A meta analysis of treating subarachnoid hemorrhage with magnesium sulfate
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CRD summary
This review concluded that there was a reduced likelihood of a poor outcome for patients treated with magnesium sulphate following subarachnoid haemorrhage, but that patient mortality was not improved. Given the potential for bias and poor reporting of parts of the review process along with the inclusion of small trials of unknown quality, these findings should be interpreted with caution.

Authors' objectives
To assess the effectiveness of magnesium sulphate for the prevention of cerebral vasospasm following aneurysmal subarachnoid haemorrhage.

Searching
EMBASE and PubMed were searched from 1989 to December 2008; search terms were reported.

Study selection
Randomised controlled trials (RCTs) that investigated the effect of magnesium sulphate in patients with subarachnoid haemorrhage were eligible for inclusion. There were no restrictions for magnesium sulphate dose, route of administration, or duration of treatment.

The primary outcomes were: poor outcome (death, vegetative state, or severe disability) or a a favorable outcome (moderate disability and good recovery); mortality was assessed as a secondary outcome. Outcomes were measured three months after aneurysmal subarachnoid haemorrhage using the Glasgow Outcome Scale score or the modified Rankin Scale.

In all included trials, magnesium sulphate was administered through continuous intravenous infusion at doses ranging from 24 to 144mmol/day; the target level of serum magnesium ranged from 1.0 to 2.3mmol/L (where reported). Administration of magnesium sulphate ranged from verification of subarachnoid haemorrhage to within five days of subarachnoid haemorrhage and lasted for 10 to 18 days; in one trial magnesium sulphate was administered until intensive care unit discharge. The mean age of participants ranged from 46 to 58.9 years.

The authors did not state how relevant studies were selected for the review.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Two reviewers independently extracted outcome data and calculated odds ratios (OR) and 95% confidence intervals (CI). Authors were contacted for additional details where necessary. Disagreements were resolved by discussion with a third reviewer.

Methods of synthesis
Pooled odds ratios and 95% confidence intervals were calculated using both fixed-effect and random-effect models.

Heterogeneity was assessed using the X^2 and I^2 test.

Results of the review
Five RCTs were included in the review (n=476 patients, range 23 to 249).

Compared with control group patients, those treated with magnesium sulphate were less likely to have a poor outcome.
after subarachnoid haemorrhage (OR 0.54, 95% CI 0.36 to 0.81; five RCTs, n=442 patients). There was no significant heterogeneity present for this comparison.

Mortality rates did not differ between the two treatment groups (four RCTs, n=193 patients).

Authors’ conclusions
Although there was reduced likelihood of a poor outcome for patients treated with magnesium sulphate after subarachnoid haemorrhage, patient mortality was not improved.

CRD commentary
The review question was clear and supported by appropriate inclusion criteria. A small number of appropriate sources were searched for literature. There was potential for language and publication biases, as the authors did not state whether language restrictions were applied or unpublished studies were sought. Two authors performed the data extraction, which minimised risks of error and bias in the analysis, but it was unclear whether this extended to study selection.

It appeared that no quality assessment was undertaken, which made the quality of the included trials difficult to verify. Limited trial details were reported. Trials were combined using appropriate methods; statistical heterogeneity was assessed and found to be absent.

The authors’ conclusions reflected the evidence presented. However, given the potential for bias and poor reporting of parts of the review process, along with the inclusion of small trials of unknown quality, these findings should be interpreted with caution.

Implications of the review for practice and research
The authors did not state any implications for practice or further research.

Funding
Jinling Hospital, China.

Bibliographic details

PubMedID
19700328

DOI
10.1016/j.jocn.2009.05.001

Original Paper URL
http://dx.doi.org/10.1016/j.jocn.2009.05.001

Indexing Status
Subject indexing assigned by NLM

MeSH
Anesthetics /therapeutic use; Databases, Bibliographic /statistics & numerical data; Humans; Magnesium Sulfate /therapeutic use; Subarachnoid Hemorrhage /drug therapy

AccessionNumber
12010000074
Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.