Parenteral nutrition (PN) is used for the intravenous delivery of nutrients to patients who cannot take food orally. However, it is not clear whether PN also negatively impacts cardiac tissue. The present empirical study investigated the cardiac effects of PN in rabbits” Gürünlüoğlu et al (2019).

Abstract:

INTRODUCTION: Parenteral nutrition (PN) is used for the intravenous delivery of nutrients to patients who cannot take food orally. However, it is not clear whether PN also negatively impacts cardiac tissue. The present empirical study investigated the cardiac effects of PN in rabbits.

METHODS: The effects of PN were examined in three groups of rabbits: animals in the PN + fasting group (n = 14) had been fully fasted before receiving a full PN dose via an intravenous central catheter; the PN + oral feeding group (n = 14) received half of the daily calorie requirement as a half dose of PN via an intravenous central catheter; the third group consisted of controls (n = 14) with full enteral feeding and full enteral fluid intake with no PN and no central venous catheter. At the end of the 10-day study period, the rabbits were subjected to echocardiographic examination and euthanized. Blood and tissue samples were obtained from all groups. DNA was isolated from nucleated blood cells. Tissue samples were examined by both light and electron microscopy, relative telomere length was determined from DNA, and blood samples were analyzed biochemically.

RESULTS: At the end of the study, there were no statistically significant differences in weight change between the three groups. Echocardiography revealed minimally impaired diastolic function in the PN + fasting group compared to the other groups. Biochemical and histopathological analyses, relative telomere length determination, and electron micrographs showed significant cardiac damage in the PN + fasting group but not in the PN + oral feeding group or the control group. The blood biochemical analyses showed hyperglycemia and a low insulin level in the PN + fasting group but not in the other two groups.

CONCLUSIONS: A combination of PN and fasting may damage the cardiac muscle cells of rabbits via a mechanism involving hyperglycemia and oxidative stress. Additional enteral
feeding may protect against the destructive effects of PN on cardiac tissue.

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