nea was not improved by elevation of the patient's shoulders and head. The dyspnea was judged to be the result of air hunger caused by marked secondary anemia. It was decided to give a blood transfusion for the purpose of increasing the number of erythrocytes and the amount of hemoglobin and, thereby, the capacity of the patient's blood to carry oxygen. Improvement in the breathing and increased strength followed the administration of 200 cc. of blood. After 1,000 cc. of blood had been given the breathing was within normal limits, the color was improved and the patient was stronger and felt better.

Premedication of morphine 1/6 grain (0.01 Gm.) and atropine sulfate 1/150 grain (0.00043 Gm.) was given. Pentothal sodium was the anesthetic of choice. Inhalations of 100 per cent oxygen were given during the performance of vaginal hysterectomy which required an hour and ten minutes. A total of 1,225 mg. of pentothal sodium was used. During the operation 500 cc. of blood was given. The patient was taken from the operating room in good condition. Two days later the hemoglobin was 7.5 Gm. per 100 cc. of blood. Convalescence was uneventful.

When the blood volume is not sufficient to support the patient and offset shock while surgical operation is being done, or when the erythrocytes and the amount of hemoglobin are inadequate to transport adequate oxygen and to eliminate carbon dioxide, then trauma or further loss of blood, regardless of type of anesthesia, may produce shock or permanent cerebral damage. Spinal anesthesia is contraindicated if the hemoglobin is 50 per cent or less. If anemia is marked, the anesthetist must assure adequate oxygen in the anesthetic mixture. When the hemoglobin is less than 5 Gm. per 100 cc. of blood there will usually be no detectable cyanosis. In this situation cerebral anemia may produce cerebral anoxia and possibly cerebral damage.

Each transfusion of 500 cc. of blood usually increases the amount of hemoglobin by about 10 per cent and the number of erythrocytes by about 500,000 cells per cubic millimeter. Enough blood should be given to produce the benefit desired. Air hunger in association with anemia is rarely seen.

F. A. M.

COLE, FRANK; BARONOFSKY, I. D., AND WANGENSTEEN, O. H.: *Curare and Shock: The Production of Hemorrhage Into The Upper Intestine of The Dog With Large Doses of Curare.* Surgery. 21: 881–888 (June) 1947.

In the laboratory of the Department of Surgery, University of Minnesota Medical School, recent investigations with large doses of curare in dogs showed that intense submucosal and mucosal congestion of the entire small and large intestine, with free bleeding into the intestinal tract, occurred. The stomachs of these animals were not congested. The present study was made to determine the mechanism of the development of the intestinal congestion and bleeding and to further study the pathological changes produced by large doses of curare as well as the effect of large amounts of curare on blood pressure in the experimental animal.

Eighteen dogs were used for these experiments. Intocostrin was used. The curare (intocostrin) was given in a single, rapid, intravenous injection. Doses ranged from 0.035 to 1.333 cc. of intocostrin per pound of body weight.

The results of these experiments show that doses of intocostrin suffi-

cient to produce muscular relaxation and respiratory depression appear to be nearly alike, in proportion to weight, in man and in the dog; the dog, however, seems able to withstand anoxia better. If artificial respiration is performed on dogs, pathological changes appear with the minimal lethal dose of intocostrin, possibly earlier.

The conclusions drawn from this study are: "Large doses of curare (0.718 to 1.240 cc. per pound), when administered intravenously in single injections to dogs kept alive by artificial respiration for two to five hours, produce congestion and hemorrhage in the intestinal mucosa. Curare does not stimulate gastric secretion. Exclusion of the gastric juice from the intestine does not prevent the mucosal intestinal hemorrhage. The topical application of curare to the mucosa of the small intestine does not produce gross congestion. Dogs receiving large doses of curare exhibit severe depression of arterial blood pressure but no appreciable change in venous blood pressure. Vasoconstricting drugs obviate the fall in blood pressure attending the intravenous injection of large amounts of curare; rapid transfusions of whole blood lack this effect. When shock is averted, intestinal hemorrhage is not seen. Shock is therefore the most likely cause of the intestinal hemorrhage attending the intravenous injection of large amounts of curare." 8 references.

F. A. M.

DODD, HAROLD: *A Technique of Local Anaesthesia for Abdominal Operations.* Post-Grad. M. J. **22**: 389–395 (Dec.) 1946.

A method of "balanced anesthesia," with local anesthesia as the principal partner, has been used in over two thousand procedures. Three local anesthetics have been used, procaine, amethocaine and nupercaine. Adrenalin, 1/1000, is added to local anesthetic, 2 minims per ounce. The solution is colored blue with indigo carmine so that the location of the anesthetic in the tissues can be determined by the color.

The local anesthetic is administered by local infiltration of the operation site plus a regional field-block of the abdominal wall. The parietal peritoneum is anesthetised separately. Before the peritoneum is opened, a fine needle is inserted into its surface and a series of injections made. Anterior splanchnic block is done with a spinal or Ogilvie type needle, injecting 40 to 50 cc. of anesthetic. Visceral sensations, especially nausea, retching, and vomiting, are cut off by blocking the vagi with 10 cc. of the anesthetic. The mesenteries of the colon and small intestine are anesthetised by inserting 30 to 40 cc. of anesthetic around the origin of the superior mesenteric artery. The sigmoid colon and upper rectum are anesthetised by injecting 20 to 30 cc. of amethocaine (0.1 per cent) into the root of the sigmoid mesocolon. For the lower rectum and pelvic organs anesthesia is produced by pooling 20 to 30 cc. of anesthetic solution below the bifurcation of the aorta and the prominence of the sacrum in the midline. The pelvic viscera are anesthetized by injecting 5 to 10 cc. of solution around the internal iliac arteries and the ovarian vessels and, when necessary, the pelvic-ovarian ligament is injected. For hernias or supra-pubic cystostomy special field-blocks are employed. The stomach and gallbladder are infiltrated locally.

The methods for producing sleep after the local anesthetic may vary. Very light ether anesthesia is safely and simply accomplished. Intravenous light barbiturate anesthesia works well in combination with local block. Gas and oxygen are unsuitable because heaving respiration, muscle tautness