1 ml/min for small infants weighing less than 6 kg and at least 3 min for the total injection for other children.

The addition of etidocaine to bupivacaine in children less than 10 yr old is not needed for complete motor blockage intraoperatively, as they have less muscle tone than adults, and, postoperatively, motor blockade can hinder proper surgical follow-up of limb mobility (i.e., toes) when casts have been applied. In addition, the use of etidocaine in postoperative pain relief increases motor blockade, which can produce anxiety in children between 4 and 8 yr old, as it is very difficult for the children to understand why they cannot move their legs. On the other hand, we agree that the use of morphine is useful for postoperative pain. However, the children which receive epidural morphine should be kept in the ICU at least 24 h because of the risk of respiratory depression.3

In conclusion, we think, as do Drs. Dalens and Haberer, that epidural anesthesia is a very effective technique to improve postoperative pain relief in infants and children.

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The Administration of Bronchodilators into the Anesthesia Circuit

To the Editor:—To administer beta-adrenergic agents into the upper airway during general anesthesia to a patient whose trachea is intubated, it is necessary to have one of a number of devices that are either “home-made” or purchased commercially. It should be noted that, while these devices do work, there are some problems associated with them that can adversely affect the speed with which therapy can be initiated. The chief drawback is that the breathing circuit must be interrupted in order to use them.

Some of the “home-made” devices suffer to some degree from design flaws, such as being clumsy to use or constructed from parts that could fall into the airway if the bonding fails.1,2

Commercially available adapters are expensive, and are intended for multiple use, which means that an effort is necessary to prevent loss and ensure availability of clean, unlogged adapters.

With the advent of mass-spectrometry and end-tidal gas sampling by anesthesiologists, luer-lock sample ports are now commonly available on the disposable anesthesia breathing circuit elbow (mass-spec elbow). The mass-spec elbows are available as part of the anesthetic circuit or can be ordered separately. We use the mass spectrometer sampling elbow on our Intertech Ohio breathing circuit.

Fitting a beta-adrenergic aerosol to the mass-spec elbow is relatively simple. First, the plastic mouthpiece from the aerosol is removed, and a commonly available vented luer-lock cap is fitted to the metal nozzle of the aerosol. The dead-ended luer-lock cap of the mass-spec elbow is then removed. The vented luer-lock cap with the aerosol attached is then screwed into the mass-spec elbow, without significant interruption of the circuit. (fig. 1). Vented luer-

![FIG. 1. Aerosol container is inserted through the vented luer-lock cap into the mass spectrometer elbow.](image-url)
A Simple Method by Which to Obtain a Desired Oxygen Concentration

To the Editor—Several letters have described simple methods by which air and oxygen can be mixed to obtain a desired inspired oxygen concentration (F\textsubscript{I02}). Priano et al.\textsuperscript{1} utilized an Alligation Alternate, and DesMarTeau and Byles\textsuperscript{2} derived a formula, both of which are relatively easy to use, but must be remembered. We employ a method which allows the construction of a table any time that mixing air and oxygen is necessary.

The key to the method is to use an 8-l total flow (V\textsubscript{T}). As pointed out by DesMarTeau and Byles,

\[ [\dot{V}_{\text{AIR}} = \dot{V}_{T} \times (1 - F_{\text{I02}}) \times 1.25] \] \hspace{2cm} (1)

and

\[ [\dot{V}_{\text{O2}} = \dot{V}_{T} - \dot{V}_{\text{AIR}}] \] \hspace{2cm} (2)

where \( \dot{V}_{\text{O2}} \) and \( \dot{V}_{\text{AIR}} \) are the oxygen and air flow meter settings, and \( \dot{V}_{T} \) is the total flow. By employing an 8-l total flow, equation 1 becomes

\[ [\dot{V}_{\text{AIR}} = 10 \times (1 - F_{\text{I02}})] \] \hspace{2cm} (3)

Thus, for each .1 increment in F\textsubscript{I02}, \( \dot{V}_{\text{AIR}} \) changes by 1 l. This allows the instantaneous construction of table 1.

To construct the table, first write the initial line for air alone, and then the final line for oxygen alone. The values for an F\textsubscript{I02} of .3 to .9 are filled in for the \( \dot{V}_{\text{O2}} \) column by increasing from 1 to 7 in 1-l steps, and, similarly, for the \( \dot{V}_{\text{AIR}} \) column, by decreasing from 7 to 1 in 1-l steps.

This method does not require the use of a calculator, nomogram, or equation. If the total flow other than 8 l is desired, scaling the table up or down is a simple matter.

An oxygen analyzer gives a double check of the settings, and its use is recommended.

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