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A Case for Monitoring Oxygen in the Expiratory Limb of the Circle

To the Editor:—Opinions vary regarding the best location in a circle system for the sensor of a polarographic oxygen monitor. By placing the sensor on the expiratory side of the circuit, the oxygen monitor can double as a circuit disconnection alarm, if a falling bellows ventilator is in use.

At this hospital, the use of low flow and closed circuit techniques has stimulated us to place the oxygen probe between the corrugated tubing and the expiratory unidirectional valve. In a standard circle system with low fresh gas flows, the inspired oxygen fraction and expired oxygen fraction may differ; however, the *minimum* oxygen fraction in the circuit will be found on the expiratory side.¹

I have observed that the oxygen concentration measured by the monitor will plummet with the first or second breath following a circuit disconnection. The falling bellows of the ventilator draws room air past the oxygen probe. The alarm limit must be set higher than 21% oxygen. Located in the expiratory limb of the circuit, the oxygen monitor will detect disconnections whether low or high fresh gas flows are used, as long as the ventilator bellows falls in expiration.

A common mishap,² accidental circuit disconnection, should be detected through continuous auscultation, chest observation, and the use of a low-pressure disconnect alarm. Since the battery-powered disconnect alarm may fail, the anesthesiologist can assure back-up vigilance by placing the oxygen probe in the expiratory limb.

RONALD M. MEYER, M.D.
*Associate in Anesthesia
Department of Anesthesia
Northwestern University—McGaw Medical
Center
Chicago, Illinois 60611*

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Stability of Atracurium Administered by Infusion

To the Editor:—Atracurium (Tracrium®, Burroughs Wellcome), a nondepolarizing muscle relaxant, is unique in that it undergoes spontaneous degradation at physiologic pH, yielding inactive metabolites. Recently, several investigators have proposed that atracurium be administered by continuous iv infusion.^{1,2} If clinicians dilute atracurium to facilitate its administration by iv infusion,

this will change its pH and may result in spontaneous degradation before administration to the patient. In turn, this practice may increase the dose requirements and cost of administration.

To evaluate the extent of degradation of atracurium in various solutions, we added 20 mg atracurium (2 ml, 10 mg/ml) to 38 ml of normal saline (Travenol Labo-

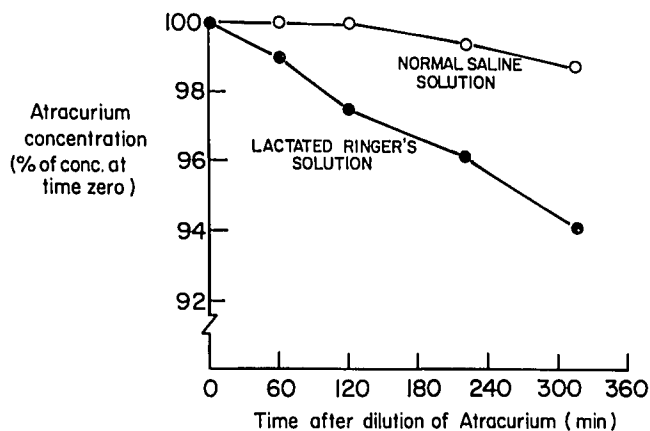


FIG. 1. The concentration of atracurium (expressed as a percentage of the concentration at time 0) decreases more rapidly after dilution with lactated Ringer's solution than after dilution with normal saline. Solutions were maintained at 22° C.

ratories Inc., pH 5.85) or to lactated Ringer's solution (Travenol Laboratories Inc., pH 6.5) in a 60-ml syringe maintained at 22° C. Aliquots were obtained intermittently for 315 min and acidified with 0.1 N H₂SO₄ to pH 3.0 to prevent further degradation. The concentration of atracurium then was determined by ion-exchange liquid chromatography. The time-related changes in concentration are shown in figure 1.

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Blood is Thicker than Water (or CSF)

To the Editor:—

Make thick my blood,
Stop up the access and passage . . .

Current medical education includes the admonition to "avoid a bloody tap" when entering the subarachnoid space with a spinal needle. Blood in the exiting cerebrospinal fluid may elevate the red blood cell count, making the diagnosis of hemorrhage less certain.

The belief that a bloody tap is bad abides. An overwhelming majority (>95%) of anesthesia residents, faculty, and private practitioners surveyed continue to believe that a bloody tap incurred in the course of administering a spinal anesthetic is inherently worse than obtaining crystal clear fluid. In fact, the opposite is probably true.

Nearly a quarter-century ago, the epidural blood patch for treatment of postspinal headache was described.² Its originator was led to the idea by the observation that the incidence of headache after bloody taps was lower than would have been expected after lumbar puncture (with the larger needles then in use).

These results demonstrate that spontaneous degradation of atracurium occurs more rapidly in lactated Ringer's solution than in normal saline. If atracurium is diluted to facilitate its administration by continuous iv infusion, we recommend that normal saline, rather than lactated Ringer's solution, be used as the diluent.

DENNIS M. FISHER, M.D.
Assistant Professor of Anesthesia and Pediatrics

CLAVER CANFELL, M.S.
Staff Research Associate IV

RONALD D. MILLER, M.D.
*Professor of Anesthesia and Pharmacology
Chairman, Department of Anesthesia*

*Department of Anesthesia
University of California
San Francisco, California 94143*

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Numerous reports³⁻⁷ over the past two decades have confirmed the efficacy of the epidural blood patch in the treatment of postspinal headache. Therefore, we would urge that, under the mask, a smile replace the frown usually present when the lumbar puncture initially yields blood-tinged fluid. A drop of (bloody) prevention is worth at least a liter of (crystalline) cure.

CARY S. STERNICK, M.D., J.D.
*Department of Neurology
Tomball Community Hospital
13414 Stallones Dr., Suite #1
Tomball, Texas 77375*

JOSEPH A. STIRT, M.D.
*Assistant Professor
Department of Anesthesiology
University of Virginia Medical Center
Box 238
Charlottesville, Virginia 22908*