

Correspondence

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Percutaneous Sample for Blood-gas Analysis: Arterial or Venous Blood?

To the editor:—Although indwelling arterial catheters have become popular for obtaining blood for gas analysis, it is still necessary at times to rely upon a single percutaneous needle puncture for obtaining blood for this purpose. Many times, when unexpected results are obtained with the latter method, the question is raised: "Was the sample from an artery or from a vein?" To distinguish between an artery and vein, a standard approach has been to use a large-gauge needle and a well-lubricated, heparinized glass syringe to let the pressure within the artery fill the syringe. This method is unsatisfactory because of the large-gauge needle necessary to fill the syringe rapidly, and the expense and bother of maintaining either reusable or disposable glass syringes. The use of small-gauge needles and plastic syringes has certain advantages, but it requires the operator to aspirate the sample, thus destroying the information as to whether the syringe would fill spontaneously or not.

I have found a method that eliminates most of the uncertainty about whether the aspirated sample is arterial or venous when 25- or 26-gauge needles and 3-ml plastic barrel syringes are used. The needle and syringe are heparinized in standard fashion, expelling all heparin except that which remains in the dead space. Following arterial puncture, the required volume of blood is aspirated. Following aspiration, the bevel of the needle is allowed to remain in the lumen of the artery for 2–3 sec. Then the syringe and needle are quickly withdrawn and attention is turned to the bevel of the needle. When there is a small drop of blood hanging from the bevel of the needle, the

sample has been obtained from an artery. When there is no drop of blood hanging from the bevel of the needle, the sample may have been arterial, or it may have been venous.

The explanation for this test is as follows. During the time that the bevel of the needle is in the artery after aspiration has been completed, the pressure inside the syringe approaches mean arterial pressure, causing the rubber diaphragm on the plunger to deform slightly. As the needle is withdrawn from the artery, the pressure inside the syringe approaches atmospheric. The diaphragm is allowed to resume a relaxed position, decreasing the volume of the syringe slightly, which in turn causes a small drop of blood to be expelled from the tip of the needle. When the bevel has been in a vein, the diaphragm will not be deformed, and no drop of blood will be seen. The crossover occurs at 40–60 torr. An occasional false-negative result occurs when the bevel of the needle is inadvertently displaced from the lumen of the artery during pressure equilibration. It is conceivable that a false-positive result would be obtained if the pressure in the vein were more than 40 torr. I have found this test extremely useful.

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Monitor of Respiratory Excursions

To the Editor:—Monitoring of respirations of infants and children undergoing radiation therapy has not been satisfactory, in our opinion. As the anesthesiologist cannot remain in the treatment room during radiation therapy, he must observe the patient through a television monitor. Because of poor imaging, the respiratory excursions cannot be observed clearly. Although the time the anesthesiologist

leaves the patient unattended in the treatment room does not exceed 2–3 min, the inability to monitor respiration is a cause of anxiety. We designed a simple light box containing a battery, light and switch (fig. 1), which is placed on the patient's abdomen or chest. With the light switched on, the upward and downward movement of the light bulb on the box is very clearly seen on the television monitor.

We have used this device in more than 100 anesthetics, and it has worked well in all cases. At present this box is not made commercially.

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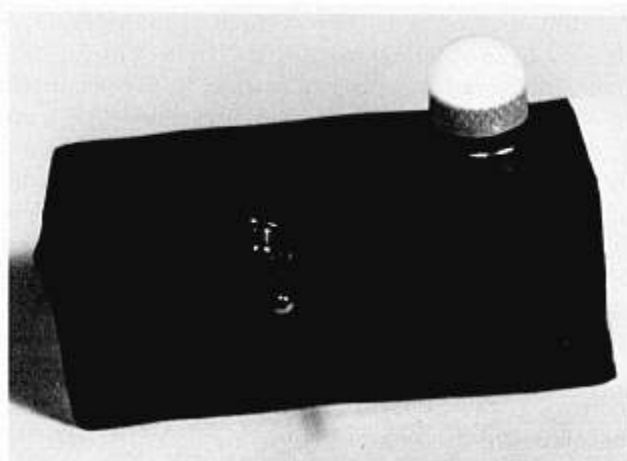


FIG. 1. Light box.

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Placental Transfer of Nitroglycerin

To the Editor:—In a recent case report,¹ prolonged depolarization neuromuscular blockade following administration of trimethaphan and succinylcholine in a pre-eclamptic parturient was explained on the basis of cholinesterase inhibition by trimethaphan. (The baby was unaffected.) It was suggested that alternative drugs such as nitroglycerin be considered for parenteral treatment in hypertensive pregnant women. There is, however, a significant difference in molecular weights and consequent predicted placental transfers between these two antihypertensive drugs.² Trimethaphan, with a molecular weight of 597, should have rather limited transmission across the human placenta, whereas nitroglycerin, with a molecular weight of 227, would be expected to cross readily and thereby decrease the baby's blood pressure in a manner similar to the mother's. Abnormally low blood pressures have been demonstrated in non-depressed newborns following administration of hydralazine (molecular weight 160) thereby to mothers.³ Neonatal hypotension is undesirable because it interferes with the normal changeover from fetal to adult cir-

culatation. We therefore believe that the safest solution to the problem is not a change in antihypertensive drug, but a decrease in succinylcholine dosage combined with continuous monitoring of neuromuscular activity by means of a nerve stimulator.

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In reply:—Drs. Diaz and Marx appropriately emphasize the importance of considering the effects on the fetus of drugs given to the mother. In addition, they correctly state that nitroglycerin may cross the placenta more readily than trimethaphan. Their recommendation to decrease the dosage of succinyl-

choline, however, is not an ideal solution to the problem. Our patient experienced prolonged apnea after a single dose of succinylcholine. The use of less succinylcholine might have resulted in inadequate paralysis, difficulty with intubation, and increased risk of vomiting and aspiration.