

of menadione bisulfite and blood transfusions should be given to combat the prothrombin deficiency before the operation has begun. . . .

"Dicumarol is effective when administered orally. A satisfactory preparation for parenteral administration has not been developed. . . .

"Effective levels are not reached for twenty-four to forty-eight hours and sometimes for a considerably longer time. . . .

"If, because of hemorrhage or abnormally high prothrombin times, it is advisable to lower the prothrombin time, this usually can be accomplished by the transfusion of 500 c.c. of fresh citrated blood (bank blood may be ineffective). It may be necessary to transfuse blood several times over a period of two or three days, since there is a tendency for the prothrombin time to increase again after two to six hours have elapsed. The effect of blood transfused for such a purpose apparently is due simply to a replacement of prothrombin, and blood which has been stored for more than twenty-four hours in the icebox may have lost much of its prothrombin."

A. W. F.

EVANS, E. I., AND RAFAL, H. S.: *The Treatment of Clinical Shock with Gelatin*. Ann. Surg. 121: 478-494 (April) 1945.

"Gelatin for intravenous use is prepared by hydrolysis, enzymatic or chemical; if certain well defined precautions are observed in its preparation, a product of rather unusual uniformity as regards viscosity and molecular homogeneity can be obtained. . . .

"The molecular weight of gelatin varies according to the amount of degradation it has suffered in its preparation. Whereas serum albumin has a molecular weight of about 69,000, that of 'lightly degraded' gelatin is around

35,000, and 'heavily degraded,' about 20,000.

"The effectiveness of any plasma substitute in the treatment of shock naturally depends to a large extent on the time it remains in the blood stream, and this is dependent on molecular size. . . .

"Gelatin has been given to 67 patients in moderate or severe shock due to various causes. . . .

#### "Advantages

"(A) One of the chief advantages in gelatin for the management of shock will be its ready availability when it can be supplied in large amounts. . . .

"(B) When large scale production of gelatin solutions can be attained these solutions should be much less expensive than plasma, either desiccated or frozen.

"(C) Intelligent use of gelatin infusions in centers where plasma banks can be operated, improves greatly the available supply of plasma. . . .

"(D) From our experience, it is apparent that gelatin is especially indicated during the first 48 hours, since most infused fluid (plasm or gelatin) is lost into the burned area during this period. This results in a large saving of plasma.

"(E) Foreign Protein Reaction.—With our first supply of gelatin . . . we saw two moderately severe reactions. . . . Since we have been supplied with gelatin solutions free of the preservative phenyl mercuric borate, there has been no instance of foreign protein reaction. . . . Also, we now see practically no venous thrombosis at the site of injection. . . .

#### "Disadvantages

"(C) It can no longer be doubted that one of the greatest needs of a shocked patient is for a greater volume of circulating red blood cells. Therefore, gelatin solutions (as well as plasma) are at a disadvantage when

compared to whole blood. For this reason alone, we would emphasize that in the rational management of patients in shock from trauma or burns, gelatin and plasma solutions should be reserved for purely emergency use. They can never be considered as true substitutes for whole blood."

A. W. F.

*The Circulation in Traumatic Shock.*

Bull. U. S. Army Med. Dept. No. 87 (April) 1945.

"Important studies on the circulation in traumatic shock in man were summarized in a recent Harvey Lecture by Dr. D. W. Richards, Jr. The basic dynamic feature, failure of return of blood to the heart with diminished blood flow and tissue anoxia, long recognized from experimental evidence, can now be said to have been proved in human cases of shock. Direct measurements of the pressure of blood in the right auricle and of cardiac output were achieved by means of a long ureteral catheter introduced into a median basilic vein and thence passed along axillary and subclavian veins into the right auricle. Comprehensive studies were made on 92 patients admitted to Bellevue Hospital. . . .

"Evidence was summarized for a strongly selective vasoconstrictor mechanism in shock, shutting off almost completely large organ systems or regions of the body not immediately necessary for survival. In shock, while the total blood flow decreases to half the normal value, the blood flow through the kidney may decrease to one-tenth or one-twentieth, perhaps even less in extreme cases. One patient in deep shock for many hours developed acute renal insufficiency similar to the crush syndrome studied by Bywaters. Spontaneous and abrupt failure of this selective vasoconstriction may precipitate fatal collapse.

"The Trendelenburg, or foot-up, po-

sition increased the cardiac output in patients with moderate reduction of blood volume but was ineffectual when there was marked reduction of blood volume. Cardiac output was not increased by the administration of pressor amines. The effects of alcoholism superimposed on those of shock were most unfavorable. Fat embolism was not observed in the series. . . .

"Persistent shock was characterized by the accumulating effects of tissue anoxia. The brain appeared to fail first. Pulmonary edema was a frequent and difficult complication. Nitrogen retention and oliguria were also observed. The status of oxygen therapy needs further definition.

"When whole blood has been lost in large amounts, replacement by plasma alone will produce an acute anemia. This may actually limit the quantity of plasma that can be given safely. Failure of sustained improvement after the administration of 1,000 to 1,500 cc. of whole blood usually indicated continued bleeding. The author emphasizes the need for further studies on the subsequent maintenance of the patient after he has been resuscitated from shock."

A. W. F.

*Special Shock Studies.* Bull. U. S. Army Med. Dept. No. 87 (April) 1945.

"Special shock studies have been conducted by Majors D. Ebert and Charles P. Emerson on detached service with the auxiliary surgical group working in field hospitals. Their observations have been summarized in a recent report as follows: All patients with arterial pressure readings below 85 mm. of Hg, excluding cases with cerebral and cord injuries, were found to have an oligemia, the deficiency averaging 40 per cent of the expected normal total blood volume. A significant reduction in blood volume, i.e.,