

Does Glutamate Influence Myocardial and Peripheral Tissue Metabolism after Surgery for Aortic Stenosis?

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Objective Glutamate plays an important role for myocardial metabolism in association with ischemia. Patients with coronary artery disease characteristically demonstrate increased uptake of glutamate. Improved recovery of myocardial metabolism and hemodynamic state after coronary surgery has been reported in patients treated with glutamate infusion. The effect of glutamate has not been studied after other cardiac surgical procedures. In addition, the effects of glutamate on peripheral tissue metabolism remain to be described.

Material and Methods Twenty patients undergoing surgery for aortic stenosis (AS) were studied after randomisation to blinded infusion of glutamate or saline during one hour immediately after skin closure. Myocardial and leg tissue metabolism were assessed with organ balance techniques.

Results Postoperative glutamate infusion induced a two-fold increase in myocardial glutamate uptake and this was associated with a significant uptake of lactate in the heart. A seven-fold increase in AV-differences of glutamate across the leg was observed and this was associated with significantly smaller negative AV-differences of amino acids and free fatty acids compared with the control group.

Conclusion Amplified glutamate uptake by the myocardium during glutamate infusion is not restricted to patients with coronary artery disease. The uptake of glutamate was doubled and associated with a significant uptake of lactate after surgery for AS. Our data also indicate that the marked increase in glutamate uptake in the leg was associated with an antilipolytic effect and a mitigation of net amino acid loss. The latter appears to be explained by net uptake of glutamate per se and is probably not directly connected to protein turnover, as no change was observed in the exchange of non-metabolizable amino acids. Taken together, the findings suggest that glutamate has a potentially favourable effect not only on myocardial metabolism but also on peripheral tissue metabolism in the postoperative phase.