

and ether, adjust the inflow of oxygen to meet the metabolic needs of the patient, and by utilizing the soda lime absorber may carry on for considerable time without variation in level of anesthesia. In the old type of gas machine a full flow of 100 gallons of gas an hour or more was maintained; no soda lime was used and the excess flow of gases carried off the accumulation of carbon dioxide and excess of ether vapor. These factors resulted in a certain good quality of surgical anesthesia which is not always provided by the carbon dioxide absorption technic. Anesthetists who do not apply the mask of the present type of gas machine so that air is excluded, who discontinue the administration of adequate percentages of nitrous oxide during the induction period, who allow ether vapor to become too strongly concentrated in the bag and who do not realize what is wrong, would do better to administer ether by the open drop method. The reasons for this statement are that with the open drop method ordinarily it is difficult to produce too much rebreathing, make the ether vapor too strong or reduce the percentage of oxygen in the air of the room to less than 20. While these remarks concern a simple and fundamental principle, nevertheless, application of this principle is the outstanding problem of inhalation anesthesia for some anesthetists who have been trained recently. . . .

"Intratracheal anesthesia increases in favor annually and deserves its important place in connection with inhalation anesthesia and in resuscitation. . . . Bronchoscopic aspiration has been employed as prophylaxis against postoperative atelectasis in many cases after pneumonectomy and lobectomy as well as after some other operations such as those on the upper part of the abdomen and is the only really accurate method of being sure that the tracheo-

bronchial tree is clean. . . . Ether still is one of the best anesthetic agents that has ever been introduced. . . . The percentage of cases in which spinal anesthesia was used in 1943 increased over that of 1942. This increase is due partly to the fact that in 160 instances continuous spinal anesthesia was used but no doubt the main reason was the fact that regional anesthesia was intentionally combined with anesthesia produced with pentothal sodium plus 50 per cent nitrous oxide and 50 per cent oxygen in many cases. The only anesthetic agents used for regional anesthesia were procaine hydrochloride or metycaïne. . . . Continuous caudal anesthesia was employed in seventy-two cases in 1943. . . . Rectal anesthesia was used as previously for a carefully selected group of patients. This group consisted principally of small children who were to undergo bronchoscopy. . . . Parenteral therapy with solutions of crystalloid materials, such as glucose, salt and so forth, has continually increased both before, during and after operations and anesthesia, for a number of years. Recently vitamins have been added to the solutions used for debilitated patients with advantageous results we think. In our use of amino acids we would prefer nonclerosing preparations to those now commonly available. Amino acids can be given orally. By using a urethral catheter to introduce the solution into the esophagus the bad taste can be largely avoided. We expect to see a greatly increased use of amino acids when the commercial products are more available and more usable." 6 references.

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ALLEN, J. GARROTT; CLARK, DWIGHT E.; THORNTON, THOMAS F., AND ADAMS, W. E.: *The Transfusion of Massive Volumes of Citrated Whole Blood and Plasma in Man*. Surgery 15: 824-831 (May) 1944.

The authors set out to investigate the reports of Ivy and Graham of possible citrate poisoning when using large volumes of blood and plasma. They point out that the work of Ivy and Graham was done on dogs with no correlation in human cases. They studied fifty-three patients undergoing radical surgical operations, in whom large transfusions were necessary. All patients in this series received 1,500 cc. or more of blood and/or plasma in a short period of time. The red blood count and hemoglobin determinations were made two to three days before surgery and repeated twenty-four hours after surgery. The time period for receiving blood and/or plasma was from two to six hours. For blood transfusions 2.5 Gm. for sodium citrate was present for each 500 cc. of blood and the plasma contained about 4 Gm. of citrate for each 500 cc.

In dogs the authors have found that 0.30 Gm. of sodium citrate per kilogram of body weight was the lethal dose when given in fifteen minutes or less. "When the time of administration is prolonged to two hours, as much as 1 Gm. of citrate per kilogram has been given with survival of the animal. Most all our patients received from 0.10 to 0.30 Gm. of citrate per kilogram of body weight in from two to three hours." The patients in this series did not receive a dose of citrate equal to the lethal dose in dogs, due to the slowness of administration of blood and plasma. Five patients of this series were found to lose from 2,100 to 3,100 cc. of blood during surgery, which again confirms the impression many surgeons have that there is more blood loss than is appreciated at the time of surgery.

In this series receiving massive transfusions the urine output was satisfactory during the first two postoperative days, the hemoglobin and erythrocyte count had not changed

from the preoperative level and the patients did not go into postoperative shock. In this series the authors attempted always to give the same type blood as the recipient, and cross-matched each donors' blood with preoperative samples taken of the recipient's blood.

The authors feel definitely that the work of Ivy and Graham in dogs cannot be applied to human beings since blood and plasma therapy in humans is given under longer periods of time. Their conclusions are:

1. "It is obvious from the data presented that the risk of citrate poisoning associated with the administration of large transfusions is negligible as currently practiced. Whatever the toxic properties of citrate may be, it is apparently detoxified rapidly enough so that it does not present a problem in the use of massive transfusions in man."

2. "Not only did our patients tolerate their massive transfusions well, but we believe that without the liberal use of blood or plasma most of these radical operative procedures could not have been carried to a successful conclusion."

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SELDON, T. H.; LUNDY, J. S., AND ADAMS, R. C.: *Nursing Care as Related to Anesthesia*. Am. J. Nursing **44**: 747-750 (Aug.) 1944.

"It is of particular importance that sedatives be given to the patient as ordered the night preceding operation. A patient who has had a restless night before operation is not in as good a mental condition as one who has had adequate sleep. The sedative which is ordered to be given immediately prior to the operation should be administered sufficiently far in advance to allow it to take its full effect before the patient is anesthetized. To administer a hypodermic injection of morphine and atropine as the patient is