

Supplementation of magnesium to warm blood hyperkalemic cardioplegia for the prevention of atrial fibrillation after coronary artery bypass grafting

Koroner arter baypas greft sonrası atriyal fibrilasyonu önlemek amacıyla sıcak kan kardiyoplejisine magnezyum ilavesi

Dear Editor,

Atrial fibrillation is among the common complications seen early after coronary artery bypass grafting (CABG). Its mechanism of development has not been clearly defined, and its frequency increases with older age. The frequency of atrial fibrillation has not decreased despite recent developments in cardiac surgical techniques, anesthetic management, and myocardial protection. Atrial fibrillation potentially leads to complications, including early and midterm thromboembolic events, hemodynamic disorders, extended duration of hospitalization, and increased costs. It is not only a rhythm disturbance, but also quite a serious morbidity factor because of its complications, and therefore prophylaxis is very important (1). Until now, many pharmacologic agents have been used to prevent atrial fibrillation. In most but not all studies, β -blockers (2) and amiodarone (1) have been shown to decrease the development of postoperative atrial fibrillation.

Magnesium (Mg) is an important cation in cardiovascular physiology. It is the second most abundant intracellular cation after potassium. It is a cofactor for the activation of many enzymatic processes of cellular homeostasis, including the turnover of adenosine triphosphate (ATP) the energy source for contractility, maintenance of membrane potentials, and the control of vascular tone (3-5). It has been used extensively in cardiology after myocardial infarction (MI) for the prevention of supraventricular and ventricular arrhythmias, prevention of coronary spasms, and sudden death. Hypomagnesemia is a common finding after open-heart surgery. This is the result of hemodilution, preoperative and perioperative use of diuretics, and catecholamine discharge. This acute loss of magnesium has been suggested as an etiology of many postoperative arrhythmias. Prospective randomized studies have been conducted to examine the efficacy of prophylactic magnesium for the prevention of postoperative arrhythmias after open-heart surgery. In only 3 of the randomized controlled clinical magnesium sulfate trials (1,2) relevant to this issue, magnesium sulfate was suggested to decrease the postoperative development of atrial fibrillation.

In our study 50 patients undergoing primary elective coronary artery bypass surgery for three vessel disease were randomized to one of two techniques of myocardial protection: (i) intermittent antegrade warm blood hyperkalemic cardioplegia or (ii) intermittent antegrade warm blood hyperkalemic cardioplegia supplemented with magnesium sulfate.

Atrial fibrillation was detected in 7 (28%) patients of control group and 5 (20%) patients of study group. Intensive care unit stay was 22.3 ± 1.8 hours in the control group and 18.1 ± 2.3 hours in the study group. Additionally, ventilatory support was longer in control group. Postoperative hospital stay was also longer in the control group.

The use of magnesium in the perioperative and early postoperative periods seems to be effective in reducing the incidence of AF after coronary artery bypass grafting; and supplemental magnesium infusion, rather than efforts to correct hypomagnesemia, has the potential to lessen the incidence of AF. Thus, prevention of atrial fibrillation would not only provide physiologic and hemodynamic benefits but will also cause cost savings. But, further studies are required to confirm these findings.

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