

The following example illustrates the use of these formulas: A patient weighs 150 pounds, and the digitalis available has an activity of 100 mg. to the cat unit. Applying Formula I for the powdered leaf, we have $100 \times 0.15 = 15$; $15 \times 150 = 2,250$; $2,250 \div 1,000 = 2.25 =$ grams of leaf in total amount. Applying Formula II for the tincture, we have $100 \times 0.15 = 15$; $15 \times 150 = 2,250$; $2,250 \div 100 = 22.5 =$ cubic centimeters of tincture in the total amount. Formula III gives $100 \div 100 = 1$; $1 \times 150 = 150 =$ cubic centimeters of the infusion in the total amount.

ADMINISTRATION OF AVERAGE CALCULATED TOTAL AMOUNT

1. When the patient has received no digitalis within the preceding ten days.

A. *In urgent cases.*—From one third to one half of the total calculated amount is administered at the first dose. After an interval of six hours, from one fifth to one fourth of the total is administered. After a second six hours, from one eighth to one sixth of the total is administered. Thereafter, if more digitalis is needed, about one tenth of the total may be repeated every six hours until maximal digitalization is secured. In the case of the example given above with the total amount being 22.5 c.c. of tincture, the first dose would be from 7 to 11 c.c.; the second from 4 to 5 c.c.; the third from 2.5 to 3.5 c.c., and thereafter about 2 c.c. every six hours if required.

B. *Rapid, for nonurgent cases.*—About one fourth of the calculated total is to be given at each of the first two doses, six hours apart. Thereafter about one tenth to one eighth of the total is given every six hours.

2. When the patient has been taking digitalis within the preceding ten days.

Before further digitalis is prescribed, the patient is to be subjected to the most careful examination, including the use of polygraphic or electrocardiographic records if available, to determine whether or not there are any evidences of digitalis action.

A. *When evidences of digitalis action are absent.*—The procedure is the same as outlined above, except that the total amount of digitalis required is to be reduced to 75 per cent. of the total calculated. Thus, in the example used the total would be reduced to 17 c.c. instead of the calculated 22.5 c.c., and the fractions prescribed at each dose would be based on the former figure (17 c.c.). The usual one tenth of the total every six hours may then be prescribed if necessary.

B. *When evidences of partial digitalization are present.*—

It is best not to attempt to administer more than one half of the total calculated amount of digitalis, divided equally between the first three doses. In urgent cases in this group, however, one may administer 75 per cent. of the calculated amount, preferably in three equal doses, and then if digitalization is not quite complete, one tenth of the total amount may be prescribed every six hours.

SAFEGUARDS

The appearance of one or more of the following criteria of adequate digitalization, or of minor digitalis intoxication, indicates the cessation of further administration, either permanently or temporarily:

1. Nausea or vomiting (except when due to splanchnic congestion and present before treatment is begun).
2. Fall of heart rate (not pulse rate) to or below 60 a minute.
3. Appearance of frequent premature contractions; of definite heart block; of marked phasic arrhythmia, or of coupled rhythm.

The observance of a six-hour interval between doses allows time for complete absorption of the preceding dose and the development of its full action on the heart so that if the patient is examined just before the administration of each dose, dangerous intoxication can be absolutely prevented. In practice it is perfectly safe to give the first three doses without personally examining the patient before the second and third doses if the one nursing the patient is properly instructed to look for nausea, vomiting, or slowing of the pulse to 60 or less a minute before giving the succeeding dose, and to stop administration if any of these phenomena appear.

When a leaf, tincture, or infusion the cat unit of which is unknown is employed, 100 mg. may be taken as the cat unit; but not more than 75 per cent. of the calculated total amount should be given in the first three doses.

When the patient cannot be weighed, or when marked edema or general anasarca is present, the body weight (exclusive of edema fluid) must be estimated as closely as possible and the total amount of digitalis calculated as usual. Not more than 75 per cent. of the calculated amount should then be given in the first three doses.

COMMENT

The employment of this method of administering digitalis is without danger to the patient if the directions are followed in detail and if the safeguards are carefully observed. By its employment it is usually possible to produce maximal digitalis action in from twelve to eighteen hours, and marked therapeutic effects frequently appear within six hours after the initial dose. By its use it is possible to dispense with the intravenous or intramuscular administration of ouabain, amorphous strophanthin, or other digitalis body in the great majority of cases of heart failure.

412 West End Avenue.

TRANSFUSION OF "ANTIBACTERIAL BLOOD"; REPORT OF CASE *

GEORGE F. LITTLE, A.B., M.D., BROOKLYN

M. K., a girl, aged 11 years, whom I first saw, Nov. 3, 1918, in consultation with Dr. Paul E. Wesenberg, had been suddenly seized with epidemic influenza, October 28. In a few days there was evidence of pneumonia at both bases. November 3 there was well marked consolidation on the right side posteriorly. A similar condition soon showed on the left, and by the 7th the patient gave signs of massive consolidation of both lower lobes. The case seemed hopeless. Oxygen was used freely; the windows were kept wide open. Moderate doses of morphin, with large doses of atropin, were being tried out at one of the army camps, in cases of massive influenzal pneumonia. The patient was given $\frac{1}{24}$ grain of morphin sulphate and $\frac{1}{50}$ grain of atropin sulphate every four hours for a day, and every six hours the second day. Morphin was then discontinued and atropin reduced to $\frac{1}{100}$ grain at four hour intervals, replaced after a day or two by 4 minims of tincture of strophanthus. Three grains of caffein sodiobenzoate were administered midway between the doses of atropin and strophanthus. Three grains of camphor in oil, and 5 minims of a 1:1,000 solution of epinephrin were employed hypodermically, as conditions warranted. Eliminative measures were freely used.

After a few days of treatment, the lung consolidation lessened and the child slowly improved. At the end of two weeks, râles at both bases were the only finding. In the meantime, however, there were other complications: an acute laryngitis; a dry pleurisy of the upper right chest, and a suppurative glossitis. November 12, swellings were noted on the back, right thigh and both ankles. The right ankle was incised on this date by Dr. Wesenberg, and pus was found. A blood culture was ordered, and mixed influenza serobacterin was administered for several consecutive days, without noticeable benefit. Dr. Horace Greeley reported the culture as showing a staphylococcus and a bacillus, the latter not identified. On account of the patient's extreme weakness, he doubted reaction to an autogenous vaccine, and suggested transfusion of blood from a donor whom the vaccine might cause to react.

An incision in the left popliteal space, November 15, revealed a quantity of pus. On the 17th, an abscess in the lumbar region was opened. A first injection of autogenous vaccine was given on this day. Two days later, incisions showing pus were made in the right side of the chest, left arm, left forearm and right hip. A considerable quantity of mucus in the stools gave evidence of an enteritis. November 20. Dr. Max Bender tested the blood of seven family

* Read in part before The Brooklyn Pediatric Society, Dec. 18, 1918.

donors with that of the patient. In only one case was there no agglutination. On the following day Dr. George I. Miller made an attempt at transfusion. The donor had no visible veins at the bend of either elbow, and dissection brought to light veins of infantile size, capable of no flow of blood. Two days later the patient's left ear drum perforated.

Professional donors were tested and one found whose blood was available for the child. Three hundred c.c. were passed from vein to vein, November 23, by Dr. Miller and Dr. Benjamin E. Wolfort. Five-tenths c.c. of the patient's vaccine was then injected in each arm of the donor, with marked reaction.

At this stage of the case, the bronchopneumonia was of low grade, with some râles at the bases, apparently needing only increased resistance for clearance. The septicopyemia, however, was overwhelming, and the prognosis indicated a fatal outcome.

From the transfusion there was a slight general betterment. Both eyes, however, became infected. November 25, 400 c.c. of blood were transferred. The patient became cyanotic at the close of the operation, and in the following twenty-four hours the pulse was of poor quality, with a tendency to cardiac collapse. Possibly a little too much blood was passed. During the following week the temperature continued of septic type; the right ear drum perforated, and abscesses were reopened on the back and left arm.

December 3, 340 c.c. of blood were transfused, the donor having received 1 c.c. of vaccine in each arm four days previously. The child took the donation well, with apparent improvement in the general condition, but the temperature showed diurnal variation from 100 to 103 F. Incision, by Dr. Wesenberg, in the left popliteal space, December 5, brought pus in quantity. Drs. Miller and Wolfort again transfused, December 8, giving to the patient 390 c.c. of "antibacterial blood" from the donor, who had been "primed," as on the last occasion. There was difficulty in locating a receptive vein, the internal saphenous finally being utilized, after delicate dissection. Local anesthesia sufficed, as in previous transfers. Owing to prolonged procedures, apparently, the heart developed a condition requiring most active stimulation, and creating anxiety as to future interference. Cardiac weakness had been more or less a feature in the septic involvement. On the same date, the right ankle required incision.

Following this transfusion, the marked septic temperature curve disappeared, the râles at the bases cleared, and the patient took nourishment well and gained daily in flesh and strength. For months, however, while not in danger as to life, she was entirely disabled by continuance of local infections. Dr. Wesenberg incised at intervals—the right leg above the ankle, the right ankle again, the lower spinal region, the right side, the right ankle still again, and the left hip. January 2, and on several subsequent occasions, roentgenograms of the infected joints were taken by Drs. Eastman and Bayles. At the indication of the plates, Dr. Wesenberg, assisted by Drs. Edwin B. Wilson and Richard M. Mills, operated under general anesthesia, January 4. The right hip joint was opened; the head of the femur, displaced upward, was brought down, and the leg straightened and put in Buck's extension. The opening into the left knee joint permitted removal of dead bone. This leg was straightened and similarly extended.

Rib resection was called for, January 30, through development of an abscess of the lung. This apparently cleared up in a few weeks, but filled again and required reopening, February 28. Further operative measures became necessary, February 19, as roentgenograms revealed considerable destruction of the surgical neck and articular surface of the left femur. This hip had been opened and drained, February 3. The incision was enlarged by being carried transversely toward the rectum. Right hip drainage had ceased and the wound had closed: the presence of pus was apparent in the plates, indicating reincision. Lieut.-Col. Edwin H. Fiske, M. R. C., saw the patient in consultation, March 10. He did not advocate further operative interference. There was no additional development of localized infection. The

affected joints were slow in clearing up—the last to heal, the left knee, ceasing to drain in July. Limitation of motion was naturally expected, loss of function of the left hip being especially feared.

The outcome of the case, as shown in the present condition of the patient, is better than expected and reflects credit on the surgery. There is good motion in both hip joints. The right leg is shortened $1\frac{3}{4}$ inches; this is partly compensated for by a 1-inch shortening of the left leg; a thick shoe sole completes the balance. There is a right talipes equinus, probably capable of correction by tenotomy. A slight interference with the left knee flexion may be overcome.

COMMENT

The possible effect of several more transfusions on the local processes would have been of interest. It was not feasible, however, to go further.

"Antibacterial blood" seems worthy of trial in any severe general infection, other measures having failed of control.

CONCLUSIONS

Those in professional attendance certainly reached the conclusion that life was saved by the transfusions.

Possibly blood, without attempted action on it, might have accomplished the result. It is rational to conclude, however, that the patient's vaccine, injected into the donor, produced antibodies in his blood which were of specific value to the patient in overcoming her septicopyemia.

469 Clinton Avenue.

HITHERTO UNDESCRIBED SIGN IN DIAGNOSIS OF LETHARGIC ENCEPHALITIS

THOMAS F. REILLY, M.D., NEW YORK

While there is no great difficulty in arriving at a diagnosis in the cases of encephalitis presenting a history of double vision, ptosis and other cranial nerve phenomena, a not inconsiderable number of patients are encountered in hospital practice who are brought in unconscious or delirious, and from whom no such history is obtainable. In such instances the patient presents a picture closely simulating that of one in the third week of typhoid fever. There are no focal symptoms pointing to a local central lesion. The leukopenia, so frequently present, is also strongly suggestive of typhoid fever.

In children the picture is almost identical with tuberculous meningitis. I have noticed in the majority of cases of encephalitis a sign that is very startling when recognized. It consists of a rhythmic convulsive twitching of the muscles of the abdomen in the neighborhood of the eighth and ninth ribs. It often simulates the muscular movement of hiccup, except that it is onesided. In two cases it involved the trapezius. Even in the conscious patient, it is beyond voluntary control. It has been present in the mild as well as in the severe cases, although in two patients it was not elicited when I observed them.

The term "lethargic" is unfortunate, as many of the patients having encephalitis are never lethargic; on the contrary, they are frequently delirious and often have choreiform movements of the limbs.

In some cases there are almost no cerebral symptoms, not even the ordinary placidity; in others a curious fear and apprehension may be evident, and again the patient presents only the painful sensations of an ordinary neuritis confined to certain peripheral nerve tracts, the central origin of which is evident by reason of its rapid transference to other regions of the border.

Often in these doubtful cases the convulsive twitching mentioned above is the only symptom that may serve to suggest that the patient is suffering from encephalitis.

It may be too early to regard this symptom as of absolute diagnostic value; but it has been present so frequently in the cases that I have observed that I am certain that it is at least a strongly suggestive sign.

34 West Eighty-Eighth Street.