

was obtained with pancuronium. Thirty minutes after intubation, the last blood sample (T3) was drawn. The 2, 3 DPG concentration was immediately assayed.⁵ From the obtained results (table 1) we can conclude that exposure to isoflurane for times ranging from 10 to 40 min does not interfere with oxyhemoglobin dissociation.

V. LANZA, M.D.

Chief of Anesthesia

S. MERCADANTE, M.D.

Assistant of Anesthesia

Servizio di Anestesia

Casa di Cura Buccheri La Ferla—Fatebenefratelli

Via Messina Marine 197

90123 Palermo

Italy

Anesthesiology
64:415, 1986

Airway Rupture with a Disposable Double-lumen Tube

To The Editor:—The recent report by Wagner *et al.* alerts us to a potentially serious complication of the new, disposable polyvinylchloride (PVC) double-lumen endobronchial tubes.¹ Their observation of tracheal rupture follows another report of rupture of the left main-stem bronchus associated with a PVC double-lumen tube.² In the latter case, as in most instances of airway trauma with double-lumen tubes, injury occurred from overdistention of the bronchial cuff.

When a PVC double-lumen tube is in proper position, the bronchial cuff usually requires less than 2 ml of air. If more than 3 ml is necessary to avoid a leak, the cuff is probably herniating above or is entirely in the carina. The low-pressure bronchial cuff of the PVC double-lumen tube assumes the high-pressure characteristics of red-rubber tube cuffs with volumes greater than 3 ml.* There have been several reports of airway rupture from double-lumen tube cuffs that were initially inflated with small amounts of air but then became further distended during prolonged nitrous-oxide anesthetics.^{2,3} If nitrous oxide is being used, it is important to deflate these cuffs periodically to avoid excessive pressure buildup on the bronchial mucosa. Nitrous oxide was not used in Wagner's case, and the intubation was apparently atraumatic so the cause of their patient's airway injury remains a mystery.

It should be reemphasized that even with stiff, low-compliant, red-rubber double-lumen tubes, tracheal-

* Hansen TB, Watson CB: Tracheobronchial trauma secondary to a Carlens tube. Presented at the Society of Cardiovascular Anesthesiologists Fifth Annual Meeting, 1983.

REFERENCES

1. Fournier L, Major D: The effect of nitrous oxide on the oxyhaemoglobin dissociation curve. *Can Anaesth Soc J* 31:173-177, 1984
2. Laasberg LH, Hedley-White J: Effect of halotane on the optical rotatory dispersion of haemoglobin and its chains. *Fed Proc* 30:603-608, 1971
3. Tremper KK: Transcutaneous P_{O_2} measurement. *Can Anaesth Soc J* 31:664-677, 1984
4. Lanza V, Bilello A, Mercadante S: Influence of cerebral spinal fluid on the affinity of human red cells for oxygen. *Boll Soc Ital Biol Sper* 60:2345-2352, 1984
5. Bergmeyer HV: Principle of Enzymatic Analysis. Weinheim and New York, Verlag Chemie, 1978, pp 217-236

(Accepted for publication October 25, 1985.)

bronchial rupture is a very infrequent occurrence. Guernelli *et al.* reported only five cases of airway rupture among 2,700 patients intubated with cuffed Carlens tubes.⁴ This rare complication, now reported with PVC double-lumen tubes, should not discourage anesthesiologists from routinely using these tubes to facilitate surgery during intrathoracic procedures.

JAY B. BRODSKY, M.D.

Associate Professor

Department of Anesthesia

MARK S. SHULMAN, M.D.

Assistant Professor

Department of Anesthesia

JAMES B. D. MARK, M.D.

Professor

Department of Surgery

Stanford University School of Medicine

Stanford, California 94305

REFERENCES

1. Wagner DL, Gammage GW, Wong ML: Tracheal rupture following the insertion of a disposable double-lumen endotracheal tube. *ANESTHESIOLOGY* 63:698-700, 1985
2. Burton NA, Fall SM, Lyons T, Graeber GM: Rupture of the left main-stem bronchus with a polyvinylchloride double-lumen tube. *Chest* 83:928-929, 1983
3. Foster JM, Lau OJ, Alimo EB: Ruptured bronchus following endobronchial intubation. *Br J Anaesth* 55:687-688, 1983
4. Guernelli N, Bragaglia RB, Briccoli A, Mastroilli M, Vecchi R: Tracheobronchial ruptures due to cuffed Carlens tubes. *Ann Thorac Surg* 28:66-68, 1979

(Accepted for publication December 20, 1985.)