Important Advances in Clinical Medicine

Epitomes of Progress -- Pathology

The Scientific Board of the California Medical Association presents the following inventory of items of progress in Pathology. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in Pathology which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Pathology of the California Medical Association and the summaries were prepared under its direction.

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Cryoprecipitate in the Treatment of Hemophilia

By appropriate fast-freezing in ethanol-dry ice, cold-thawing at refrigerator temperature, and centrifuging, blood banks now process fresh blood to prepare two final products—cryoprecipitate and reconstituted whole blood—using a two-bag set. Or they prepare three final products—packed cells, cryoprecipitate, and supernatant plasma—using a three-bag set. The cryoprecipitate is stored at −20 degrees C.

Just before infusion, the contents of the appropriate number of bags are dissolved by addition of 10 ml of normal saline solution to each and warming to 37 degrees C. Calculation of dosage is based on the fact that the average bag of cryoprecipitate contains approximately 125 units of Factor VIII. The standard deviation of this value is almost 50 percent, however, owing mainly to the wide range of donor Factor VIII. The goal of a priming infusion should be approximately 50 percent circulating Factor VIII; in most cases of internal or joint bleeding, one infusion will suffice to end the episode. For major operations, however, a floor level of 25 percent should be maintained for a week to 10 days. The above data, combined with an assumption of a 40 percent hematocrit, led to the "rule of thumb" dosage of one unit of cryoprecipitate for six kg of body weight as initial or priming dose, with subsequent infusions of two-thirds as much given every 24 hours.

Compared with the much more concentrated pharmaceutical products, cryoprecipitates have the advantage of lower cost and decidedly reduced risk of hepatitis, owing to single unit production and administration.

The disadvantages of cryoprecipitate are the variability in potency among individual units and the need for storage of −20 degrees C rather

than at refrigerator or room temperature. When −20 degree C storage is not available, the commercial products of necessity must be used.

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REFERENCES

Dallman PR, Pool JG: Treatment of hemophilia with factor VIII concentrates. New Eng J Med 278:199-202, 1968

Pool JG: Cryoprecipitated factor VIII concentrate. Thromb Diath Haemorrh Supplement 35:35-40, 1969

Proven and Possible Future Uses of Anti-Rh Gamma Globulin

Rh hemolytic disease of the newborn can be nearly completely eliminated by the prompt administration of anti-Rh gamma globulin (RhoGAM®) during the post-partum period. All non-immunized Rh-negative women delivered of Rh-positive infants should be treated with one ml of RhoGAM, which contains 300 μg of antibody. Large fetal-maternal hemorrhage must be recognized in order that the dose may be increased. Confirmation of the large hemorrhage and its measurement may be done with the Kleihauer-Betke technique. For these patients one ml of RhoGAM should be given for each 10 ml of packed fetal red cells in maternal circulation. A similar dose schedule is recommended for the accidental transfusion of Rh-positive blood to an Rh-negative patient.

E. R. JENNINGS, M.D.

REFERENCE

Jennings ER, Dibbern HH, Hodell FH, et al: Prevention of hemolytic disease of the newborn. Calif Med 110:130-133, 1969

Blood Component Therapy: Packed Red Blood Cells versus Whole Blood

Hemotherapy is best accomplished by infusions of specific blood components and derivatives. If all transfusions, when the red blood cells are needed, were accomplished by infusion of packed red blood cells, then as a by-product of whole blood collection, the Blood Bank will be able to make available all of the components and derivatives, which are single donor plasma, fresh frozen plasma, fresh frozen lyophilized plasma, 5 percent albumin, 25 percent albumin, platelet concentrates, Factor VIII rich cryoprecipitates, Factor VIII concentrates, Factor II-IX concentrates and gamma globulin. A unit of packed red blood cells (volume of 300 ml) has the identical red cell mass as a unit of whole blood (volume of 517.5 ml) and its use is preferable to whole blood because the unit of packed red blood cells (1) has greater oxygen carrying capacity per ml, (2) gives greater immediate rise of patient's hematocrit, (3) will increase the patient's blood viscosity—an aid in correcting the high output cardiac failure often seen in anemia, (4) has lessened incidence of transfusion hepatitis, (5) has lessened incidence of allergic and febrile type transfusion reactions, (6) has lessened sodium and albumin—an aid in transfusions for elderly patients and patients with congestive heart failure, (7) has lessened amounts of ammonia and citrate—an aid in transfusions for patients with liver failure, (8) has lessened potassium and acid—helpful in patients with renal failure and in exchange transfusions for the newborn.

All patients requiring red blood cell infusions are effectively treated with cross-matched packed red blood cells. Even in hemorrhage, if the hemorrhagic shock has been corrected with plasma expanders, packed red blood cells are preferable to replace the red blood cell mass.

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Preoperative Screening for Bleeding Diathesis

Despite the current availability of sensitive laboratory screening tests for bleeding disorders, a careful history to elicit evidence of abnormal bleeding in the patient or his family remains the most valuable single preoperative screening procedure. All patients with an abnormal or suspicious history should have adequate laboratory screening tests before operation. Although a case can be made for routine preoperative laboratory studies, this depends on the availability of laboratory personnel; and the use of routine tests should never replace a careful history. When the history indicates a need for further study, laboratory screening tests of value include the following: (1) Evaluation of platelets by careful examination of blood smear or platelet count; (2) bleeding time (Ivy or modified Ivy method); (3) activated partial thromboplastin time; (4) prothrombin time; (5) thrombin time. It should be emphasized that the clotting time for whole blood is of no value as a screening test. Specific assays of clotting factors and other special tests