LETTER TO THE EDITOR

SIR:

Your article entitled "Considerations anesthésiques sur l'hypophysectomie trans-sphenoidale: étude retrospective" by J. Cote and M. Rouillard¹ was of great interest to us since we have done over 100 cases of transphenoidal hypophysectomy in the past two years. We would like to elaborate on some of the points made by the authors.

(1) While the Doppler cardiac auscultation unit² is essential for early detection of venous air embolism, its use must be associated with the insertion of a right atrial catheter³ for aspiration of air emboli if they occur. The right atrial catheter is placed prior to surgery and its position checked by X-ray or P-wave configuration on electro-cardiogram.

The combination of Doppler and right atrial catheter is particularly important during transphenoidal hypophysectomy since the patient is placed in the semi-sitting position⁴ at a 45-degree angle with the horizontal. We have previously demonstrated that a gradient of as little as 5 cm is sufficient for entrainment of air⁵ and recently reported three cases of air embolus during transphenoidal surgery in the semi-sitting position.⁶ One patient entrained 150 cc and had a positive technetium macroaggregated albumen lung scan.⁷

(2) We place an intra-arterial cannula in all our patients undergoing transphenoidal hypophysectomy for essential beat to beat monitoring of blood pressure, information unavailable from the Doppler arteriosonde (which we also use intra-operatively). The indwelling arterial line also provides easy access for sampling discontinuous arterial blood gases, haematocrit, and serum chemistry. Ventilation is adjusted to maintain arterial P_{CO_2} between 25 and 30 torr; blood osmolarity, sodium, and potassium are checked before and after administration of osmotic and loop diuretics.

(3) Our anaesthetic technique includes nitrous oxide/oxygen, muscle relaxant, and narcotic plus diazepam and droperidol. We use parenteral nitroglycerin⁸ for maintenance of normotension as well as for induced hypotension where indicated. We avoid the use of potent inhalational anaesthetics such as halothane because of the adverse effect on patients with mass lesions who may have increased intracranial pressure prior to surgery. Since intracranial pressure has been shown to increase with halothane despite prior hyperventilation,^{9,10} a mask induction in this situation may be hazardous.

In addition, administration of halothane in cases in which epinephrine is routinely infiltrated courts unnecessary difficulty with arrhythmias;¹¹ difficulty avoidable with other techniques such as nitrous/narcotic/relaxant. The question also arises as to the effect of increased ICP and the sitting position itself on the arrhythmogenic threshold in neurosurgical patients.

Halothane has also been shown to have deleterious effects on cerebral metabolism. It increases the amount of brain water in previously traumatized brain¹² and also augments cerebral lactic acidosis in the ischaemic state.¹³

(4) We have recently abandoned the use of reinforced (anode, armored,

Tovell) endotracheal tubes in favor of ordinary disposable tubes after we developed serious obstructive problems intra-operatively due to faulty anode tubes.¹⁴ These difficulties occurred with brand new tubes as well as those which had previously been gas-sterilized.

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REFERENCES

1. COTE, J. & ROUILLARD, M. Considerations anesthésiques sur l'hypophysectomie trans-sphenoidale: étude retrospective. *Can. Anaesth. Soc. J.* 24: 275-281 (1977).
2. MAROON, J.C., EDMONDS-SEAL, J., & CAMPBELL, R.L. An ultrasonic method for detecting air embolism. *J. Neurosurg.* 31: 196-201 (1969).
3. ALBIN, M.S., BABINSKI, M., MAROON, J.C., & JANNETTA, P.J. Anesthetic management of posterior fossa surgery in the sitting position. *Acta Anaes. Scand.* 20: 117-128 (1976).
4. HARDY, J. Trans-sphenoidal microsurgical removal of pituitary microadenoma. *Progr. Neurol. Surg.* 6: 200-216 (1975).
5. MAROON, J.C., ALBIN, M.S., & CARROLL, R. Venous air embolism in neurosurgery. *Proc. A.A.N.S. Mtg.*, Apr. 24-28, Toronto, Canada (1977).
6. NEWFIELD, P., ALBIN, M.S., CHESTNUT, J., & MAROON, J. Air embolism during trans-sphenoidal hypophysectomy. *Neurosurg.* (In press.)
7. CARROLL, R.C., ALBIN, M.S., GUMERMAN, L.W., & PAVARES, J.A. Diagnosis of pulmonary air embolism by lung-scanning - an experimental evaluation. *Proc. First World Congr. Nuclear Med.*, Tokyo & Kyoto, 1140-1143 (1974).
8. CHESTNUT, J.S., ALBIN, M.S., GONZALEZ-ABOLA, E., NEWFIELD, P., CHANG, J., & MAROON, J. Clinical and experimental evaluation of intravenous nitroglycerin for induced hypotension. *Proc. A.A.N.S. Mtg.*, Toronto, paper #30 (1977).
9. GORDON, E. The action of drugs on intracranial contents. In *Progress in Anesthesiology*, p. 60. Editors: T.B. Boulton, R. Bryce-Smith, M.K. Sykes, *et al.*, Excerpta Medica, Amsterdam (1970).
10. MISFELDT, B.B., JORGENSEN, P.B., & RISHOJ, M. The effect of nitrous oxide and halothane upon the intracranial pressure in hypnocapnic patients with intracranial disorders. *Br. J. Anaesth.*, 46: 853-858 (1974).
11. JOHNSTON, R.R., EGER, E.I. II, & NILSON, C. A comparative interaction of epinephrine with enflurane, isoflurane and halothane in man. *Anesth. Analg.* 55: 709-712 (1976).
12. SMITH, A.L. & MARQUE, J.J. Anesthetics and cerebral edema. *Anesthesiology* 45: 64-72 (1976).
13. MICHENFELDER, J.D. & MILDE, J.H. Cerebral protection by anaesthetics during ischemia (a review). *Resuscitation* 4: 219-233 (1975).
14. Ng, T.Y. & KIRIMLI, B.I. Hazards in use of anode endotracheal tube: a case report and review. *Anesth. Analg.* 54: 710-714 (1975).