Monitoring Ventilation during Computed Tomography Scan

To the Editor—Electronic stethoscopes with wireless remote earpieces have been introduced into clinical anesthesia practice. We use such a device (Vitacomm, Inc., Orange, California), which has an infrared optical system linking patient to anesthetist. We recently found a situation in which it was indispensable.

A 5-yr-old girl was brought to the computed tomography (CT) suite for needle biopsy of the liver by CT localization. Anesthesia was maintained primarily by continuous ketamine infusion with spontaneous ventilation. Since the anesthesiologist cannot be present in the room during a scan, the patient and her monitors could be observed only from the control room through a leaded-glass window and by a video camera. Visible monitors included electrocardiograph, automated blood pressure cuff, and pulse oximeter. Although conventional stethoscope was not possible, we taped the electronic precordial stethoscope to the upper chest with the transmitter near by and found satisfactory signal reception through the glass, enabling us to hear breath sounds.

Ventilation can be monitored remotely by observing chest motion or (with endotracheal intubation) motion of the anesthesia bag, which may be accentuated by attaching an object such as a tongue blade to act as a lever arm. However, observation of chest motion alone in a stuporous patient with an unprotected airway might fail to detect upper-airway obstruction. Auscultation of breath sounds permits better assessment of adequacy of ventilation and degree of upper-airway obstruction. One possible alternative is a stethoscope equipped with a microphone and loudspeaker, but this might be difficult to hear through x-ray shielding and over background noise. We recommend a wireless stethoscope system in such a setting.

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REFERENCES

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Possible Pitfalls in Calculating Thoracic and Abdominal Volumes

To the Editor—The study of Hedenstierna et al. illustrates two longitudinal sections of the thorax and abdomen. The first is a radiographic tomogram that shows clearly the shape of the diaphragm ascending from its insertion at the rib margin almost directly cranially to form its well-known domed configuration within the rib cage. This finding substantiates the reasoning of Mead and Loring that the rib cage is an important container of abdominal contents. This is because over a considerable range of lung volumes the margins of the diaphragm are opposed to the inner wall of the rib cage and the abdominal contents lie within, rather than below, this part of the diaphragm. The second longitudinal section is a diagram that Hedenstierna et al. use to summarize the mean volume changes that were calculated to have occurred in their study. It shows a curved diaphragm with no apposition to the rib cage. This is a condition that would probably only exist when lung volume is very large and would not be expected in the conditions of this study. It may explain, however, the author’s failure to consider a further source of the change in volume of the abdominal container necessary to account for the cranial movement of the diaphragm that they describe. It is quite possible that this cranial diaphragmatic movement, and hence shift of abdominal contents cranially, could be accounted for by the simultaneous reduction of the cross-sectional area of the rib cage that they noted. In fact, the lowest section of the rib cage that they measured is quite close to the dome of