

FIG. 1.

significant decreases in flow secondary to transient crimping of the Javid shunt. This crimping, while otherwise unobserved, was rapidly detected by the flows decreasing from the 200 ml/min range to 30–50 ml/min range.

In summary, we believe the above to be a reliable, clinically workable, inexpensive solution to shunt flow determination during carotid endarterectomy surgery.

ROBERT L. LINDSEY, M.D.
Associated Anesthesiologists
5800 Fairfield Blvd.
Suite 150, Worthman Mall
Fort Wayne, Indiana 46807

(Accepted for publication March 2, 1984.)

Anesthesiology
61:216–217, 1984

A Simplified Method of CPAP Delivery to the Nonventilated Lung during Unilateral Pulmonary Ventilation

To the Editor:—The proper management of anesthesia for thoracic surgical procedures employing a double-lumen endobronchial tube and unilateral pulmonary ventilation has been a subject of much debate. Multiple approaches have been proposed to improve oxygenation in this setting. In an editorial comment,¹ Benumof summarized the experience of multiple authors, recom-

mending a treatment sequence for severe hypoxemia during one-lung ventilation in the lateral position. If the application of 5–10 cmH₂O of positive end-expiratory pressure (PEEP) to the ventilated, dependent lung did not result in an improvement in oxygenation, he recommended the application of 5–10 cmH₂O of continuous positive airway pressure (CPAP) to the airway of the nonventilated, nondependent lung. The mechanics of CPAP application to the nonventilated lung have been left to the inventiveness of the individual anesthesiologist. Insufflation of oxygen via a catheter (*i.e.*, nasogastric tube) introduced into the endobronchial tube of the nonventilated lung has shown promise. However, utilizing this technique can lead to uncontrollable and unmeasurable levels of positive pressure applied to the lung. Numerous other reports^{2–4} have related effective means of applying CPAP to the nonventilated lung, but these have involved the use of individually constructed components not readily available to the practicing anesthesiologist. I have employed a system that is safe, sterile, and easily controlled utilizing equipment found in most anesthesia departments.

When unilateral ventilation becomes desirable, the ventilator and circle system are connected to the dependent limb of the endobronchial tube and ventilation continued. As illustrated, CPAP insufflation of oxygen to the nonventilated lung is accomplished by connecting the distal end of a Coaxial (CPRAM®) or Bain® breathing circuit to the superior limb of the endobronchial tube

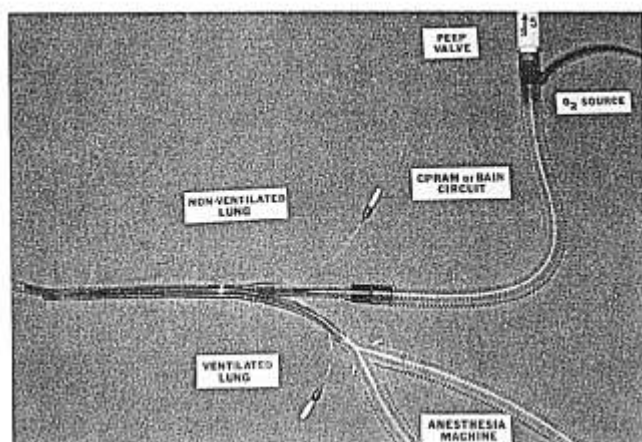


FIG. 1. As described in the text, the CPRAM or BAIN circuit (here shown is an 18-inch CPRAM circuit) is connected directly to the limb of the endobronchial tube in contact with the nonventilated lung. The opposite end is fixed in an upright position and connected to the PEEP valve and an oxygen source. The ventilated lung remains connected to the primary circuit and anesthesia machine.

and securing the proximal end in an upright position to a nearby stationary object. Oxygen fresh gas flow is provided by a portable oxygen source connected to the fresh gas inlet of the CPRAM or Bain circuit. PEEP valves (Boehringer Laboratories, Wynnewood, Pennsylvania) are mounted in 2.5 cmH₂O increments on the upright proximal end of the circuit, providing a safe and controllable source of CPAP. Oxygen flows of 3 to 4 l/min have proven to be adequate, and levels of CPAP can be evaluated by visual examination of the lung, reexpansion of atelectatic segments, arterial blood gases, and the tolerance of the surgeon of the distended but nonmoving lung. It has been my experience that the mild distension of the lung obtained using CPAP of 5 to 7.5 cmH₂O has caused no difficulty for operating surgeon and consistently has improved intraoperative oxygenation.

THOMAS E. LYONS, M.D.
*Director, Cardio-thoracic Anesthesia
Walter Reed Army Medical Center
Washington, D. C. 20307*

REFERENCES

1. Benumof JL: One lung ventilation: Which lung should be PEEPed? *ANESTHESIOLOGY* 56:161-163, 1982
2. Andersen HW, Benumof JL, Ozaki GT: New improved double lumen tube adapter. *ANESTHESIOLOGY* 56:54-56, 1982
3. Powner DJ, Eross B, Grenvik A: Differential lung ventilation with PEEP in the treatment of unilateral lung ventilation. *Crit Care Med* 5:170-172, 1977
4. Gallagher TJ, Banner MJ, Smith RA: A simplified method of independent lung ventilation. *Crit Care Med* 8:396-398, 1980

(Accepted for publication March 2, 1984.)

Anesthesiology
61:217-218, 1984

Epinephrine Should Be Used with the Therapeutic Dose of Bupivacaine in Obstetrics

To the Editor:—Dr. Marx should be commended for her recent editorial “Cardiotoxicity of Local Anesthetics—The Plot Thickens,”¹ which is an appropriate follow-up to my editorial in 1979.² It is unfortunate that the recent warning, “0.75% bupivacaine is no longer recommended for obstetrical anesthesia because of reports of cardiac arrest and death where resuscitation has been difficult or impossible despite apparently adequate preparation and appropriate management,” was not included as an addendum. This warning was sent as a “Dear Doctor Letter” by the manufacturers of bupivacaine in August, endorsed by the FDA’s Anesthetic and Life Support Drugs Advisory Committee in October, and promulgated by the FDA Drug Bulletin in November 1983. During the 5 months subsequent to the “Dear Doctor Letter” there have not been any new cases of bupivacaine-induced seizures and cardiac arrest, which is in contrast to the 10 cases reported to the FDA over the previous 2 years.

I cannot agree with Dr. Marx’s statement that “epinephrine 5 µg/ml should not be added to the full dose because of its propensity for decreasing uterine blood flow.” This controversy is more than just of academic interest. Potentially false-negative epidural test doses of bupivacaine 0.75% (plain) have occurred with 2, 3, 4, and 5 ml.* Even if a negative epinephrine test dose is administered, the needle or catheter may enter a blood

vessel just before the therapeutic dose. Incremental bupivacaine 0.75% (plain) epidural injections of 2 + 1 + 4 ml, 2 + 4 + 15 ml, 2 + 5 + 10 ml, 3 + 4 ml, 3 + 5 + 8 ml, 3 + 5 + 10 ml, 10 + 10 ml, 5 (needle) + 5 (catheter), and 3 + 3 + 3 + 3 ml have resulted in cardiac arrest in obstetric patients.* Therefore, incremental doses of bupivacaine 0.75% without epinephrine as a marker to warn of an intravascular injection are potentially unsafe and may result in cardiac arrest. Incremental epidural injections of lesser concentrations of bupivacaine (plain) may be less hazardous, but 15–27 ml of bupivacaine 0.5% (10 cases) and 30 ml of bupivacaine 0.25% have resulted in maternal cardiac arrest.*

Dr. Marx discussed three parturients (out of 12) from my previous work, who had a decrease in intervillous blood flow (IBF) following the epidural administration of 10 ml chloroprocaine 2% with epinephrine 5 µg/ml.³ Two of these patients had calculated mean blood pressures below 75 mmHg, and the third patient with the greatest decrease in IBF has a coupled contraction at the time of the IBF measurement that may have invalidated it. An unreported patient during this study had intravenous ¹³³Xe injected unintentionally in a solution containing 11 ml of chloroprocaine 2% with epinephrine 5 µg/ml. When the patient’s dramatic increase in blood pressure and heart rate returned to preinjection values 20 min later, ¹³³Xe diluted in saline was injected for a “control” IBF measurement. The IBF measurement during the intravenous epinephrine injection (55 µg) demonstrated only a 15% decrease from the “control” value.

* Transcript of the Fifth Meeting of the Anesthetic and Life Support Drug Advisory Committee, held on October 4, 1983.