

ternatively very large doses of paraldehyde and chloral hydrate per rectum, exceeding the usual maximal doses, but even these brought rest for only a very short period. . . . He continued to toss about and his general condition degenerated. He became progressively weaker, which in view of his continuous expenditure of energy and our inability to supply him sufficiently with the necessary fluids and calories was not surprising, and we expected his death on June 19, early in the morning. His movements became weaker, his pulse which was 90, was barely palpable. However at 5.30 that morning he suddenly regained consciousness, and said 'What is the matter with me, where am I?' From that moment on, he was completely rational, normal in his behaviour, regained full control of his senses, had no complaints except extreme tiredness, and took food and fluids by mouth. His temperature dropped to normal, he made an uneventful recovery and was discharged July 1. Incidentally he did not even develop a postoperative hernia, which is remarkable in view of the continuous violent muscular efforts he made immediately following the operation. In retrospective analysis I would designate this case as one of an aseptic meningoencephalitis due to spinal anaesthesia with novocaine. . . . I have seen this patient many times since, he feels perfectly well now, and has had no sequelae of any kind."

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ADAMS, R. C., AND DIXON, C. F.: *Anesthesia in Thyroid Surgery*. Surgery 16: 700-704 (Nov.) 1944.

"Surgeons performing thyroid operations may be divided roughly into two groups from the standpoint of their choice of anesthesia. Surgeons of one group prefer that their patient be asleep throughout the course of the

operation and hence favor inhalation or intravenous anesthesia. Those of the other group favor having the patient awake, at least intermittently, throughout the operation in order that his speaking voice may be checked at intervals for possible damage to the recurrent laryngeal nerve and to permit straining in order that all potential bleeding vessels may be ligated securely before the wound is closed. This group prefers local or regional anesthesia with only the intermittent use of a general anesthetic agent. . . . Despite the fact that a surgeon may prefer a certain type of anesthesia in uncomplicated cases, some conditions make certain types of anesthesia preferable to others. Such conditions might include very large glands; substernal goiters; those which are causing undue pressure on, or displacement of, the trachea; dyspnea, cardiac disease; and severe thyrotoxicosis. . . . The fact that many patients suffering from goiter have varying degrees of elevation of emotional tone necessitates individualized adjustment of the preliminary medication to effect adequate preanesthetic sedation. Since the site of the operation is in close proximity to the trachea and upper respiratory passages, respiratory obstruction is always a potential hazard. Because of the elevation of the metabolic rate, anoxemia is not only undesirable but even dangerous, since these patients have a high oxygen requirement. Respiratory obstruction, in addition to inhibition of oxygenation, complicates the surgical procedure by increasing bleeding in the operative field. . . . Patients who have a disease of the thyroid, particularly those who have severe hyperthyroidism, require adequate preliminary sedation in order to lower their emotional tone to somewhere near basal level. . . . Avertin with amylene hydrate has attained favor with many surgeons for the pro-

duction of basal anesthesia in operations on the thyroid. We prefer the use of morphine and a barbiturate in divided doses since this method appears to have greater flexibility than the single administration of basal sedatives by rectum. Pentobarbital sodium is administered the night before operation in doses of $1\frac{1}{2}$ to 3 gr. (0.1 to 0.2 Gm.). The dose should be sufficient to insure a good night's rest. On the morning of the operation the dose or doses of pentobarbital sodium are repeated and $\frac{1}{6}$ gr. (0.01 Gm.) of morphine and $\frac{1}{150}$ gr. (0.00043 Gm.) of atropine are administered hypodermically at least one-half hour before the time of operation. The important feature is to adjust the dosage and timing of the premedicants so that the patient reaches the operating room in a drowsy and peaceful state of mind. . . .

"Much stress has been placed on the preoperative management of the patient suffering from disease of the thyroid in regard to absolute rest and quiet and shielding him from the knowledge of anything relative to the operation or its time. . . . Most of these patients get along well on ordinary routine preoperative management and it often seems that special attentions render them more, instead of less, apprehensive. . . . Provided the patient has been well premedicated, local anesthesia has many advantages. It is adequate for most stages of the operation and produces the minimum of secondary toxic effects. Our method consists in blocking the superficial cervical plexus bilaterally with 1 per cent solution of procaine hydrochloride or metycaine and infiltrating the region of incision with a 0.5 per cent solution of one of these drugs. The use of epinephrine as a vasoconstrictor in the local anesthetic solution is contraindicated if the gland is of the toxic or exophthalmic type. It is to be remem-

bered that some patients are definitely sensitive to epinephrine and many so-called procaine reactions have been due to this vasoconstrictor. In cases of nontoxic thyroid conditions, cobefrin may be used as a vasoconstrictor. . . . Most of the discomfort under local anesthesia occurs when the lobes are being delivered and when traction is made on the gland. Brief periods of supplementation with nitrous oxide and oxygen at these times render the patient comfortable. . . . In certain cases in which the patient is an extremely poor risk, because of debility, toxicity, or the size and position of the gland, it may be undesirable to put the patient to sleep. In such cases complete cervical block will provide anesthesia of all the deep and superficial structures. This is accomplished by bilateral injection of 1 per cent solution of procaine or metycaine into the second, third, and fourth cervical nerves and the superficial cervical plexus. The region of operation is also infiltrated with a 0.5 per cent solution of one of the agents. . . .

"Nitrous oxide, ethylene, and cyclopropane have all been employed in thyroid surgery and, because of their inert nature, are suitable agents. However, nitrous oxide-oxygen anesthesia alone often fails to provide sufficient depth of anesthesia without the patient becoming cyanotic, which is to be avoided. To a lesser degree this also applies to ethylene. The value of these agents in thyroid surgery is enhanced if they are complemented by local or regional anesthesia. Cyclopropane is considered by many to be the agent of choice if inhalation anesthesia is to be used. It produces quiet breathing, while anesthesia can be maintained with a comparatively high concentration of oxygen. These features together with the rapid recovery period commend its use in operations on goiter. The main drawback of cyclopro-

pane is its explosibility but this need not necessarily contraindicate its use if proper precautions are observed. . . . Most surgeons and anesthetists agree that as a rule ether is not a desirable agent for routine use in operations on the thyroid. However, if it is felt that an inhalation anesthetic agent is indicated (perhaps with an intratracheal tube) moderate amounts of ether may be administered with comparative safety to a patient for whom a gaseous anesthetic agent is inadequate. For a child undergoing an operation on the thyroid, inhalation anesthesia, preferably intratracheal, becomes the method of choice and moderate amounts of ether may be administered without untoward effect. . . . Intratracheal anesthesia is probably the method resulting in the most efficient second-to-second control if the gland is large or substernal or if there is pressure on, or deviation of, the trachea. . . . If pentothal sodium is used as the sole anesthetic agent, mechanical obstruction of the upper part of the respiratory tract or obstruction due to laryngeal spasm can occur. Since the laryngeal reflexes probably will be still active, it may be difficult to insert an intratracheal tube without trauma, if the need arises. Certain patients suffering from thyroid disease who are unusually hyperactive may require large amounts of the drug, which may result in a prolonged postoperative sleep, accompanied by restlessness or excitation during recovery. All these side effects are undesirable.

"For those who wish to take advantage of the desirable features of intravenous anesthesia, we feel that its use as an adjunct to other methods of anesthesia produces the best results. . . . In order to obtain the fullest benefit from the choice of anesthesia, the problems of the individual case should be

weighed preoperatively by the surgeon and the anesthetist."

J. C. M. C.

REA, C. E.: *A New Plan in the Operative Treatment of Patients with Severe Hyperthyroidism: the Use of Spinal Anesthesia as an Adjunct to their Preoperative Care.* *Surgery* 16: 731-738 (Nov.) 1944.

"It is the purpose of this communication to report briefly the employment of spinal anesthesia as an adjunct to the operative management of severe hyperthyroidism. This plan has been employed in twenty cases with real satisfaction. Whereas the use of spinal anesthesia in the management of postoperative thyroid storm has been described previously from this clinic [Department of Surgery, University of Minnesota Medical School, Minneapolis, Minnesota], and whereas Crile and Bartels, Stuart, and Johnson have employed spinal anesthesia for a similar purpose, the basis of the proposal described herein is predicated on the thesis that an effective spinal anesthesia, which would inhibit medullary adrenal releases during the operation, would help to forestall the occurrence of immediate severe postoperative reactions. It is not the intent to secure anesthesia to a level (second to fourth cervical segment) which would permit the operation being done under this agency alone. On the contrary, a somatic analgesia to about the fourth dorsal segment is derived with the use of spinal anesthesia, the analgesic for the performance of the operation upon the neck being obtained with the use of other agents—usually a combination of pentothal and cyclopropane. . . . The idea is rational and feasible; further investigation is necessary to determine how valid the premises are." 11 references.

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