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Better Designs for Mass Spectrometer Monitoring of the Awake Patient

To the Editor:—Recently, Ibarra and Lees[1] described an oxygen cannulae modified to accept the sampling line of the mass spectrometer for monitoring of end-tidal (ET) CO_2 in an awake patient. However, we have tried the described method and found it unsatisfactory. An alternative method has proved more reliable.

An appropriate-size nasal airway is inserted into a naris using lubricant containing local anesthetic. The thin plastic sampling line, from the mass spectrometer, is inserted into the nasal airway. The tip of the sampling tube is placed 1 cm from the pharyngeal opening of the airway. The tubing is then sutured to the nasal airway (fig. 1).

We conducted patient trials using each technique in awake and sedated patients in the operating room and recovery room. Whereas neither method is as reliable as monitoring ET CO_2 *via* an endotracheal tube, a satisfactory ET CO_2 curve was obtained more consistently using the nasal airway. With both techniques, the sampling tube occasionally becomes obstructed with secretions.

EDWARD A. NORMAN, M.D.
Fellow in Obstetrical Anesthesia

NORMAN J. ZEIG, M.D.
Chairman, Department of Anesthesia

IDREES AHMAD, M.D.
Anesthesiologist

Department of Anesthesia
St. Barnabas Medical Center
Livingston, New Jersey 07039

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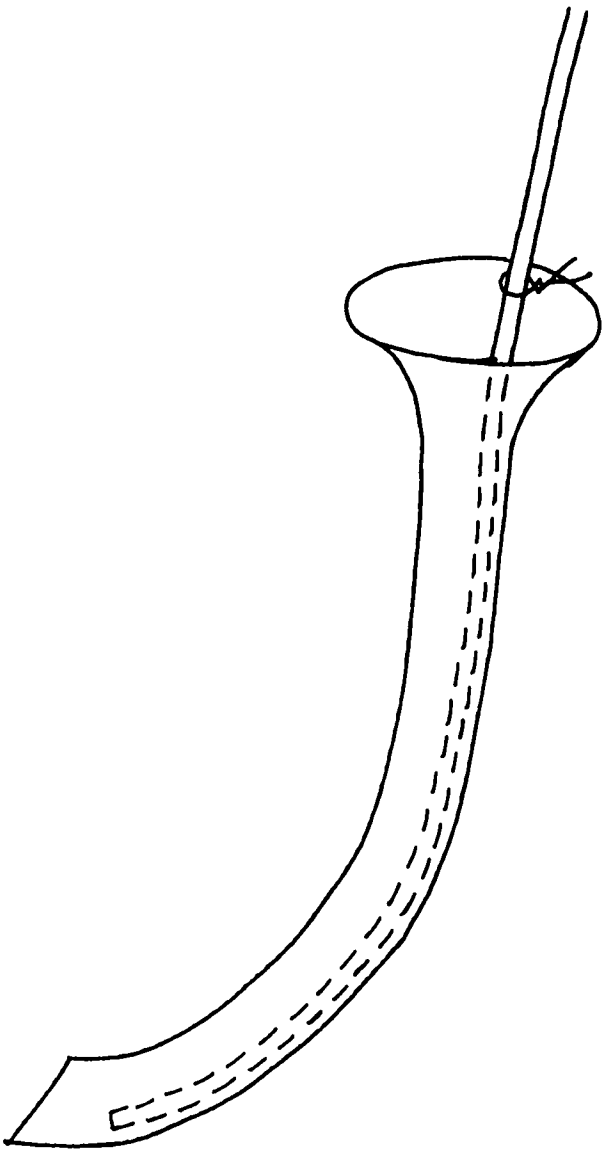

FIG. 1. Nasal airway with inserted sampling tube from the mass spectrometer.

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Elective Coronary Bypass Surgery without Pulmonary Artery Catheter Monitoring

To the Editor:—Bashein *et al.* demonstrated in their retrospective study[1] that there was little difference in the mortality and perioperative rates between those patients in whom pulmonary artery pressure monitoring was used in addition to central venous pressure measurement.

In this unit, central venous pressure measurement alone was used for 764 consecutive patients who underwent elective, isolated coronary artery bypass graft surgery during the last 3 yr (October 1982–October 1985). There were 669 men and 95 women. Patient age (mean ± SD) was 56.0 ± 8.5 yr, with a range of 21–79 yr.

Left ventricular function as assessed by angiography

was considered normal in 355 (46%) and moderately impaired in 409 (54%) patients. The mean number of grafts performed was 3.6 (range 1–6). There were no intraoperative deaths. There were seven in-hospital deaths, a mortality of 0.91%. Four patients died in the early postoperative period. All had profound myocardial depression with or without intractable arrhythmias despite well-functioning grafts on reopening of the chest. Within 16 days after the surgery three patients died as a result of: 1) poor left ventricular function not helped by intraaortic balloon pump and inotropes; 2) bilateral Pseudomonas pneumonia and septicemia; and 3) late hemorrhage from a graft.

Twenty-three (3.0%) patients showed S-T changes on ECG over a period of more than 30 min intraoperatively, and overall myocardial damage was detected in 30 (3.9%) patients.

Our retrospective mortality and perioperative infarction data correspond closely with those presented by Bashein *et al.* and both compare favorably with the mortality rate reported by the Coronary Artery Surgery Study.[2]

We agree with the authors that in this group of patients, despite sometimes extensive coronary disease (judged by the number of grafts placed) but with relatively healthy left ventricular function, pulmonary artery pressure measured perioperatively offers very little, if any, advantage over central venous pressure monitoring. To be used, it should offer real benefit to the patient, which does not appear to be the case for this group of patients. In addition, its potential for complications should always be considered.

BERNARD J. LIBAN, F.F.A.R.C.S.
DAVID M. DAVIES, F.F.A.R.C.S.
Consultant Anaesthetists
Department of Anaesthesia
St George's Hospital
London SW17, England

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Potency of Sufentanil

To the Editor:—Goldberg and colleagues recently reported a case of chest wall rigidity in the recovery room following sufentanil, which had been administered several hours earlier.[1] They provided a thoughtful case report and an excellent brief review of the poorly understood problem of narcotic-induced chest-wall rigidity. We believe the authors raised several important issues not directly addressed in their article. Specifically:

1. What should the dose of sufentanil be when combined with a muscle relaxant and ½ MAC of an inhalational agent?
2. Does the manufacturer's literature adequately describe sufentanil dosing?
3. Should we anticipate that chest wall rigidity will occur frequently after sufentanil is used in an appropriately administered, balanced anesthetic?

We therefore reviewed the available dosing information for this agent when used during balanced anesthesia for noncardiac operations. To estimate drug requirements for loading and maintenance doses requires that we know the volume of distribution and clearance of the drug, and the blood concentration required for the desired effect.[2]

$$\text{Loading Dose} = \text{Target Concentration} \times \text{Volume of Distribution}$$

$$\text{Maintenance Dose} = \text{Target Concentration} \times \text{Clearance}$$

Sufentanil's volume of distribution and clearance are approximately 3 l/kg and 12 $ml \cdot kg^{-1} \cdot min^{-1}$, respectively.[3] The potency of sufentanil is considered to be 5–10 times that of fentanyl.[3–5] In the absence of specific data defining effective serum concentrations for sufentanil, we extended the data of McClain and Hug and Murphy and Hug for fentanyl[6,7] and applied them to sufentanil dosing as outlined subsequently. The results have been used with reasonable clinical success, in the sense that patients emerge from balanced anesthesia comfortable, with respiratory rates in excess of 12 breaths/min and do not require naloxone for sustained normal ventilation and recovery.

These data indicate that a fentanyl serum concentration of 2.0 μg/l should be effective in balanced anesthesia, without causing excessive postoperative respiratory depression (ventilation relatively normal in pain-free vol-