connected to standard chest pieces located in both axillae or on both sides of the chest for auscultation, and then attached to a three-way stopcock (fig. 1). A standard ear-piece is connected to the third port of the stopcock. Chest locations can be altered according to need, or can be substituted for with an esophageal stethoscope. A simple turn of the stopcock allows each chest to be auscultated individually or both to be examined simultaneously.

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REFERENCES

Unusual End-tidal CO₂ Waveform

To the Editor:—End-tidal CO₂ monitoring is being utilized with increasing regularity by anesthesiologists in the operating room. Many of the new CO₂ monitors provide, in addition to a digital readout, a CO₂ excretion waveform. The shape of the CO₂ waveform can provide additional information, such as evidence of airway obstruction and spontaneous respiratory effort superimposed on mechanical ventilation. During our use of such a monitor (Saracap), we encountered a CO₂ waveform which we were unable to explain on a physiologic basis (fig. 1, upper panel). The explanation for the unusual waveform was discovered to be a loose luer-lock fitting between the disposable sampling line and the capnograph. The abnormal waveform could easily be reproduced by simply loosening the connection, and the waveform reliably returned to normal when the fitting was tightened (fig. 1, lower panel).

We believe that the plateau portion of the abnormal waveform is caused by entrainment of room air at the loose connection. Note that the oxygen and nitrous oxide concentrations measured when the connection was loose reflect entrainment of room air. The beginning of the end-expiratory peak in the abnormal waveform occurs precisely with the onset of the next positive pressure inspiration; the pressure gradient across the sampling line causes increased flow of the end-expiratory gas in the sampling line and less entrainment of room air. The mea-


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Fig. 1. Abnormal (upper panel) and normal (lower panel) CO₂ waveforms.
sured peak end-expiratory CO₂ concentration remains basically unchanged.

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Reusing the Nellcor Pulse Oximeter Probe: Is it Worth the Savings?

To the Editor:—We wish to point out a potential source of error when using the pulse oximeter. A Nellcor pulse oximeter with oxisensor Model N-25 was used on a 2-week-old term neonate (weight = 3.0 kg) for an urgent pyloromyotomy. The probe, which looks like a bandage, contains two low-intensity light emitting diodes and a photocell detector.¹ These optical components are located on the adhesive side of the probe, and are covered with transparent material. Even though this particular probe is recommended for single patient use, in a cost-conservation effort, we had reused the probe several times.

During preoxygenation, prior to a rapid sequence induction, with FIO₂ = 1.0, saturation as indicated by the pulse oximeter (SPO₂) was 99%, and the pulse rate sensed by the oximeter correlated with that shown on the electrocardiographic monitor. After intubation, SPO₂ continued to register 99% and auscultated breath sounds were equal. FIO₂ was decreased using an air/oxygen mixture to maintain an SPO₂ of 95–96% and the surgery was started. After 10 min, the oximeter indicated an SPO₂ of 75%, with good signal detection. A quick check of the patient’s breath sounds, endotracheal tube placement, and FIO₂, showed these to be unchanged; the FIO₂ was increased to 1.0 with only a minimal increase in SPO₂. A new oximeter probe was attached to the patient’s other extremity. Oxygen saturation indicated by this probe with an FIO₂ of 1.0 was 100%. The FIO₂ was again decreased to maintain SPO₂ at 95%, and the case was completed uneventfully. Upon emergence, with the FIO₂ = 1.0, the reused probe was again attached to the oximeter and gave readings of 80–85%; changing to the new probe, SPO₂ was 100%.

On examining the reused probe, it was noted that some of the adhesive from the bandage-like part of the probe had partially covered the transparent windows over the optical components (fig. 1). Since pulse oximetry functions by positioning a pulsating arterial vascular bed between a two-wavelength light source and a detector, an opacity over the light source will effectively decrease the amount of light delivered and, consequently, the amount detected.

Such an instrument error caused us needless worry over more ominous causes of desaturation, and, in the case of the neonate, the resultant attempt to increase SPO₂ by increasing FIO₂ could have unnecessarily predisposed the patient to the development of retrolental fibroplasia.² While cost containment is an important consideration, it would seem prudent, for more reliable patient monitoring, not to reuse this type of probe.

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REFERENCES

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