

oxygenator. Separated red cells: Maintenance of effective oxygen-carrying capacity without circulatory overload; chronic anemia. Plasma (liquid): Plasma volume expander. Plasma (fresh): Platelets as plasma or concentrate. Plasma (ion exchange): Immune and typing sera and labile factors. Plasma (frozen): Labile clotting factors; storage. (Gibson, J.: *Battle of Blood*, U. S. Armed Forces Med. J. 11: 1276 (Nov.) 1960.)

**PLASMA** The chief problem with pooled human plasma has been the high incidence of homologous serum jaundice associated with its use as a plasma expander. Although the etiological agent of homologous serum jaundice remains unknown and unidentified, at least two partly acceptable empirical methods have emerged for ridding pooled human plasma of its ability to transmit this disease. These are (1) the heating of plasma and plasma products for ten hours at 60 C., and (2) the "shelf-storage" method in which plasma is stored for six months at 31 to 32 C. Plasmanate is a new plasma product, the only one to receive a license from the Biologics Division of the National Institutes of Health, manufactured by partial fractionation of fresh plasma by the cold ethanol method. The fibrinogen and some of the globulins are thus removed from the original plasma leaving a final product which contains about 88 per cent albumin and 12 per cent globulin. There is good evidence that this product is a safe and effective plasma expander. (Hamit, H. F.: *Status of Human Plasma as Plasma Volume Expander*, J. A. M. A. 174: 1617 (Nov. 19) 1960.)

**RED CELL PRESERVATION** The addition of lactose or dextrose to blood in acid citrate dextrose enables it to be stored between -3 and -40 C. provided rapid freezing and thawing are employed. Only about 5 per cent of red cells in blood so treated are hemolyzed. Blood so preserved has a post-transfusion survival after 24 hours of 77 per cent of the original cells after storage for 2 years at -93 C. (Strumia, M. M., Colwell, L. S., and Strumia, P. V.: *Preservation of Blood for Transfusion*, J. Lab. Clin. Med. 56: 576 (Oct.) 1960.)

**PLASMA EXPANDER** "Plasmagel" is a 3 per cent gelatine solution, isotonic, liquid at room temperature, free from sodium and chloride, but containing glucose; it has a molecular weight between 35,000 and 40,000. Administration of 500 ml. increases the plasma volume by 400 ml. The solution is well tolerated. Even repeated infusions have not caused allergic or toxic reactions. It does not interfere with blood cross matching and typing and does not cause bleeding tendency. (Hascher, H., and Hascher, M.: *Contribution to Treatment of Shock with Particular Emphasis on Liquid Gelatine as Plasma Expander*, *Der Anaesthetist* 9: 236 (July) 1960.)

**PERITONEAL ABSORPTION** Erythrocytes tagged with radioactive chromium were introduced into the peritoneal cavities of 15 patients. Rates of absorption of blood from the peritoneal cavities were similar, regardless of whether patients were kept in supine or Fowler's position. When air was introduced into the peritoneal cavity, and the patient was kept in Fowler's position, the rate of absorption of erythrocytes was reduced approximately one-third. The presence of pneumoperitoneum slows the absorption of blood because of a blocking layer of air beneath the diaphragm, and because the lymphatics are blocked by air bubbles. (Schildt, B., and Eiseman, B.: *Peritoneal Absorption of Cr<sup>51</sup> Tagged Erythrocytes. Its Influence by Pneumoperitoneum and Fowler's Position*, *Acta chir. scandinav.* 119: 397 (Sept.) 1960.)

**HEMORRHAGE** Patients taking anticoagulant drugs who require surgical procedures present special problems of management. Should emergency surgery be necessary in a patient receiving heparin, the slow intravenous infusion of a one per cent solution of protamine sulfate in a dosage equivalent, milligram for milligram, to that of the heparin will immediately counteract the effects of heparin. Emergency surgery may be performed in a patient on bishydroxycoumarin (Dicumarol) therapy after the intravenous administration of vitamin K<sub>1</sub> (phytonadione) in a dosage of 50 to 55 mg. Other vitamin K

preparations are not effective. Blood or plasma should be given to provide an immediate increase in the low plasma levels of coagulation factors. The only indication for the use of human fibrinogen (Parenogen) is the rare case of bleeding associated with hypofibrinogenemia. This may occur in patients with abruptio placentae, placenta previa, retained fetus, and some neoplasms, especially of the prostate. Effective blood substitutes are Dextran and plasma. (Buckwalter, J. A., and Connor, W. E.: *Hemorrhage—Anticipation and Control*, J. A. M. A. 174: 151 (Sept. 10) 1960.)

**CEREBRAL HYPOXIA** Damage to brain cells is determined chiefly by the degree and duration of the hypoxic period. Although some cerebral cells may be completely destroyed, others are not so severely affected and, under suitable conditions, their damage is reversible. The main factor preventing recovery of these cells is cerebral oedema, occurring as a result of simultaneous hypoxic damage to the cerebral blood vessels. Capillary rupture and increased permeability permit crystalloids and plasma proteins to escape from the vessels into the intercellular spaces. This oedema fluid acts as a physical barrier and interferes with the passage of oxygen across the intercellular spaces to the reversibly damaged cells; their hypoxic state is increased and irreversible changes may now set in. Once cerebral hypoxia from whatever cause is recognized, adequate oxygenation should be insured and then dehydration treatment started without delay. Preferred hypertonic solutions are 50 per cent sucrose or 30 per cent urea in invert sugar. (Cope, D. H. P.: *Dehydration Therapy in Cerebral Hypoxia*, *Proc. Roy Soc. Med.* 53: 678 (Aug.) 1960.)

**PHEOCHROMOCYTOMA** In the United States 800 deaths a year are due to this tumor. It consists of pheochromocytes, which are derived from sympathetic formative cells. Ninety per cent are found in the adrenal medulla. An excess of levarterenol or epinephrine is secreted by the tumor. This causes hypertension, hypermetabolism or hyperglycemia, and may mimic thyrotoxicosis. The best diagnostic test is quantitative de-

termination of urinary catacholamines. Problems of anesthesia include avoidance of stress hypertension during induction, provision of adequate muscle relaxation, and caring for circulatory and respiratory abnormalities which may occur during operation. When unrecognized pheochromocytoma is present, and unrelated operations are done, there may be as much as 50 per cent mortality. (Dieffendort, R. O., O'Donnell, A., and Creelman, E. W.: *Pheochromocytoma*, A. M. A. Arch. Surg. 81: 679 (Nov.) 1960.)

**DIABETES** Diabetic patients are sensitive to ganglion blocking agents and to tranquilizers. There is real danger of vomiting during induction of anesthesia in the diabetic with ketosis. Hexamethonium and tranquilizers may enhance the action of insulin and cause severe hypoglycemia. Hypoglycemic coma can occur during an operation and is characterized by sweating, pallor, tachycardia and dilated pupils. It should be treated with intravenous glucose 25 per cent followed by a 5 per cent solution and 25 to 50 units of insulin. Hypoglycemic coma may be the cause of delayed return of consciousness. (Jacques, A., and others: *Evaluation, Preparation of Patient and Selection of Anesthesia for Emergency Surgery*, *Surgical Clinics N. A.* 40: 1433 (Oct.) 1960.)

**FAT EMBOLISM** The diagnosis of fat embolism was made in 24 out of 6,084 patients with fractures; the real incidence is believed to be considerably higher. The clinical picture is due to obstruction of capillaries by droplets of fat with resulting hypoxia, anoxic damage of the endothelium and edema. The pulmonary circulation is first affected. Generalized fat embolism may later occur. It is characterized by cerebral damage, interference with renal function and petechiae. There may be excitement, somnolence or unconsciousness. Respiratory embarrassment is frequent. Hyperthermia occurs in 50 per cent of the cases. Cerebral edema is a frequent complication. The only effective preventive measures are limitation of movement of fractures and postponement of early surgery. Treatment is symptomatic. Hypotension must be prevented, hyperthermia must