

Magnesium and the Cardiovascular System

Bernard Horn

In a recent editorial, Altura and Altura [1] state the following: 'Systemic administration of pharmacologic amounts of magnesium has been known for more than 100 years to produce vasodilatation and hypotension...'.

There is no longer any doubt that magnesium alters vascular tone profoundly, and that perfusion of vital organs is increased when magnesium is administered. However, the author of the present letter has, over 15 years, made the following observations in over 8,000 surgical patients who had magnesium sulfate added to their intravenous infusions preoperatively, intraoperatively and postoperatively. The usual dose given was 3 g of MgSO₄ added to 1,000 ml of fluid and administered intravenously over 6-8 h, followed by 1 g in each subsequent intravenous injection.

No normotensive patient ever had any significant blood pressure drop when receiving the above dosage of MgSO₄. Hypertensive patients, however, were quite different, and often exhibited marked lowering of both their systolic and diastolic pressures. This occurred quite commonly even in patients who had been refractory to conventional therapy, including bed rest. The impression

was that the more severe the hypertension seemed to be, the more profound the response to MgSO₄. It was not at all unusual that patients who had blood pressures over 200 systolic and 150 or more diastolic would arrive in the operating room with normal pressures, after having received an infusion of MgSO₄ for 8-10 h.

Other findings were equally dramatic. Patients who had exhibited ventricular arrhythmias such as premature ventricular contractions or bigeminy sometimes for years, would revert to a normal sinus rhythm after several hours of MgSO₄ infusion, often to the great surprise of their internist who had followed these patients for years. Atrial arrhythmias did not react as profoundly as some of the ventricular abnormalities; this was equally true during long and stressful operations when sometimes life-threatening ventricular arrhythmias occurred for whatever reason.

We never hesitated to give magnesium to patients who were hypotensive for other reasons such as hypovolemia or direct surgical stress, since perfusion always seemed to improve, when magnesium was administered. This was particularly impressive after vascu-

lar surgery of the lower limb, when often severe vasoconstriction threatens the newly operated limb. Hypotension for whatever reason was never made worse by magnesium administration.

During aortic clamping, when renal function is sometimes markedly slowed, magnesium was very useful as a diuretic, and diuresis was sometimes so profound that we had

troubles keeping up with other electrolytes which were lost.

The only real complication which occurred with magnesium was that it sometimes (but not often, if careful) prolonged the action of curare, making it necessary to maintain patients on ventilators somewhat longer.

Hopefully, some of the mechanisms will be clarified in the future.