

First thought was given to the utilization of a Bird polysulfone bifurcation to serve as the vaporizing chamber. Exposure to the pure vapor of enflurane for a 10-day period resulted in no obvious interaction and, by reason of its transparency, it appeared ideal. Later, it was discovered that when exposed to anesthetic concentrations of halothane or methoxyflurane, the polysulfone gradually softened and cracked. At once it became apparent that all metal construction was essential.

A simple device which has proven satisfactory in extensive clinical practice was designed (fig. 1). This device consists of a metal sleeve 4.5 cm long, and with ends that are sized to be inserted between the expiratory breathing tube and the absorber. A hole is drilled in the sleeve to accept the hub of a 30-gauge non-disposable Luer-Lok needle. The needle is then shortened to 0.075 cm and bearing-silver soldered in place. The fluorocarbons attack lead solder. The Luer-Lok fitting permits the firm attachment of a glass syringe. A 10-ml syringe, when filled with any fluorocarbon anesthetic and attached in the upright position, will result in no flow through the 30-gauge channel until considerable pressure is applied to the plunger. In practice, a 5-ml syringe is employed and refilled as needed. An average 70-kg adult will only require 6.5 ml of halothane, or 13.5 ml. of enflurane for a three-hour operation.

Although experience has demonstrated that it is not necessary, if desired, a metal or nylon stopcock may be interposed between the syringe and the injection port. Clear plastic stopcocks (polyvinylchloride) should be avoided since they react with the fluorocarbons. In any event, a nylon stopper is attached to the port shoulder to close the channel when the closed system is not being employed.

Bronze millings were placed inside the metal sleeve to promote vaporization of the anesthetic, albeit there is not general agreement that this is necessary in a rapidly circulating system.

We believe the device fills the need for a simple vaporizer for closed-circuit anesthesia. The cost should be approximately \$35.00.\*

\*Available from Anesthesia Associates, Inc., 581 N. Twin Oaks Valley Road, San Marcos, California 92069.

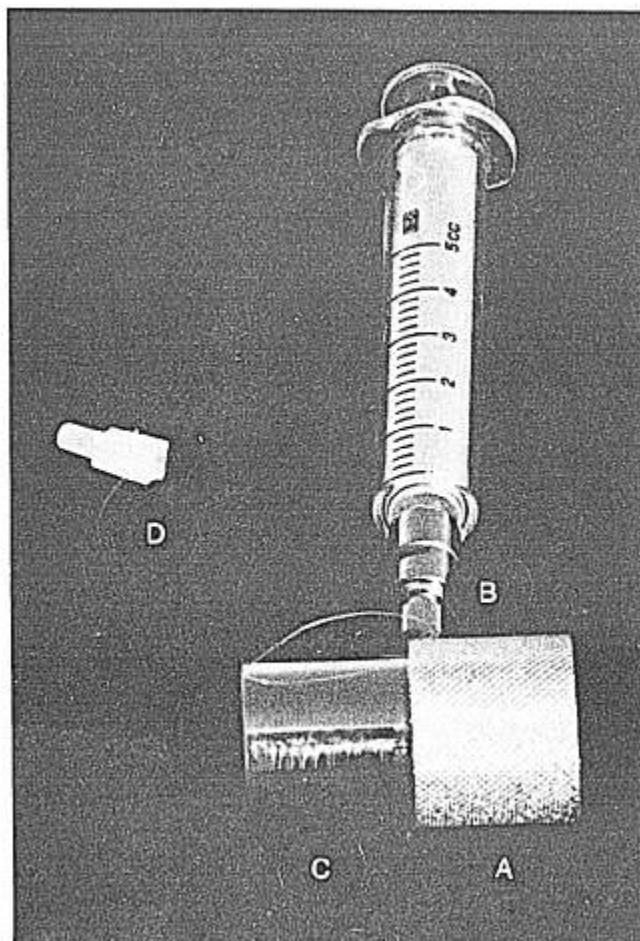


FIG. 1. An in-circuit vaporizer for closed systems. The components of the vaporizer are: (A) Knurled fitting to the expiratory limb of the absorber. (B) A Luer-Lok syringe attachment. A metal or nylon stopcock may be interposed at this connection. (C) Sleeve containing bronze millings. (D) A nylon port blocker.

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## Regional Anesthesia is Preferable for the Premature Fetus

*To the Editor:*—Datta and Alper published a very extensive review in the August issue of ANESTHESIOLOGY.<sup>1</sup> The article was researched exhaustively with a total of two hundred forty-five references.

We disagree with one important concept raised by the authors however, pertaining to prematurity of the fetus. The authors specifically alleged that there was no evidence in the literature that any form of anes-

TABLE 1. Perinatal Mortality by Type of Anesthesia in Premature and Mature Births\* in a Study Conducted by Ten University Teaching Hospitals, Ontario (Single Births—1960–1961)

Type of Anesthesia	Total Births		Fetal Deaths		Early Neonatal Deaths		Perinatal Deaths	
	Number	Per Cent	Number	Rate†	Number	Rate‡	Number	Rate‡
None	738	21.7	164	222.2	161	238.9	325	440.4
General	1,707	50.2	232	135.9	191	129.5	423	247.8
Conduction	764	22.4	30	39.3	77	104.9	107	140.0
Combined	193	5.7	8	41.4	26	140.5	34	176.2
Total	3,402	100.0	434	127.6	455	153.3	889	261.3

\* Birth weight under 2,500 grams.

† Per 1,000 total births.

‡ Per 1,000 live births.

thetia was preferable in obstetric patients in the presence of premature fetus.

A study was conducted by the Ontario Department of Health\* which was published in 1967, pertaining to this very question. The data, though quite old, showed the enormous difference in mortality in premature neonates when different techniques of anesthesia were compared (table 1). Although we are not entirely familiar with the methods used to collect these data, we assume that it was retrospective and therefore should be subjected to much closer scrutiny. However, the results were so positively in favor of conduction anesthesia that they are difficult to ignore.

In a recent review, Shnider and Levinson<sup>2</sup> stressed that the fetus was very susceptible to depressant drugs administered maternally. General anesthesia usually involves the administration of several drugs, including depressants. It would seem logical that techniques involving the administration of only one drug, such as spinal anesthesia, would be preferable. One can speculate that only minute quantities of local anesthetic may reach the fetus during a spinal anesthetic. During epidural anesthesia, larger quantities of local anesthetic are required, therefore one should select agents which are either rapidly metabolized in the maternal circulation, such as 2-chloroprocaine or bupivacaine, which is highly protein bound. Scanlon *et al.*<sup>3</sup> has shown that lidocaine and mepivacaine are

more likely to cause neurobehavioral abnormalities in newborn infants than other local anesthetics and therefore should be avoided in these premature infants. To even complicate matters further, Teramo *et al.*<sup>4</sup> have shown in animal studies, that premature fetuses may be more resistant to the toxic effects of local anesthetics than full-term fetuses.

In this institution, we feel strongly that properly conducted regional anesthesia, including proper selection of local anesthetic agents, offers more advantages to the well being of the fetus than general anesthesia, which by necessity requires the administration of several drugs including depressants.

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3. Scanlon JW, Ostheimer GW, Lurie, AO, et al: Neurobehavioral responses and drug concentrations in newborns after maternal epidural anesthesia with bupivacaine. *ANESTHESIOLOGY* 45:400–405, 1976
4. Teramo K, Benowitz N, Heymann MA, et al: Gestational differences in lidocaine toxicity in the fetal lamb. *ANESTHESIOLOGY* 44:133, 1976

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\* Supplement to the Second Report of the Perinatal Mortality Study in Ten University Teaching Hospitals, Ontario, Canada, The Ontario Department of Health 1967, p. 214 (Table III).

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## Failure of a New System to Prevent Delivery of Hypoxic Gas Mixture

*To the Editor:*—The recently introduced Ohio Modulus® anesthesia gas machines are provided with a Proportion Limiting Control System. This system is to insure, that with an oxygen-nitrous oxide mixture, at

least 25 per cent of the mixture will be oxygen. A warning on the machines states: "Hypoxic mixtures may be delivered if gases other than oxygen, nitrous oxide and/or air are used".