

Clinical pharmacokinetic properties of magnesium sulphate in women with pre-eclampsia and eclampsia: A systematic Review 2015. Published online November 24, 2015

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Abstract

Background

The pharmacokinetic basis of magnesium sulphate (MgSO₄) dosing regimens for eclampsia prophylaxis and treatment is not clearly established.

Objectives

To review available data on clinical pharmacokinetic properties of MgSO₄ when used for women with pre-eclampsia and/or eclampsia.

Search strategy

MEDLINE, EMBASE, CINAHL, POPLINE, Global Health Library and reference lists of eligible studies.

Selection criteria

All study types investigating pharmacokinetic properties of MgSO₄ in women with pre-eclampsia and/or eclampsia.

Data collection and analysis

Two authors extracted data on basic pharmacokinetic parameters reflecting the different aspects of absorption, bioavailability, distribution and excretion of MgSO₄ according to identified dosing regimens.

Main results

Twenty-eight studies investigating pharmacokinetic properties of 17 MgSO₄ regimens met our inclusion criteria. Most women (91.5%) in the studies had pre-eclampsia. Baseline serum magnesium concentrations were consistently <1 mmol/l across studies. Intravenous loading dose between 4 and 6 g was associated with a doubling of this baseline concentration half an

hour after injection. Maintenance infusion of 1 g/hour consistently produced concentrations well below 2 mmol/l, whereas maintenance infusion at 2 g/hour and the Pritchard intramuscular regimen had higher but inconsistent probability of producing concentrations between 2 and 3 mmol/l. Volume of distribution of magnesium varied (13.65–49.00 l) but the plasma clearance was fairly similar (4.28–5.00 l/hour) across populations.

Conclusion

The profiles of Zuspan and Pritchard regimens indicate that the minimum effective serum magnesium concentration for eclampsia prophylaxis is lower than the generally accepted level. Exposure–response studies to identify effective alternative dosing regimens should target concentrations achievable by these standard regimens.

Tweetable abstract

Minimum effective serum magnesium concentration for eclampsia prophylaxis is lower than the generally accepted therapeutic level.
