CURRENT COMMENT AND CASE REPORTS

CURRENT COMMENT is a section in ANESTHESIOLOGY in which will appear invited and unsolicited professional and scientific correspondence, abbreviated reports of interesting cases, material of interest to anesthesiologists reprinted from varied sources, brief descriptions of apparatus and appliances, technical suggestions, and short citations of experiences with drugs and methods in anesthesiology. Contributions are urgently solicited. Editorial discretion is reserved in selecting and preparing those published. The author's name or initials will appear with all items included.

PROBLEMS OF ANESTHESIA IN TRACHEAL RECONSTRUCTION

In patients who have advanced tracheal stenosis, the fundamental anesthetic problem during surgical repair is to maintain adequate oxygen concentrations at the alveolar surfaces and thus in the blood stream. This may be rendered difficult by: (1) the narrowed diameter of the trachea; (2) the presence of secretions which, in the absence of a cough reflex, will block the trachea rapidly, and (3) the surgical intervention which disrupts the continuity of the tracheobronchial tree.

Case 1.—A 19 year old girl had been followed at Duke Hospital for fifteen years because of epidermolysis bullosa. When she was four years of age a severe laryngeal infection developed which necessitated tracheotomy, and this had been maintained since. In the six months before admission she had been in almost constant respiratory distress.

On admission this patient weighed 81 pounds. A number 4 tracheotomy tube was in place and respirations were loud and difficult. Breath sounds were distant in the left chest. Roentgenograms and fluoroscopy of the chest showed obstructive emphysema of the left lung, and planigrams revealed tracheal stenosis beginning just below the end of the tracheotomy tube and extending to the carina, with involvement of the left stem bronchus. The trachea was so stenotic that lipiodol instillation was contraindicated for fear of causing complete tracheal obstruction.

On March 12, 1952, a right thoracotomy was performed by one of us (W. C. S.). When the trachea was opened, the wall was found to be 1 cm. thick, with a lumen of only 3 mm. The entire trachea and left stem bronchus were incised longitudinally and a dermal graft from the posterior chest wall was fashioned to fit the tracheal defect. The details of the surgical technique are reported elsewhere (1).

The anesthetic management was somewhat complicated. For premedication demerol®, 75 mg. and scopolamine, 0.4 mg., were given. On arrival in the operating room she was quiet but somewhat apprehensive. Blood pressure was 110 mm. systolic and 90 mm. diastolic, and the pulse was 120 per minute and regular. Respirations were normal in rate but labored owing to the tracheal stricture. The upper portion of the respiratory tract was cocainized through the tracheotomy opening and then, to relieve apprehension, hypnosis was induced with surital® sodium, 120 mg. This was given slowly by the intravenous route. A number 3 Magill (22 French) plastic portex endotracheal tube, the largest possible in this patient, was introduced through the tracheotomy opening a distance of 3 to 4 inches, where it met an obstruction. Because of the desire to depress spontaneous respirations as little as possible, induction of anesthesia was continued through the tube with nitrous oxide, oxygen and ether. Plane 2 stage 3 anesthesia was attained without incident and the incision made forty-five minutes after induction was begun. For the next one and one-half hours narcosis was maintained with a partial rebreathing technique, employing nitrous oxide and oxygen in equal percentages, with ether added as required. Respirations were assisted by intermittent manual pressure on

the reservoir bag of the circle system Foregger machine. During the dissection of the trachea secretions were troublesome and partial respiratory obstruction was relieved several times by aspiration of mucoid and blood-tinged material. Blood pressure averaged 100 mm. systolic and 80 mm. diastolic, with the pulse 100 per minute and regular.

It had been hoped that the endotracheal tube could be pushed down the trachea and into the right main bronchus prior to incision of the trachea. With the mediastinal dissection completed, this was attempted. However, complete obstruction ensued which could not be alleviated. With the heart slowing perceptibly owing to anoxia, an incision was made into the right main bronchus at the bifurcation and a number 3 Magill catheter inserted directly into it. By this time cardiac arrest was present. The new catheter was connected with the anesthesia machine and by a combination of cardiac massage and pulmonary ventilation a normal heart beat with good myocardial tone was restored in one and one-half minutes. For the next four hours of the operation oxygenation was maintained by exchange through the middle and lower lobes of the right lung. During this period respirations were controlled entirely by the anesthetist and narcosis was maintained by means of cyclopropane in a closed system. Cardiac action remained good, with blood pressure averaging 120 mm. systolic and 90 mm. diastolic and pulse rate 100 per minute. When the tracheal reconstruction was completed, another endotracheal tube was slipped into the new trachea, and the right upper lobe and left lung were expanded. During the closure helium was introduced into the anesthetic mixture with a fractional technique to reduce the hazard of postoperative atelectasis.

The patient was fully awake one hour after completion of the operation and appeared rational and normally responsive. The postoperative course was complicated only by the necessity for frequent tracheal aspiration of mucus and blood, which was necessary for approximately two weeks. In a follow-up period of over six months the patient has had no respiratory difficulty and has gained 20 pounds. The grafted area cannot be distinguished from the remainder of the tracheal wall.

Case 2.—A 53 year old man had had a laryngectomy three and one-half years previously for a lesion believed to be carcinoma. In the intervening period ulcerations had appeared about the tracheostomy and from these lesions Blastomycetes dermatitides were isolated. In the month before admission an acute respiratory infection developed and on several occasions during this intercurrent illness the patient almost succumbed from tracheal obstruction.

On examination in hospital the tracheotomy was widely patent with marked scarring about the skin adjacent to it. Roentgenograms that included planigrams and lipiodol visualization of the trachea showed a markedly narrowed trachea beginning at the end of the tracheotomy tube and extending to within 1 cm. of the bifurcation. On April 11, 1952, a right posterior thoracotomy was performed by one of us (W. C. S.). After exposure the abnormally thickened trachea was opened from the end of the tracheotomy tube to the tracheal bifurcation. A dermal graft was excised from the posterior chest wall, fashioned to fit the tracheal defect and sutured in place.

The anesthetic management was somewhat different from that of the first patient. For premedication, pentobarbital sodium, 100 mg., demerol, 50 mg., and atropine, 0.4 mg., were given. The patient arrived in the operating room adequately sedated and cocaine was applied topically to the trachea. Normal ventilation was impeded by mild to moderate respiratory obstruction. The blood pressure was 120 mm. systolic and 80 mm. diastolic and the pulse 100 per minute and regular. A number 3 plastic portex endotracheal tube was inserted through the tracheotomy opening and hypnosis induced with pentothal sodium given intravenously. Anesthesia was established and maintained throughout operation with nitrous oxide, oxygen and ether, employing a partial rebreathing technique with the circle system of a Heidbrink anesthetic machine. Spontaneous respiratory efforts persisted throughout the procedure and these were assisted continually by intermittent manual pressure on the reservoir bag of the gas machine.

When the trachea was dissected free of the mediastinum, the endotracheal tube was pushed down into the right main stem

bronchus. A second tube was placed in the left main bronchus and allowed to traverse the surgical field toward the head. Both tubes were connected directly to the anesthesia machine by a glass Y tube. Pulmonary ventilation was maintained in this manner, utilizing both lungs, for the remaining four hours of the surgical procedure.

The immediate postoperative course was free of anesthetic complications, but crusts of mucus and blood in the trachea had to be removed several times daily with foreign body forceps. About seven weeks after operation the entire graft was coughed up leaving the lumen of the trachea covered with epithelium except in one small area. Six months after operation the patient was entirely asymptomatic and was carrying on fulltime work as a druggist.

1. Sealy, W. C.; Keeley, R. L.; Collins, J. P., and Stephen, C. R.: Reconstruction of Benign Non-Tuberculous Strictures of Trachea, Ann. Surg. 138: 99–103 (July) 1953.

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AN EXTRA LENGTH CATHETER FOR TRACHEOBRONCHIAL ASPIRATION

In 1946 Friend (1) described a modified rubber catheter for nasopharyngeal, oropharyngeal and tracheobronchial aspiration. This catheter was designed with an opening at the tip and with two lateral openings adjacent to the terminal opening. Such a catheter has, in our experience, proved to be vastly superior to the conventional type of urethral catheter which is frequently employed for aspiration of secretions from the respiratory tract.

We have found that the usefulness of the Friend type aspirating catheter can be considerably improved by increasing its length.

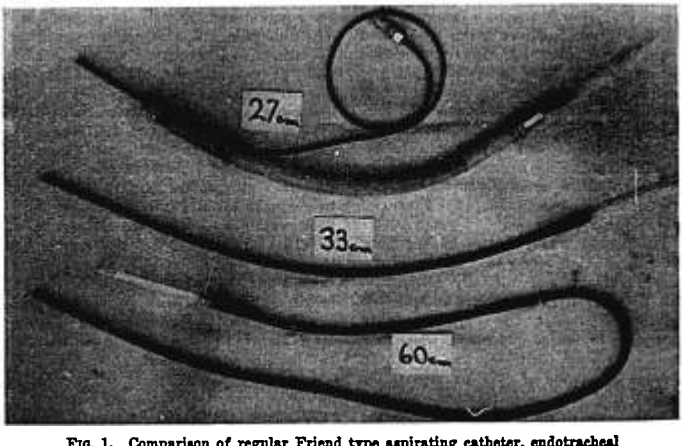

FIG. 1. Comparison of regular Friend type aspirating catheter, endotracheal tube and extra length aspirating catheter.