6-8 weeks from the onset of the attack, the T wave may lose its characteristic shape and approach the normal. From our experience in other cases of coronary artery occlusion, we know that the cove-plane T may persist for years. On the other hand, we have seen no example of long duration of the changes of the first stage, *i. e.*, marked elevation of the R-T transition. The general similarity of the successive changes in the four cases cannot be regarded as accidental. Therefore, it may be said that the early electrocardiographic changes associated with acute coronary artery occlusion are first seen in the R-T interval, and then in the T wave itself.

2920

Lactic acid of normal and pathological spinal fluids.

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In 1917 Levinson[1] observed that spinal fluids from cases of epidemic meningitis immediately after withdrawal had a subnormal pH. This was in some instances further decreased when the fluids were permitted to stand at room temperature unstoppered. However, normal and tuberculous meningitic fluids when freshly drawn showed similar figures for pH, and the pH increased on standing, particularly in the tuberculous fluids. Levinson believed that the lowering of the pH of the spinal fluid in meningococcus meningitis was due to the accumulation of lactic acid in the fluid, but he presented no data to substantiate this explanation.

In the present communication, data are presented for the sugar and lactic acid of the spinal fluid of normals, miscellaneous pathological conditions and meningitis. Clausen's method was employed for the determination of the lactic acid, and the Folin-Wu procedure for the sugar.

Specimens of spinal fluid obtained from five normal adults, after a night's fast and rest, showed lactic acid concentration from 8 to 15 mg. per 100 cc. In twenty-one miscellaneous non-menin-

[1] Levinson, A., *J. Infect. Dis.*, 1917, xxi, 556.

gitic cases the lactic acid varied from 9 to 26 mg. per 100 cc. Fluids obtained from two chronic nephritics after convulsions gave figures of 22 to 23 mg., and from two cases of *encephalitis lethargica* 26 and 23 mg. Clinical improvement in the instances of encephalitis was accompanied by a fall in the spinal fluid lactic acid to 18 and 17 mg. respectively. Meningismus associated with broncho-pneumonia in three children gave normal figures for the spinal fluid lactic acid.

Meningococcus meningitis in the seven patients studied presented figures for the spinal fluid lactic acid varying from 23 to 77 mg. per 100 cc. In all instances there was observed a decrease in the sugar, and in some no sugar was found. The amount of lactic acid produced did not account for all the sugar lost. Similar changes in the spinal fluid sugar and lactic acid were noted in influenza and pneumococcus meningitis. In one case the intraspinal administration of anti-meningococcus serum resulted in a continuous fall in the lactic acid from 30 to 7 mg. within 10 days time. This patient recovered. However, in another instance the lactic acid continuously rose from 37 to 77 mg. although the serum was given intraspinally within 3 days, and the patient died.

The lactic acid of ten tuberculous meningitic fluids varied from 11 to 33 mg. Figures exceeding 20 mg. were obtained in those subjects suffering from an active pulmonary or miliary tuberculosis with meningitis. The intraspinal administration of anti-meningococcus serum to cases of tuberculous meningitis produced an increase in the spinal fluid lactic acid which appeared to run parallel with the increase in the cells.

A comparison of sugar and lactic acid of the spinal fluid and of the whole, venous blood was made in two normals and thirteen pathological cases. The specimens were obtained during fasting and resting state and as nearly at the same time as possible. The lactic acid content of normal blood varies from 11 to 15 mg. per 100 cc. The sugar of the spinal fluid was found to be from 60 to 70 per cent of that of the blood, except in two cases of meningitis. Here the spinal fluids gave no reaction for sugar, although both specimens of blood showed a hyperglycemia. The lactic acid, however, in the spinal fluids had a concentration from 80 to 90 per cent of that of the blood. In two instances of epilepsy, specimens of blood and spinal fluid were obtained about 20 minutes after convulsions. The lactic acid of both the blood and spinal fluid was increased more than 100 per cent above that of

the control specimens from the same patient, and in these specimens taken after convulsion the concentration of the lactic acid in the spinal fluids was greater than that of the blood.

2921

The effects of repeated intravenous injections of India ink on the blood picture in rabbits.

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The following investigation was undertaken in order to study the effects of the repeated intravenous injection of India ink upon the blood picture in rabbits.

Higgins' waterproof India ink was used. It was filtered and suspended in physiological salt solution in the proportion of one part of ink to three parts of salt solution. The suspensions were sterilized before each injection. With few exceptions, ten cubic centimeters of the ink suspension were injected into the ear veins of the rabbits, at intervals of forty-eight hours. The number of injections varied between seventeen and fifty-six. The rabbits weighed between two and one-half and three kilos.

The following constituents of the blood were studied: erythrocytes, hemoglobin, leucocytes and reticulated cells. Examinations were made immediately preceding injections. Similar examinations were made on a series of normal control rabbits kept under the same conditions.

In all the rabbits, as a result of the injections, there was a gradual fall in the number of erythrocytes, which at the lowest levels was forty to fifty per cent of the original count. Following this drop, in spite of continued injections, there was a rise in the erythrocyte count which reached approximately normal values at about the twentieth injection.

Determinations of hemoglobin were made with the Newcomer apparatus, using daylight as the source of illumination. The values obtained with this apparatus are only relative, but they tended to follow the fluctuations in erythrocyte counts except in