A CHRONIC SIX-WEEK STUDY IN DOGS

PHARMACOLOGIC APPLICATION OF ULTRASOUND IN MODERATE INJURY.
Electrocardiograms were recorded before coronary artery ligation and at specified intervals throughout the study. On 13 animals, the heart was removed and a coronary artery ligation was performed via a transverse incision. Serum lactate dehydrogenase (LDH) and aspartate transaminase (AST) activities were also obtained to verify the infarction. At the end of the study, the hearts were removed, and a specimen was taken for histological study. The hearts were then perfused with saline via a Bain's circuit. The hearts were then fixed in situ with 10% formaldehyde, dehydrated, and embedded in paraffin. Sections were cut at 5 μm and stained with hematoxylin and eosin. Histological sections were photographed and examined microscopically. Vascular casts were made from the coronary arteries of each animal. The area of the infarct was determined by planimetry. The results were then analyzed statistically.

General findings include: (1) less dense collagen staining in the treated animals; (2) 25% of the treated hearts showed no signs of infarction; (3) 42% of the infarcts in the control group were transmural, whereas in the treated group, none were; (4) 50% of the subendocardial infarcts in the treated group were smaller in the treated animals; (5) 30% of the treated animals that were rhythmically monitored demonstrated a decrease in the rate of premature ventricular contractions (PVCs), while one (1%) showed an increased PVC rate.

Our conclusion is that ultrasound does have some beneficial effects. The doses and schedules used must be optimized. The mechanical effects which result in decreased scarring during the acute process and better perfusion during the chronic process require further evaluation.

(work supported by NIH Contract KB-121/12-1-5004 of the National Heart, Lung, and Blood Institute, Branch of the NIMH.)