the diaphragm and hence will reflect quite closely the top of the cylinder of abdominal contents that lies below. In essence, the abdomen could become longer, and less wide, after induction of anesthesia.

Mead and Loring\(^2\) show that these relative volume changes can be calculated, and they indicate that such a change in shape can take place with no change in the length of the diaphragm. Their analysis is more complex than that of Hedenstierna et al.,\(^1\) whose calculation of the volume of abdominal contents is misleadingly simple and could be in considerable error. For example, the most cranial section across the abdomen was only 14 cm above the lower margin of L4, which is about the lower margin of T12. Since at functional residual capacity in the supine subject the dome of the diaphragm may extend up to about T6, this uppermost section will not accurately reflect the volume of the abdominal container up to the dome of the diaphragm. Analysis of the results of this study is far from simple, and the authors should consider other muscles as well as the diaphragm in their analysis of the shape changes they describe.

G. B. DRUMMOND, F.F.A.R.C.S.
M. R. LOGAN, F.F.A.R.C.S.
Department of Anaesthetics
Edinburgh Royal Infirmary
Edinburgh Scotland EH3 9YW

REFERENCES


(Accepted for publication July 22, 1985.)

In reply.—Dr. Drummond indicates the difficulty of determining the change in thoracic and abdominal volume caused by a change in the position and shape of the diaphragm. We have also stressed that “no detailed analysis of the configuration of the diaphragm was undertaken in the present study; this would have required additional transverse projections through the dome which was not possible for radiation dose reasons.” However, our method of calculating the thoracic and abdominal volumes (abdominal volume: transverse area times height of each abdominal segment, plus the maximum shift of the diaphragm multiplied by a factor of 0.75 times the transverse area at the level of the lowermost thoracic projection) turned out to be fairly accurate in various model analyses. This calculation will include the abdominal content within the rib cage; thus we do not agree with Dr. Drummond that we have failed to consider it. The schematic drawing in figure 2, with no detailed or exact configuration of the diaphragm, should not be used for criticism of our analysis of the effects of a shift in the position of the diaphragm.

GÖRAN HEDENSTIERNA
Department of Clinical Physiology
Huddinge University Hospital
S-141 86 Huddinge
Sweden

(Accepted for publication July 22, 1985.)

Histamine H1 Antagonist Alone Attenuates d-Tubocurarine-induced Hypotension

To the Editor.—Morphine and d-tubocurarine (d'Tc) have been widely used for anesthesia but are known to release histamine, which induces hypotension. Philbin et al. have shown that hypotension induced by morphine infusion was completely prevented by pretreatment with H1 and H2 antagonists when used in combination but not alone.\(^3\) On the other hand, it also has been suggested that the cardiovascular action of histamine is altered by the method of the drug administration, i.e., infusion or injection.\(^2\) We examined the efficiency of H1 and H2 antagonists, singly or in combination, in preventing hypotension induced by a bolus injection of d'Tc.

Twenty-four patients (ASA I or II), of either sex, ranging in age from 18 to 60 yr, and who were undergoing peripheral orthopedic, gynecologic, or abdominal surgery, were studied. At the time of the study, the Human Ethics Committee for Research had not been established in our institution, however, after full explanation of the study,