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Case Report

Management of Anesthesia during Tracheal Resection in a Patient with Tracheal Tumor

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Abstract: We anesthetized a 59-year-old patient with a tracheal tumor. The tumor was approximately 3.5 cm at maximal diameter, and it arose from the left posterior wall of the middle trachea, making near total tracheal occlusion.

A small suction catheter was insinuated past the tumor into the trachea so that the patient could be ventilaed.

Aneshesia was maintained with 50% nitrous oxide and 1–3% enflurane administered through the catheter, before the resection of the tracheal tumor.

While the trachea was opened, the anesthetic gas was administered across the operative field from two anesthesia machines attached separately to two endobronchial tubes in the main bronchi.

After reconstruction of the trachea, ventilation was maintained through the nasotracheal tube.

During anesthesia the PaO_2 value was good. We think it is important to have close perioperative communication between the surgeon and anesthesiologist.

Key words: adequate ventilation, airway obstruction, tracheal tumor

The resection of tracheal stenosis poses the problem of haw to ensure adequte ventilation during anesthesia. In our patient, we were able to insinuate a small suction catheter past the tumor into the trachea and thus the patient could be ventilated. A cuffed endotracheal tube was used for preventing aspiration and as an expiratory airway.

Case Report

A 59-year-old man visited our hospital with complaints of cough, wheezing and dyspnea, which had started about two years before. Chest roentgenogram, computed tomography and bronchoscopy revealed a polypoid tumor, approximately 3.5 cm at moximal diameter, arising from the left posterior wall of the middle trachea, that made near total tracheal occlusion. The distal margin of the tumor was 4 cm apart from the carinal spur. Socobarbital, 100 mg, and atropine, 0.5 mg, were given intramuscularly at 45 min prior to the induction of anesthesia. In the operating room, the patient was preoxygenated with 100% oxygen for 5 min, and meperidine, 35 mg, was given intravenously.

After the pediatric fiberscope was passed between the vocal cords, a 24-French suction cathether (Terumo) was insinuated

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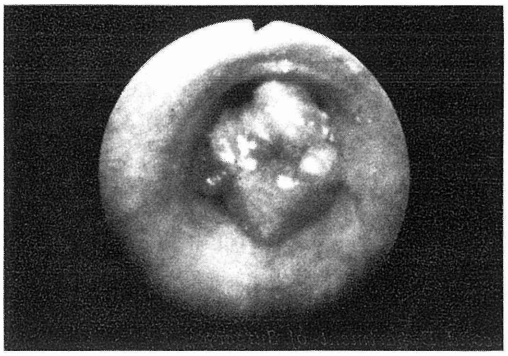

Fig. 1. Picture of bronchoscopy showing the polypoid tumor which made near total tracheal occlusion.

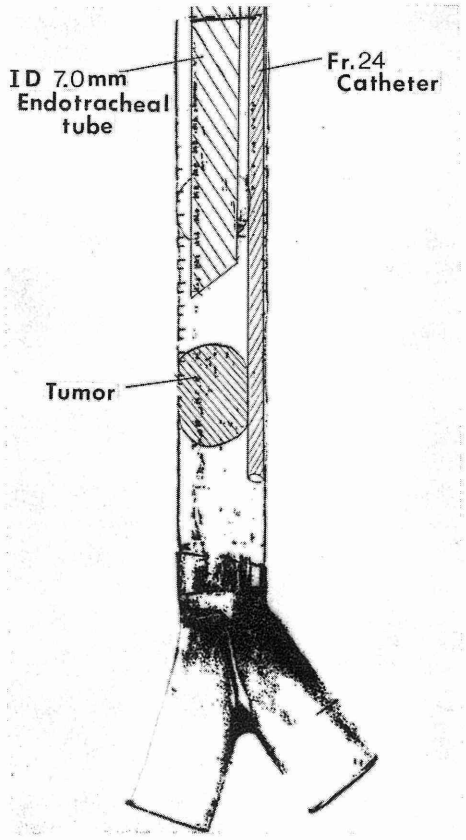

Fig. 2. Illust of catheter, endotracheal tube and tumor.

past the mass of the tumor using the fiberscope as a guide. The suction catheter was connected to the demand valve powered by the oxygen pipeline, and adequate ventilation, as judged by the movement of the lungs, was achieved easily.

Anesthesia was induced with thiamylal (300 mg) followed by succinylcholine (60 mg). The trachea was then intubated with another cuffed spiral tube (inner diameter 7 mm), the distal end of which was kept just a little above the tumor. At first we tried intermittent positive pressure ventilation through the spiral tube, but we could not inflate the lungs well. Consequently, we had to ventilated him manually through the catheter with a small tidal volume and high frequency. After that we controlled the ventilation using an ACOMA-KMA 1,300 ventilator with the tidal volume of 400 ml at a rate of 30/min through the catheter. Anesthesia was maintained with 50% nitrous oxide and 1-3% enflurane. After we ensured adequate ventilation with a blood gas analysis, we gave 4 mg of pancuronium intravenously. Part of the expired gas, which flowed back by the tumor and through the spiral tube, was scavenged to the air.

After suprahyoid release in supine position, right posterolateral thoracotomy and cylindrical resection of three tracheal rings with primary reconstruction were started in the left lateral position. While the trachea was opened, gas was given across the operative field from two anesthesia machines attached separately to the right and left endobronchial tubes.

The resection of the tumor and the reconstruction of the trachea was performed within 80 minutes. After that, the two tubes of the operative field were extubated, and ventilation was maintained through the naso-tracheal tube which had been replaced instead of the orotracheal spiral tube. Arterial blood gas tensions before, during, and after tracheal reconstruction are shown in Table 1.

Table 1. Arterial blood gas tensions (mmHg) and pH before, during, and after tracheal reconstruction.

	FIO_2	PaO_2	$PaCO_2$	pH
Spontaneous breathing (preoperative)	0.2	84	44.5	7.38
CV (with catheter, before)	0.5	186	25.4	7.56
DLC (with two tubes, during)	1.0	81～211	18.8～34.1	7.43～7.56
CV (with endotraccheal tube, after)	1.0	386	22.8	7.55
Spontaneous beeathing (postoperative)	0.2	88	43.3	7.36

Abbreviations: CV; conventional ventilation, DLV; differential lung ventilation.
When PaO_2 decreased during tracheal reconstruction, we used a demand valve powered by the oxygen pipeline.

Discussion

The interpretation of the clinical manifestations of tracheal tumors is often difficult because of vague localizing signs and symptoms, and usually no sign is detectable in a chest X-ray and the patient is in clinically good condition. The tracheal lumen is often more than 75% compromised before any localizing signs and symptoms appear. As a result, the patient is treated for a long period of time as having obstructive lung disease or asthma[1].

Our patient also had been treated for a year and a half as an asthmatic. Computed tomography and bronchoscopy is useful to determine the size, location and character of tracheal tumors.

In such cases, simple rapid induction is dangerous, because controlled ventilation may not be achieved due to airway obstruction.

In our case, after a suction catheter was insinuated past the mass of the tumor using a fiberscope, a spiral tube was intubated into the trachea. But IPPV was not achieved with that spiral tube.

Jet ventilation shows much promise for this area of surgery[2], but was not used in our case. We thought that if sufficient minute volume was given through the suction catheter in this case, the same effect could be expected[3]. When adequate ventilation was not achieved, we used the demand valve powered by the oxygen pipeline[4]. As a result, our patient was hyperventilated without cardiovascular disturbance.

Wilson *et al*[5]. reported temporary partial cardiopulmonary bypass during emergency operative management of near total tracheal occlusion. In our case, we had sufficient time, and could examine the patient's disease. We were able to achieve good results without a partial cardiopulmonary bypass in our case.

In summary, in the management of a patient with a tracheal tumor, anesthesiologists should be cautious of various possible complications throughout the perioperative period.

In any case, it is important for anesthesiologists to examine the conditions of the patient, to have close intraoperative communication with the surgeon, to improve anesthetic management techniques.

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