Review: magnesium prophylaxis after cardiac surgery reduces the risk of arrhythmia and atrial fibrillation


Does magnesium prophylaxis after cardiac surgery reduce the risk of arrhythmia?

METHODS

Data sources: Medline (1966 to June 2003), EMBASE/Excerpta Medica (1980 to June 2003), Cochrane Controlled Trials Register (Issue 3, 2003), and hand searches of references of reports and reviews.

Study selection and assessment: randomised controlled trials (RCTs) in any language that compared a single, fixed dose of prophylactic magnesium (intravenous, central, or intracoronary administration) with control (placebo or routine care) after cardiac surgery. 2 independent reviewers assessed the methodological quality of individual trials using the 5 point Jadad scale.

Outcomes: atrial fibrillation (AF), supraventricular arrhythmia (SA) and ventricular arrhythmia (VA), serum magnesium concentration on postoperative day 1, length of hospital stay, myocardial infarction (MI), and mortality.

MAIN RESULTS

17 RCTs (n = 2069) met the selection criteria. 9 studies had Jadad scores of 4–5 out of 5, and 8 studies had scores < 3. Pooled serum magnesium concentration at 24 hours after surgery was higher in the magnesium group than in the control group (weighted mean difference [WMD] 1.1 mg/dl, CI 0.7 to 1.4). Meta-analysis based on a random effects model showed that fewer patients who received magnesium had SAs, VAs, or AF compared with those who received the control intervention (table). The groups did not differ for length of hospital stay (7 trials, n = 1227, WMD 0.28 d, CI –0.70 to 2.17), perioperative MI (9 trials, n = 1191, relative risk [RR] 1.03, CI 0.52 to 2.05), or mortality (12 trials, n = 1588, RR 0.97, CI 0.43 to 2.20). Only 5 trials (n = 648) investigated side effects; no severe bradycardia or hypotension was reported.

CONCLUSIONS

Prophylactic treatment with magnesium after cardiac surgery is better than usual care or placebo for reducing the risk of atrial fibrillation and supraventricular and ventricular arrhythmias. Magnesium had no effect on length of hospital stay, myocardial infarction, or mortality.

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Table: Magnesium prophylaxis v control (placebo or routine care) after cardiac surgery*

<table>
<thead>
<tr>
<th>Outcomes at 1–30 days</th>
<th>Number of trials (n)</th>
<th>Weighted event rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Magnesium prophylaxis</td>
<td>Control</td>
</tr>
<tr>
<td>Supraventricular arrhythmia</td>
<td>16 (2029)</td>
<td>22%</td>
</tr>
<tr>
<td>Ventricular arrhythmia</td>
<td>10 (1119)</td>
<td>5%</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>12 (1649)</td>
<td>19%</td>
</tr>
</tbody>
</table>

*Abbreviations defined in glossary; weighted event rates, RR, NNT, and CI calculated from data in article using a random effects model.
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