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Inexpensive Stethoscopic Transmitter

To the Editor:—Short-range transmitters are useful in teaching and supervisory environments in the operating room to allow multiple listeners to maintain vigilance of heart and breath sounds. We wish to report the construction of a simple and inexpensive device for this purpose.

A cordless, battery-operated FM microphone (Radio-Shack #33-1076, $19.95) may be modified for connection to standard iv extension tubing by removing the cover and drilling a ¼" diameter hole directly over the sound port to accept a ¼" O.D. × ⅛" I.D. rubber grommet (fig. 1). Acoustic coupling of the miniature transmitter is then easily made to any standard precordial or esophageal stethoscope. Unwanted noise coupling through the case may be damped by injecting 3 ml of silicone cement into the screw hole at the top of the unit, maintaining it inverted until the cement gels.

Any of several pocket FM receivers, including the Sony Walkman™, can be used to monitor vital sounds up to several feet away, and multiple sets may easily "listen in." We have found sound quality and lack of electrocautery interference with this device to be comparable to much more expensive, commercially marketed products.

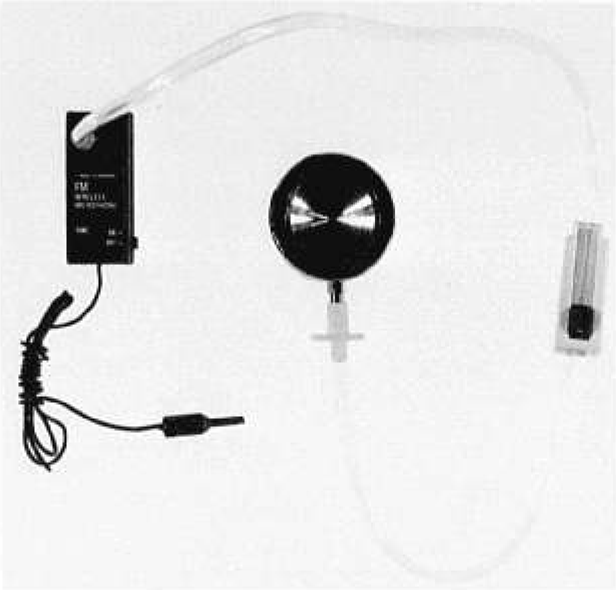

FIG. 1. FM microphone with attached precordial stethoscope.

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Rapid Calculation of Isoflurane Unit Doses for Closed-Circuit Anesthesia

To the Editor:—The recent letter by Frenette *et al.*[1] proposes an elegant simplification for calculation of those parameters in closed-circuit anesthesia which are derived from the exponential $kg^{3/4}$. The mathematical substitution $kg^{3/4} = 0.3 \times kg + 3$ is proposed, which approximates the exponential and eliminates the need for a slide rule computation. Employing this mathematical substitution in the calculation of anesthetic doses by the square root of time model[2] permits rapid and reasonably accurate anesthetic unit doses, as we show below. A unit dose is that quantity of anesthetic which is taken up by the patient in the first minute. The square root of time model predicts that equal amounts of anesthetic are taken up between squares of time; hence, equivalent doses are administered for the time intervals 0–1 min, 1–4 min, 4–9 min, 9–16 min, etc., and these are, by definition, unit doses.

The calculation, by the square root of time method, of the unit dose of isoflurane required to provide a 1% alveolar concentration ($C_A = 1$) is presented here:[2]

$$\text{unit dose (vapor)} = 2 \times C_A \times \lambda_{B/G} \times \text{cardiac output}, \quad (1)$$

where $C_A = 1\%$; $\lambda_{B/G} = 1.48$; and cardiac output $= 2 \times kg^{3/4}$ (dl/min).