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Intrinsic Lower Esophageal Activity May Interfere with Esophageal Pressure Measurements

To the Editor:—We read the article on the measurement of esophageal pressures in anesthetized subjects by Higgs *et al.*[1] with great interest. We have used measurements of esophageal pressures in studies of pulmonary dynamics but have encountered interference from intrinsic esophageal activity. Intrinsic lower esophageal contractility (LEC) can be observed during anesthesia and may interfere with attempts to measure transmitted pressure changes from the lungs and heart.

Lower esophageal contractions of up to 100 mmHg magnitude can be recorded during "light" general anesthesia. The contractions typically last 3–5 s and may occur at a rate of 4–5 min during periods of very light anesthesia or severe surgical stimulus (fig. 1). We have been able to demonstrate that this spontaneous LEC is nonpropulsive or tertiary in nature; tertiary esophageal activity is recognized to be a stress-related phenomenon.[2–4] LEC also can be induced by mechanical stimulation of the pharynx or esophagus. The brief inflation of a second balloon in the lower esophagus can provoke a response that can be recorded as a contraction of the lower esophagus.

Both provoked and spontaneous LEC are suppressed progressively by increasing doses of inhalation and intravenous anesthetic agents. LEC seldom is recorded during anesthesia with inhalational agents when concentrations in excess of 1.0 MAC are used but readily can be observed at or below this level. The combination of 70% nitrous oxide and approximately 1 MAC of halothane used by Higgs *et al.* obviously was sufficient to suppress LEC in their study. Measurements of esophageal pressures are clearly of value in studying pulmonary dynamics providing intrinsic activity is suppressed by adequate anesthesia. The measurement of intrinsic LEC itself, however, may have potential in assessing the depth or adequacy of anesthesia.

That LEC can be recorded during anesthesia despite the use of skeletal muscle relaxants can be explained by the presence of smooth and not striated muscle in the lower half of the human esophagus. Anatomically, this is an unusual arrangement shared only by the American opossum.

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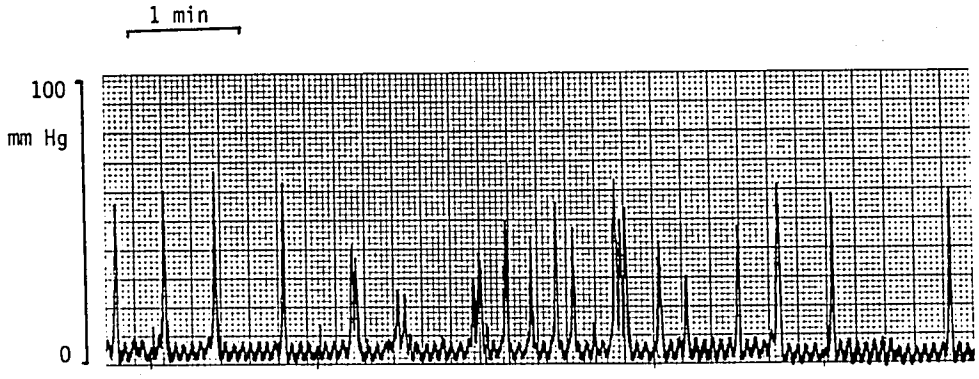

FIG. 1. Spontaneous LEC during nitrous oxide and enflurane anesthesia; muscle relaxation was produced by pancuronium. The patient was "light" as judged by clinical signs. The regular base line signal (0–8 mmHg) is transmitted pressure from pulmonary ventilation. The superimposed high-amplitude signals are caused by intrinsic lower esophageal activity, which frequently obscures the transmitted signal.