnesium supplement?” by Kisters [1]

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“Most importantly the authors compared a daily dose of 520 mg magnesium given as oxide to a dose of 300 mg magnesium given as citrate. The rationale behind this is obscure – how can a comparison be made if the same absolute magnesium dose is not given? The authors do not comment on why these different dose regimens were investigated or how they could influence the conclusions.”

There are two main, oral, magnesium preparations in Israel: Tab. magnesium oxide [Magnesium Diasporal 610 mg (98.6 mg of elemental magnesium) Protina GMBH, Ismaning, Germany] and Tab. magnesium oxide [Magnox 520™ (magnesium oxide monohydrate, 520 mg of elemental magnesium), Naveh Pharma, Israel]. The maximum dose of magnesium citrate tablets, as registered in Israel in the MEDIC book (Israel Pharmacological Index, therapeutic classification of all products according to their indications) is 3 loz, daily, (i.e. a total of 295.8 mg/day of elemental magnesium). The maximum dose of oxide tablets is once daily (i.e. 520 mg/day of elemental magnesium). We therefore compared the maximum recommended doses of the above two oral magnesium preparations usually given in common practice [2]. However, in Israel magnesium citrate is usually given as Magnesium Diasporal once daily. Therefore, we wanted to compare the absorption of these two magnesium preparations at the maximum recommended dose in our country. In the “Study limitations” section at the end of the “Discussion” (page 36), we wrote that “The Diasporal dose was not identical to that of Magnox, which could explain the null effect of [Mg²⁺].”

“The authors emphasize that magnesium oxide rather than magnesium citrate reduced cholesterol. This is an overinterpretation of the data as the level of cholesterol was elevated only in the magnesium oxide group (201 ± 37 versus 186 ± 27 mg/dL), but just reduced to the lower level that was already present in the citrate group (187 ± 28 versus 187 ± 25 mg/dL). The same applies for LDL cholesterol.”

The statistical analysis of the data was done by a PhD statistician from the Tel Aviv University. The delta change was measured and compared between the study groups (see details in the “Statistical analysis” section). The p value for total cholesterol change after 30 days in the Diasporal group was 0.978 and in the Magnox group 0.016 (see table 2) and LDL-C 0.622 and 0.042, respectively [2].

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