26446 - ANESTHETIC & NUTRIENT CARDIOPROTECTION AFTER MI IN RATS

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INTRODUCTION Perioperative myocardial infarction remains an important clinical problem. This study was design to evaluate the impact of two potential cardioprotective therapeutic strategies: nutrient supplementation and anesthetic preconditioning. Specifically, we compared the effect of triple nutrient therapy (TNT) and preoperative isoflurane preconditioning on cardiac function, infarct size and survival after myocardial infarction in rats.

METHODS Thirty one male Wistar rats were randomized to receive either oral TNT (n=11, carnitine [300 mg/d], CoQ10 [7 mg/d] and taurine [650 mg/d]), isoflurane preconditioning (ISO, n=11) or neither (CONT, n=9) prior to ligation of the left anterior descending (LAD) coronary artery under ketamine anesthesia. TNT was administered for 4 weeks prior to and 10 days after LAD ligation. The ISO group received two ten-minute episodes of isoflurane inhalation (2% inspired) at 24 and 48 hours prior to LAD ligation. The CONT group received neither treatment. At 10-day post surgery, cardiac function was assessed using echocardiography, and infarct size was measured using 2,3,5-triphenyl tetrazolium chloride–stained heart sections and planimetric analysis. End-diastolic and end-systolic dimensions were obtained using the leading edge method. Fractional shortening and stroke volume were calculated using standardized equations. Survival post surgery was also recorded. Data was analyzed using chi-square and ANOVA as appropriate with $p<0.05$ considered significant.

RESULTS Survival was similar between TNT and ISO (55 vs 54%, NS), and both were significantly higher compared with CONT (35%, $p<0.03$). In contrast, infarct size in the TNT group (24.7±7.1 %) was significantly smaller when compared with either the CONT or ISO groups (40.2±6.0 vs 49±3.2 %; $p<0.01$). End diastolic and systolic dimensions were significantly smaller in TNT animals compared with either CONT or ISO animals ($p=0.05$). Fractional shortening was also significantly higher in TNT compared with CONT and ISO groups ($p=0.05$). Stroke volume, heart rate and cardiac output were similar between the 3 groups.

DISCUSSION Preoperative isoflurane preconditioning and nutritional intervention prior to myocardial infarction resulted in improved survival. In contrast, only nutritional intervention preserved cardiac structure and contractility at 10-day post MI. The differences between TNT and preoperative isoflurane preconditioning on cardiac function and structure may be related to the dose used, timing of administration and/or mechanism of action. Future research is needed to determine the optimum use of these potential therapies in patients at risk for myocardial ischemia and infarction.