

LENAHAN, N. E.: *Anesthesia in Thoracic Surgery*. Ohio State M. J. 41: 243-245 (Mar.) 1945.

"Anesthesia in thoracic surgery as practiced at University Hospital [Columbus, Ohio] is limited to cyclopropane, oxygen, helium, and ether. . . . The anesthetist . . . is concerned with the following problems: 1. To provide adequate oxygenation and relaxation. 2. To prevent a paroxysm of coughing. 3. To prevent paradoxical respiration. 4. To provide an open airway and the means to aspirate mucus and blood from the tracheal tree. 5. To carry out or supervise continuous circulatory resuscitation by means of fluids such as glucose, saline, plasma, or blood. 6. To maintain efficient respiration, under pressure if need be. . . . A thorough routine preoperative check-up is made on each patient. . . . The patient's status is decided upon as to operative risk and chance of success. Consultation with the anesthetic department as to the premedication and type of anesthesia is next in order. . . . In our hands cyclopropane-oxygen-helium-ether seems to be entirely satisfactory. . . . Occasionally one finds a patient who continues to cough, hack or hold his breath and in these cases we use sodium pentothal for an inducing agent, then cautiously add cyclopropane-ether until the proper depth of anesthesia has been reached for intubation. . . . By the use of the laryngoscope a woven catheter endotracheal tube with an inflatable cuff is then inserted into the trachea. . . . The depth of anesthesia after the skin incision is made, may be lightened and simply maintained below the cough reflex. . . . Novocaine is of value to infiltrate the periosteum of the ribs prior to stripping them. By so doing stimulation of respirations are not so pronounced, or, as occasionally happens, stop altogether for a few seconds. In pneumonectomies and lobectomies, no-

vocaine is injected into the hilus of the lung to block the vagus and its pulmonary plexus; the phrenic nerve also may be injected if necessary. With an open pneumothorax, positive pressure is very desirable. . . . During the operation positive pressure is usually maintained at 8-20 mm. pressure. . . . In analyzing our cases as to age groups, we found the greatest case age came in the 20-29 year olds. . . . The youngest operated on was 7 years old. The oldest was 67 years old." 1 reference.

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NICHOLSON, M. J.: *Anesthesia for Thyroid Surgery*. Surg. Clin. North America, Lahey Clinic Number 627-644 (June) 1945.

"General anesthesia is our choice for almost all thyroid operations because it fulfills the average patient's desire to be asleep and is relatively nontoxic. . . . Hyperthyroidism is a disease that affects the entire body, but the liver, gastrointestinal tract, cardiovascular and central nervous systems seem to be most vulnerable. Evidence of this vulnerability is found in the patient's complaints of nervousness, irritability, emotional instability, weight loss, weakness, fatigue, increased appetite, intolerance to heat, dyspnea, palpitation, vomiting and diarrhea. If postoperative reaction, crisis and death are to be prevented, an attempt must be made during the period of preoperative preparation to rectify these complaints. This can usually be done by bed rest, sedation, a diet high in carbohydrate, protein and vitamin content, plus iodine or thiouracil medication as indicated. . . . At this time it would seem that the use of thiouracil has more or less revolutionized the anesthetic management of the severely toxic thyroid patient. The indications for multiple stage operations have shown a striking de-

cline. The operative course is seldom fraught with danger, and postoperative reactions, when seen, are seldom severe. However, thiouracil must be used with extreme caution as it has the ability to depress the white blood cell count, particularly the polymorphonuclear elements, to a dangerous and even fatal level. . . . The possibility of respiratory obstruction occurring during a thyroid operation is greater than in most other types of operations commonly performed. . . . Our experience has shown the wisdom of electing the endotracheal method of anesthesia to insure a free airway for those patients with: (1) deviated or compressed trachea; (2) recurrent hyperthyroidism; (3) cancer of the thyroid; (4) intrathoracic goiter, and (5) unilateral or bilateral paralysis of the vocal cords. . . . On occasion, the use of helium in the presence of severe respiratory obstruction from tumor, edema of the false cords, or vocal cord paralysis has been spectacular in restoring oxygenation and facilitation induction of general anesthesia. . . . Whenever this situation is encountered, we believe a tracheotomy should be done. . . .

"Our routine medication consists of a combination of narcotics and a sedative, the doses of which are varied according to the age, vigor and metabolic activity of the patient. . . . If deeper narcosis seems indicated when the patient reaches the operating room, additional morphine and scopolamine may be administered intravenously. . . . Cyclopropane is not used as the sole anesthetic agent, not even for induction, for patients who are severely toxic or have shown any abnormality of the cardiovascular system; that is, recent cardiac failure, auricular fibrillation, extrasystoles and so forth. Rather, a mixture of cyclopropane-ethylene-oxygen is used for induction, or straight ethylene-oxygen is elected. Such inductions are usually followed

by light ether maintenance anesthesia. A mixture of 30 per cent oxygen, 60 per cent ethylene and 10 per cent cyclopropane has proved to be extremely valuable for thyroid anesthesia. . . . The test of time finds anesthetists returning more and more to ether anesthesia for thyroid operations. . . . Because ether-oxygen mixtures rarely ever cause cardiac irritation, they are selected for thyrotoxic patients who show signs of cardiac damage. . . . For safety's sake we consider all gaseous anesthetic agents used in thyroid operations to be inflammable and explosive, with the exception of straight nitrous oxide-oxygen. . . . Avertin . . . is used but sparingly for the production of basal anesthesia for thyroid operations. . . . Pentothal . . . has been used on occasions to render an apprehensive patient unconscious or as an induction agent for inhalation anesthesia. . . . A small number of patients have been successfully anesthetized with a combination of 60 per cent nitrous oxide and pentothal or 60 per cent ethylene and pentothal. In the future, pentothal alone or in combination with one of the gaseous agents may enjoy a wide field of usefulness in the production of thyroid anesthesia. . . .

"The ideal management for any complication is to anticipate it and take the proper steps to prevent its occurrence. . . . During the course of anesthesia excess mucus can be extremely troublesome and frequently must be aspirated from the nasopharynx with a soft rubber catheter of appropriate size. . . . Much of the postoperative difficulty from excess mucus in the tracheobronchial tree can be eliminated if this excess mucus is removed by tracheal or nasopharyngeal aspiration at the close of each operation. . . . Hemorrhage which occurs during the operation can be readily seen by the anesthetist and the indi-

cated measures to combat it with intravenous administration of saline solution, glucose, plasma and blood should be taken. . . . A hole may accidentally be cut in the trachea at any time. However, this complication is not so likely to occur at the first operation as it is at secondary operations on the thyroid gland. The anesthetist should recognize what has happened and increase the flow of gases so as to keep positive pressure in the trachea during all phases of respiration. With positive pressure maintained in the tracheobronchial tree, anesthesia can be maintained and no blood or debris will be aspirated into the trachea while the surgeon closes the tracheal defect. . . . Any sudden, severe, simultaneous drop in pulse rate, blood pressure and respiration should make one think of the stimulation of a sensitive carotid sinus. Successful treatment depends on early recognition, interruption of the operation, lowering the patient's head, and effective artificial respiration. Ten cubic centimeters of 1 per cent procaine should be injected at the bifurcation of the carotids on the side in question, and atropine sulfate, grain  $\frac{1}{100}$ , should be injected intravenously in an attempt to depress the vagal influence in this syndrome. These patients usually make a rapid and complete recovery when the source of stimulation to the sensitive carotids is removed. Air embolus . . . is a rare happening but must be borne in mind when the surgeon is dealing with large veins in the area of the thyroid gland. A sucking noise is heard especially on inspiration, and almost as suddenly, the pulse, blood pressure and respiration disappear. Unless the open vein is closed with dispatch, a fatality is almost inevitable. . . . In spite of careful preoperative preparation and adequate premedication, one occasionally sees a patient come to the operating table with marked tachycardia. Most

often this is a sign of pure nervous instability rather than toxicity. However, the only way to distinguish the two conditions, I believe, is by inducing general anesthesia. The tachycardia of nervous origin will subside, while the severely toxic patient will show little drop in pulse rate and should have more preparation before operation is undertaken. We have no hesitancy in cancelling the operation when this extremely unusual response is seen. Convulsions under anesthesia . . . is another rare but, indeed, alarming and frequently fatal complication. . . . The anesthetist's first consideration is to stop the convulsion, and this can usually be done by the judicious intravenous administration of a soluble barbiturate, such as pentothal sodium. At the same time effective artificial respiration must be carried on to prevent the damages of anoxia. As treatment in such instances must be rapid and general rather than specific, it is well to administer calcium gluconate against the possibility of tetany, discontinue ether if it is being used, change to fresh soda lime to insure adequate carbon dioxide removal from the anesthetic mixture, and start the intravenous administration of glucose and saline solution. . . . Since most toxic patients show some reaction after operation, great care must be exercised in evaluating the cause of such a reaction. . . . Postoperative bilateral cord paralysis or marked edema of the false cords generally makes tracheotomy necessary." 27 references.

J. C. M. C.

DE TAKATS, GEZA, AND FOWLER, EDSON FAIRBROTHER: *The Problem of Thrombo-Embolism*. Surgery 17: 153-177 (Feb.) 1945.

"3. Paravertebral Sympathetic Block.—Some of the symptoms following venous thrombosis are due to a spasm in the peripheral vascular tree.