Response to Letter Regarding Article, “Intraoperative Magnesium Administration Does Not Improve Neurocognitive Function After Cardiac Surgery”

We thank Dr Derakhshan1 for his interest in our recently published study on magnesium and postoperative cognitive decline.2 The questions he raises on handedness and hemispheric dominance have already been elegantly addressed in a previous response to a similar query.3 In essence, handedness may be unreliable as a representation of hemispheric specialization.4,5

Dr Derakhshan also refers to the work of Messerotti Benvenuti et al5 in asserting that flow to the right hemisphere is not relevant (P=0.08).6 To their credit, Messerotti Benvenuti et al suggested caution in interpreting their findings because “it seemed unlikely that neuropsychological tests activate the left hemisphere in isolation” and supported the need for a validation study with broader cognitive assessment (eg, visuospatial tasks).

The most puzzling comment in the letter from Dr Derakhshan is his critique of our expectation that magnesium treatment would reduce the incidence of cognitive deficits to 25%. It would seem that he is simultaneously arguing that the cognitive deficit rate can never exceed 50% and that it cannot be lowered. If cortical hypoperfusion is in fact a significant predictor of postoperative cognitive decline, magnesium-induced vascular smooth muscle relaxation would improve cerebral blood flow and potentially lower the cognitive deficit rate. As we describe in our study, magnesium has also been reported to exert neuroprotective properties via other mechanisms independent of blood flow, including preservation of cellular energy metabolism, noncompetitive inhibition of the N-methyl-D-aspartate receptor, attenuation of presynaptic excitatory amino acid release, potentiation of presynaptic adenosine, and blockade of voltage-gated calcium channels.7 For all of these reasons, it is entirely logical to postulate that intraoperative magnesium administration would reduce postoperative neurocognitive dysfunction.

Disclosures

None.


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