

Severe Abdominal Distention Following Jet Ventilation during General Anesthesia

JUEI-LING CHANG, M.D.,* HERMAN MEEUWIS, M.D.,† ACHIEL BLEYAERT, M.D.,‡
MACIEJ BABINSKI, M.D.,§ JAROSLAW PETRUSCAK, M.D.‡

Jet ventilation has proven to be a safe technique for laryngoscopy and fiberoptic bronchoscopy during general anesthesia.¹⁻³ This case report presents a complication following jet ventilation.

REPORT OF A CASE

A 44-year-old man was scheduled for direct laryngoscopy and biopsy of the vocal cords and removal of a sequestration in the right mandible. Past medical history revealed essential hypertension with no current medication. Physical examination was unremarkable and all laboratory data were normal.

Premedication was with pentobarbital, 150 mg, and glycopyrrolate 0.2 mg, im, an hour before operation. Anesthesia was induced with 300 mg thiamylal, and succinylcholine, 100 mg, was given to facilitate endotracheal intubation. The vocal cords were sprayed with 160 mg 4 per cent lidocaine and the trachea intubated with a 3.5-mm ID endotracheal tube. Ventilation was controlled using an intermittent jet of oxygen from a 50-psi source delivered through a 14-gauge catheter introduced into the end of the endotracheal tube.¹ Anesthesia was maintained with fentanyl, thiamylal, and *d*-tubocurarine. Breath sounds and chest movements were satisfactory. Vital signs were stable, and cardiac dysrhythmia did not occur during the laryngoscopic procedure, which lasted 45 minutes. At the end of the laryngoscopy, the jet catheter was removed and trachea was reintubated with an 8.5-mm ID anode tube. A semi-closed circuit absorber system with 70 per cent nitrous oxide/30 per cent oxygen was used. The second part of the operation lasted 50 minutes. At the end of anesthesia, narcotic was reversed with 0.4 mg naloxone and the muscle relaxant reversed with prostigmine, 2.5 mg, and atropine, 1.0 mg, iv. The patient was awake, responsive, and able to raise his head. After extubation of the trachea, his voice was markedly hoarse, and he experienced shortness of breath. At that time, severe abdominal distention was observed. The patient became restless and slightly cyanotic. Reintubation of the trachea was performed, followed by ventilation with 100 per cent oxygen. Arterial blood gases at Fi_{O_2} 1.0 were: pH 7.23, P_{CO_2} 43 torr, P_{O_2} 67 torr. Sodium bicarbonate, 100 mg, was administered iv. Roentgenogram of the abdomen showed air in the gastrointestinal tract with a paralytic ileus pattern. Insertion of a nasogastric tube did not relieve the distention. The patient was transferred to the intensive care unit, where mechanical ventilation with PEEP was applied. Blood gases improved, and the trachea was extubated the next day. The abdominal distention was gone, and recovery was uneventful.

* Assistant Professor of Clinical Anesthesiology.

† Resident, Anesthesiology.

‡ Associate Professor of Clinical Anesthesiology.

§ Assistant Professor of Anesthesiology.

Received from the Department of Anesthesiology, Eye and Ear Hospital of Pittsburgh, University of Pittsburgh, Pittsburgh, Pennsylvania 15213. Accepted for publication January 28, 1978.

Address reprint requests to Dr. Chang.

DISCUSSION

Anesthesia for endoscopy has been reviewed extensively.² The oxygen-jet ventilation method has proven to be a safe and simple technique in more than 600 cases at the Eye and Ear Hospital of Pittsburgh. Contraindications to the use of this technique are conditions impairing compliance of the lung or chest, such as obesity and chronic pulmonary disease. Difficulties may also be encountered when a patient has a large glottis held open by a large laryngoscope. Dangerously high intratracheal pressure can occur with a prolonged inspiration when the upper airway is narrowed.¹

The abdominal distention in this case may have been due to displacement of the jet catheter during laryngoscopy. The tip of the catheter might have been in the anterior portion of the larynx with the distal side holes opening into the pharynx or by displacement into the lower part of the oropharynx or esophagus. In spite of adequate ventilation, some oxygen was forced into the gastrointestinal tract. During the second portion of the procedure, nitrous oxide was added for the maintenance of anesthesia. Because of its solubility characteristics, this exaggerated the abdominal distention.⁴

Abdominal distention affects the excursion of the diaphragm and will subsequently cause respiratory insufficiency. We report this case to stress that when using a jet ventilation technique, one must ensure correct placement of the tip of the catheter by direct visualization. Watching the chest wall and abdominal movement and auscultation of the lungs are not adequate.

REFERENCES

1. Smith RB, Babinski M, Petruscak J: A method of ventilating patients during laryngoscopy. *Laryngoscope* LXXXIV/4: 553-559, 1974
2. Smith RB: Anesthesia for Endoscopy. The Pennsylvania Academy of Ophthalmology and Otolaryngology. *Transaction*, 28/2, 1975
3. Smith RB, Lindholm CE, Klain M: Jet ventilation for fiberoptic bronchoscopy under general anesthesia. *Acta Anaesthesiol Scand* 20:111-116, 1976
4. Foldes FF, Kepes ER, Ship AG, et al: Severe gastrointestinal distention during nitrous oxide and oxygen anesthesia. *JAMA* 194:1146-1148, 1965