

stain and other similar stains wherein a neutral dye (azure-blue) is produced, but this is of no value to the physician and is apt to be confused by the less experienced with the granules in the cytoplasm.

It is easy to test the purity of the methyl alcohol in regard to water contents. It should be at least 99 per cent. pure. Such a sample shaken up with about a gram of powdered anhydric copper sulphate in a test-tube and allowed to stand for four hours should show no blue color to the solution and only a bare trace of green in the copper sulphate sediment in the bottom of the test-tube at the end of that time. A more accurate test is to shake equal parts of the alcohol and benzol together when any turbidity of the resulting solution proclaims the presence of water. In case of failure with either of the stains it is usually best to test the alcohol first, as I have more often found this at fault than the dyes themselves. One peculiarity that may be noted is that if an absolute methyl alcohol can not be obtained, but one which is at least 95 per cent., the alcohol-soluble eosin (Grübler) will often make a very satisfactory stain where the water-soluble eosin fails.

It will be noted from the method given above that a little of the eosin is conveyed by the cover-slip each time into the methylene-blue solution. This is no detriment, and is, in fact, I believe, one of the reasons why the latter solution improves "with age." I have had no success, however, with direct admixture of the two dyes either in equal proportions or various proportions. It is to be noted that this is the scheme of the Jenner stain except that the addition of distilled water is made and a new dye substance (neutral dye) is really formed.

In my experience the presence of water in either of the staining solutions accounts for the uncertainty of the stains at various times, their tendency to deteriorate, and for the failure to bring out the nuclei, especially of the large mononuclear forms, and to stain the granules in the myelocytes. Stains made up at various times will vary somewhat in the intensity of their reactions, but the propensities of any given sample are quickly learned, and as the dye is used over and over again the original 100 c.c. solution will last many months if not years. On account of the supersaturation all that is necessary when the dye gets down near the bottom of the bottle is to render more of it soluble by the addition of methyl alcohol. I have some stain at hand which is over four years old and will stain thoroughly in ten seconds. It will not overstain if left several hours.

SUMMARY

1. The stain for blood smears here advocated for busy physicians is a modified Jenner-Romanowski (polychrome eosin-methylene-blue), commonly called Skelton's stain.

2. This stain consists of only three ingredients (methyl alcohol, eosin and methylene blue) and is made up by the physician himself in ten minutes' time.

3. The following directions embody the secret of success with the Skelton stain: 1. Keep the two dye solutions separate. 2. Stain away from the air. 3. Use pure methyl alcohol and keep the stains uncontaminated with water.

4. Advantages of the stain and method are: 1. Rapidity—one to three minutes for the entire process. 2. Simplicity—no special technic, no guess work, no "eye on the watch." 3. Impossibility of overstaining. 4. Polychrome staining—acidophilic, basophilic and neutrophilic properties brilliantly contrasted as well as

pathologic discolorations. 5. Red cells stained in direct proportion to amount of hemoglobin carried—a Tallqvist scale on a microscopic principle. 6. Staining of the blood plates. 7. The ideal parasite and bacterial stain for blood smears. 8. Improvement with age; the stain never deteriorates. 9. Inexpensiveness—the same stain is used repeatedly—one to two dollars will buy enough of the ingredients for a lifetime practice.

5. Indication for blood smears: fever or pallor.

6. The physician is urged to make a blood smear (preferably cover-slip) at least in every case where indicated, whether other blood determinations are made or not; for (1) some idea of the number of erythrocytes and the percentage of hemoglobin (in ordinary anemias) can be readily attained; (2) the color index and the leucocyte count can be estimated well within clinical limits; (3) the differential leucocyte count, poikilocytosis, parasites, etc., in other words, the true pathologic picture can be obtained in no other manner; and (4) a permanent record of all these findings is gained which has been easily obtained, and an indication and stimulation for more blood work where necessary.

A CASE OF TETANY TREATED BY CALCIUM SALTS

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In a recent issue of *THE JOURNAL*¹ attention was editorially called to the relation between calcium metabolism and tetany, and reference was made to a paper by MacCallum and Voegtlin² on the subject. In a preliminary report by these authors, appearing last year,³ I was first made aware of the importance of calcium in tetany, and was prepared to apply clinically the experimental principles evolved by these writers should the occasion arise. Such an opportunity has presented itself, and the purpose of this article is to put on record clinical observations which may be of interest and importance.

I have no intention of venturing on an elaborate discussion of the whole question of tetany in a paper primarily simply a case report; but a brief preliminary summary of the work referred to above is necessary, in order to make evident the bearing of the findings in this case. Tetany is a condition which has been observed to arise in connection with a number of disorders. It may be associated with gastrointestinal disturbances, particularly gastric dilatation, with lactation, with acute infections, and after thyroidectomy. It is characterized by intermittent tonic contractions of the voluntary muscles, which in severe cases may be associated with great disturbances of respiration and a comatose mental state. The most typical contractions are those occurring in the hands and arms, the fingers being firmly pressed together, stiffly extended at the interphalangeal joints, but flexed on the hand at the metacarpal-phalangeal articulations. The thumb is opposed tightly against the palm and the hand flexed on the wrist. This posture has been termed the "obstetric" hand, as the position is much like that assumed in manual dilatation of the cervix. Without detailed dis-

1. *THE JOURNAL A. M. A.*, Jan. 30, 1909, III, 388.

2. *Jour. Exper. Med.*, 1909, xi, 118.

3. *Johns Hopkins Hosp. Bull.*, 1908, xix, No. 204, p. 91.

discussion of the theories as to the etiology and pathology of the disease, the facts to which I wish to call attention are the following:

The cases of tetany following thyroid operations have been satisfactorily shown to be due to destruction of the parathyroids. In animals experimentally deprived of the parathyroid glandules tetany develops. In studying the metabolism of such cases MacCallum and Voegtlin discovered that there was a profound disturbance of calcium relation, and that the animals lost this element rapidly by excretion, the calcium contents of the blood and tissues being much reduced. The animals improved on an increase in the ingestion of calcium salts. From these data the two authors referred to have postulated certain hypotheses. They suppose that the internal secretion of the parathyroid presides over calcium metabolism in some manner, and that when this secretion becomes deranged there is a consequent disturbance in the use of calcium by the tissues. The removal of the glands obviously precipitates such derangement. But it may also arise in consequence of the changes associated with lactation, the puerperium, gastric dilatation, etc. This, in brief, is the central idea presented. It has been elaborated considerably by theories as to how the disorder of the parathyroid may occur in various clinical cases, and as to the specific functions of calcium salts, but the elementary conception is as just described.

With this outline of the relation between calcium and tetany, I will proceed with the following case report:

History.—The patient was a white girl, aged 8. She was sent to the University of Virginia Hospital by Dr. F. L. Thurman, of Keswick, Virginia; was admitted Sept. 8, 1908, at about 11 a. m. Her family history was unimportant. For some months the patient was subject to frequent attacks of abdominal pain, most intense in the epigastrium. There was loss of appetite, but no definite nausea and no vomiting. These attacks were relieved by various home remedies. The child was otherwise healthy.

Present Illness.—The patient went to bed the night before admission apparently well. There was no history of indiscretion in diet. In the morning, on arising, she complained of one of the attacks of abdominal pain noted above, and was given a small drink of whisky and put to bed. About an hour afterward the mother's attention was called to the child by hearing her groan. She was found comatose, and seized by one of the convulsive attacks to be described later. Her physician was called, who sent her immediately to the hospital, the patient arriving less than five hours after the onset of the trouble. During this interval she was in the condition now to be noted.

Examination.—The patient was well nourished, of good color, and general healthy appearance. A careful search failed to show any lesion that might have been portal of entry for tetanus. The child was semicomatose, failed to answer questions, and uttered no sound except an occasional groan. There was no fixed attitude of face or body. At intervals of from five to fifteen minutes, however, there was a convulsive seizure lasting several minutes, with marked rigidity of neck and jaw, and opisthotonos. The jaw was sometimes closed and sometimes open, but always rigid during attacks. When the jaw was open the tongue was forcibly protruded. During these seizures the patient groaned with pain, and became cyanosed and dyspneic. The most peculiar feature of these attacks was the behavior of the extremities. The arms were always rigid, sometimes extended, sometimes flexed at the elbows, but the hand and wrist always took the position known as the "obstetrical" hand. The feet were also forcibly extended. The eyes were held half-closed, and rolled far out on either side or upward or downward, but never with strabismus or nystagmus. The knee-jerks and

other reflexes were somewhat exaggerated but there was no clonus anywhere. Temperature was 101 degrees, pulse 135 per minute, the tongue coated, chest clear, the abdomen negative, except for some fulness. Trousseau's phenomenon of induced spasms of the hand by compression over nerves and vessels of the arm was doubtful. A partial contraction was produced, but not a complete reproduction of the typical position. Chvostek's nerve-tapping sign was negative. The child voided involuntarily in small amounts. Swallowing was impossible.

Treatment.—The patient was chloroformed during the convulsion and calcium treatment started at once. A subcutaneous infusion of normal salt solution to which 30 grains of calcium lactate had been added was given, and every four hours 10 grains of the same salt were administered in milk through a nasal tube.

Course of Disease.—The condition of the patient remained about as described for nearly twenty-four hours. At 1 a. m., September 9, convulsions became gradually less, and the last one occurred at 3 a. m. After this the patient fell into a stuporous sleep which lasted until about 7 p. m., the patient only arousing when the nasal feeding of milk and calcium lactate was given. During the evening of September 9, the patient was awake in a drowsy condition. At 1 a. m. of September 10 she responded to her name and spoke a few words for the first time. During September 10 she was apparently much better except for marked mental dulness, and that night she slept well. During this day she could swallow and talk, and the next day seemed practically well. She was discharged from the hospital September 12, 1908, the calcium being kept up to the last.

The report of our case affords no justification for drawing any general conclusions, but it presents several facts of interest. First, as to the diagnosis: Tetanus and hydrophobia can be excluded as possibilities by the history, symptoms and conclusion of the case. Strychnin poisoning, which was suggested by the onset closely following the drink of whisky, is excluded by the dull mental condition, lack of sensory stimulation, and absence of any ill effect following the drinking of the same whisky at approximately the same time by other people. The diagnosis between hysteria and tetany was more difficult. The absence of any previous hysterical condition, the temperature, pulse-rate and general appearance of the patient made against hysteria. On the other hand, the clinical picture was identical in every particular with that of a severe attack of tetany, excepting the equivocal Trousseau's sign and the absence of Chvostek's phenomenon. I did not determine the size of the stomach and so can not say whether it was dilated or not. The incontinence and tossing of the patient made the collection of urine impossible during the first part of the attack. When it was examined, during convalescence, it was found normal. The patient has been followed since her discharge and has remained entirely well. In the event of a second attack the doubtful points just noted will be again investigated.

In conclusion, while not drawing deductions by the formula "Post hoc, ergo propter hoc," the following facts are clear: A case of tetany of unusual severity and intensity cleared up in a remarkably short time, following treatment with calcium salts, and in the absence of any other treatment save chloroform for the actual convulsions. The case certainly seems to lend clinical support to the experimental work of MacCallum and Voegtlin.

Disseminated Telangiectasis of the Liver.—Hedrén concludes that the primary condition is a degeneration and disintegration of liver cells and the telangiectasis a secondary and purely mechanical sequence. The same condition occurs in cattle as in human beings.—*Hygica Festband.*