

gas along. 'Gas pains' are experienced with beginning peristaltic activity and morphine will tend to exaggerate and prolong them. Periods of decreased intestinal activity due to morphine are followed by an attempt on the part of the intestine to recover its peristaltic activity. In addition to decreasing intestinal activity, morphine causes a decrease in intestinal secretions and a slowing of the advancement of material through the bowel, with resultant constipation. Hand and Audin recommend the use of morphine sulfate, grain $\frac{1}{8}$ (0.008 gm.) and prostigmine, grain $\frac{1}{130}$ (0.0005 gm.), subcutaneously every four hours, as necessary for pain. A small dose of morphine lessens the incidence of undesirable effects associated with the employment of larger doses. Abdominal distention may vary in degree from mild flatulence to a paralytic ileus. . . . Prostigmine methylsulfate, a synthetic compound, is a parasympatheticomimetic drug causing an increase in intestinal activity. . . . In therapeutic doses prostigmine will increase the tone of the intestine and so aid in the prevention and treatment of distention. Prostigmine is administered hypodermically in doses of $\frac{1}{250}$ grain (0.00025 gm.) every three hours for four to six doses postoperatively. . . . Heavy preoperative and postoperative medication increases the incidence of atelectasis and bronchopneumonia. . . . If atelectasis does occur, the prompt and vigorous aspiration with a tracheal catheter or bronchoscope must be instituted. . . . Starr and Gilman have used intercostal nerve block for the relief of upper abdominal wound pain to improve vital capacity and to make coughing easier and more effective. Following prolonged surgery the use of oxygen therapy is indicated. . . . There is inconclusive evidence as to the etiologic factor for postspinal headache. . . . The treatment consists of keeping the patient flat in bed and the

administration of codeine sulfate, grain $\frac{1}{2}$ (0.032 gm.) to grain 1 (0.065 gm.), with acetylsalicylic acid, grains 10 (0.65 gm.). For the persistent severe headache, the administration of pitressin, concentrated glucose or saline has been proposed. Watson, in discussing the treatment of postspinal anesthetic headache due to aseptic meningitis, has recommended the administration of pitressin or glucose saline which may relieve intracranial pressure by promoting diuresis." 36 references.

J. C. M. C.

LUNDY, J. S.: *Anesthesia in Shock*. S. Clin. N. America, Mayo Clinic Number: 740-742 (Aug.) 1945.

"In order to make this consideration brief, it will be assumed that all anesthetic agents and methods are available; otherwise, there would be no choice. The difficulty of defining shock seems to make it necessary to describe the condition which I interpret as shock. I fully realize that it is difficult to define shock particularly from the standpoint of the research physiologist. The shocked patient is more or less prostrated; he is usually conscious although he may not be; his skin is cold and wet and white in contrast with the pink, warm and dry skin of a well person. His blood pressure is usually lowered to a point where muscle tone is markedly decreased; the pulse is usually fast and thready and the pulse pressure is low (less than 20 mm. of mercury). Dyspnea and apprehension may be present. The patient may have suffered an injury and may have lost blood. He may have been exposed to a strong electric current. He may have become weakened through a long debilitating disease and may have been bedridden for a long time. In the latter case, it is sometimes difficult to say whether the patient is simply weak or whether some degree of shock has developed. . . .

"Pain itself seems to contribute to

shock or at least to the lowering of blood pressure if the pain is prolonged and severe. It is essential that general supportive measures be instituted. As soon as the patient shows some improvement from this treatment, it is possible to begin the administration of the anesthetic without preliminary medication. It is much safer, however, to withhold the anesthetic until definite improvement occurs, that is, until the systolic blood pressure can be elevated to an arbitrary level of 100 mm. of mercury, until the pulse pressure reaches 20 mm. or more and until the pulse rate becomes 120 or less. Under these circumstances, the patient has begun to show improvement although he is still weak and there is plain evidence of shock. The safest anesthesia is accomplished by infiltration with a minimal quantity of a 0.5 per cent solution of procaine hydrochloride. . . . In general, spinal anesthesia should be avoided. Intravenous anesthesia with pentothal also should be avoided. Although it is possible to use spinal anesthesia or intravenous anesthesia in the presence of shock provided that the anesthetic technic is modified so that very small doses of very weak solutions of the anesthetic agent are used and provided that the patient is well supported with the various measures that are generally available today, there are better and safer anesthetic methods. One of the very best methods is to use ethylene and at least 20 per cent oxygen. A small amount of ether may be added without untoward effect. Nitrous oxide with 20 per cent oxygen may be used. A small quantity of ether may be necessary. Cyclopropane may be used, but I do not think that it is as good as ethylene in cases of shock. . . . The generous use of oxygen helps considerably and, if spinal anesthesia or intravenous anesthesia with pentothal is to be used, oxygen must be given in a

concentration of at least 50 per cent. I find that the mixture of 50 per cent nitrous oxide and 50 per cent oxygen is effective in reducing the amount of pentothal required.

"In some cases of shock, large doses of morphine have been administered because of severe pain. In such cases, the required dose of the anesthetic is less than it is in similar cases in which morphine has not been administered. In many combat areas, patients have been given morphine after they have been in shock and have become cold. Because their peripheral circulation is poor, the absorption of morphine is poor. When their circulation improves, the morphine is absorbed quickly and morphine poisoning may occur. These patients require supportive treatment more than they need an anesthetic although obviously they need a sufficient amount of anesthetic so that they will not suffer from pain. The use of the intratracheal tube in connection with inhalation anesthesia makes it possible to keep the patient well and adequately ventilated, and it becomes more and more desirable as the degree of shock increases. . . . If, during operation, a patient goes into a state of shock, it will be immediately evident to the anesthetist that the patient requires very little anesthetic. The blood pressure will fall, the respiratory rate and the pulse rate will increase and the patient will become cold, moist and pale. If there has been considerable loss of blood during the operation, one should attempt to give enough blood or plasma to increase the systolic blood pressure to at least 100 mm. of mercury and to decrease the pulse rate to 120 or less. Rapid administration of blood may be necessary, but the rate of administration should be decreased as soon as the patient's condition becomes about as has just been described. Often there has been a much greater loss of blood than any member of the surgical team

realizes. . . . Rectal anesthesia usually is not indicated in cases of shock." J. C. M. C.

ADAMS, R. C.: *Curare as an Aid to Relaxation in Anesthesia*. S. Clin. North America (Mayo Clinic Number) 735-739 (Aug.) 1945.

"From the inception of anesthesiology physicians have had certain aims in the practice of this specialty. These aims may be condensed as follows: to administer an anesthetic agent which will interfere as little as possible with the patient's normal functions during and after operation; to provide the best possible working conditions for the surgeon, and in more recent years, to promote the patient's welfare in connection with the operative procedure. . . . Of the previously mentioned aims, perhaps the one most difficult to achieve consistently is that of providing the surgeon with favorable working conditions. . . .

"Curare (intocostrin) is one of the most recent additions to the system of supplementing the effects of one agent by combining it with another in order to provide muscular relaxation without profound depression from the anesthetic agent or without using large doses. . . . Curare is not an anesthetic agent although mild anesthetic properties have been ascribed to it. Its main effect is on the myoneural junction or synapse. It produces muscular relaxation by blocking the nerve-to-muscle impulses at this point, presumably by interfering with normal action of acetylcholine. It affects the nerves to skeletal muscles and also sympathetic nerve impulses but it appears to have little or no effect on smooth muscles or on the heart or circulation. The muscles are affected in the following order: (1) those innervated by cranial nerves, (2) muscles of the trunk and extremities and (3) muscles of respiration, the diaphragm being affected last. While central respiratory depression

has been reported, the peripheral effects are predominant. Large doses paralyze respiratory function by peripheral action. Curare is destroyed in part by the liver and eliminated by the kidneys although some of the drug is excreted unchanged. Judicious therapeutic doses rarely produce side effects. Curare is effective when administered intramuscularly or intravenously but when it is used in connection with an anesthetic agent intravenous administration is preferred. When the drug is given intravenously, its effects appear within sixty seconds and the maximum effect may be evaluated in two or three minutes. . . . Physostigmine and neostigmine may be considered as specific antidotes although of the two physostigmine is thought to have a more specific antidotal effect. This drug should be available when curare is being used but if curare is administered in safe amounts there should seldom, if ever, be occasion to use it. . . .

"Cyclopropane has been considered the anesthetic agent of choice for supplementing with curare, due to its evanescence and the rapidity with which the depth of anesthesia may be varied. Because of the flexibility of cyclopropane anesthesia, it has been thought that it is easier to differentiate the effects of cyclopropane and curare than the effects of other combinations and to compensate for them. In addition, cyclopropane apparently does not have the curare-like action of agents such as ether, avertin (tribromoethanol) and pentothal sodium. Although cyclopropane is no doubt still the agent of choice for combination with curare, it is now generally believed that the use of other agents need not be hazardous, provided small doses are employed. . . . At the Clinic we prefer to use 2 to 3 cc. (40 to 60 mg.). If adequate relaxation is not obtained in five minutes, we administer an additional dose of 1 to 2 cc. (20 to 40 mg.). If