

Title: REGIONAL DIFFERENCES IN LEFT VENTRICULAR WALL MOTION.

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Differences in function between the apex (supplied by the left anterior descending coronary artery) and the base (supplied by the left circumflex coronary artery) of the left ventricle (LV) have been previously reported (1,2). The effect of anesthetic agents and of other cardioactive drugs may also differ in different regions of the left ventricle. This study was undertaken to test the hypothesis that the effects of stepped increases in halothane concentration may have dissimilar effects in the apex and the base of the left ventricle of the dog.

Methods: Fourteen mongrel dogs were anesthetised with halothane (1-2%), artificially ventilated, and subjected to a left lateral thoracotomy. They were instrumented to measure aortic and LV pressure, aortic blood flow, and stroke volume. In order to assess regional function, a pair of 5 MHz sonomicrometry microcrystals was implanted subendocardially in the short axis of the ventricle in the basal region. Another pair was implanted in the subendocardium of the apex in the short axis. After completion of surgery, the halothane concentration was reduced to 0.5 - 0.7%, and control recordings were obtained after one hour of stabilization. The inspired halothane concentration was then increased to 1.0, 1.5, and 2.0%, and recordings taken after 10 minutes at each concentration. Systolic shortening was expressed as percentage of end-diastolic length (%SS). Hemodynamic variables were compared, using two-way ANOVA, while comparisons between apical and basal shortening were done using paired t-tests. $P < 0.05$ was considered significant.

Results: Hemodynamic variables were depressed in a dose-dependent manner by increases in halothane concentration, culminating at 2% halothane in significant reductions in heart rate (-10%), arterial pressure (-44%), and LV dP/dt max (-58%), while LV end diastolic pressure remained unchanged. At control, %SS was significantly greater in the apex (19.72 ± 5.5) than in the base (13.91 ± 4.85) (mean \pm 1 SD). Depression of %SS with each successive increment in halothane concentration was greater in the apex than in the base.(Fig. 1).

Discussion: Studies of the effects of anesthetic agents on regional function of compromised myocardium have examined basal segments (3), apical segments (4), or both (5). The finding that in the control state, with a low

halothane concentration, the apex of the LV is more dynamic than the base, is in keeping with previous reports (1,2). In addition, stepped increases in halothane concentration caused significantly greater depression of the apex than the base. Thus great care must be taken in interpreting studies of regional function. An apical segment may not be used as control for a basal segment and vice-versa.

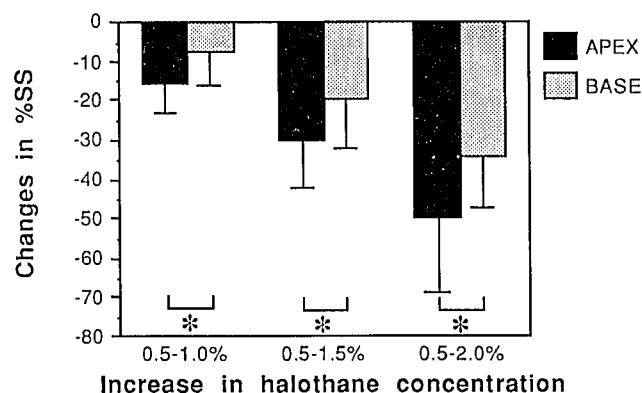


Figure 1: The effect of increases in halothane concentration on systolic shortening (%SS). Values are mean \pm 1SD. N=14. *= $P < 0.05$.

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