

The specimen consists of a pancreas with a cystic tumour attached to it for some three inches of its length.

The cyst is rather thin-walled and the interior is smooth and free from outgrowth of any sort.

The pancreas appears to have been removed in its entirety, but at one end there is a cut surface which may be due to a small portion of it having been left behind.

The specimen having been sent for the Museum, no histological examination of the pancreas or cyst-wall was made.

Note:—Allen found in operative diabetes in animals that glycosuria does not result until seven-eighths of the pancreas is removed. The pathological report shows that the gland was not completely extirpated as claimed. We must, therefore, conclude that sufficient of the gland was left behind to prevent glycosuria, and that our conception of the relation of the pancreas carbohydrate metabolism is not on this account in need of revision.—[EDITOR, I. M. G.]

RELAPSING FEVER EPIDEMIC IN SEONI DISTRICT (CENTRAL PROVINCES), FEBRUARY TO MAY, 1920.

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THE epidemic broke out in the interior of the Seoni District about the middle of 1919 and gradually spread to the town in January, 1920. The first admission to the hospital was in the beginning of February. From February to April 34 cases were admitted into the hospital, and more than 200 cases were treated in the out-door dispensary. Almost the whole district was infected, and the mortality was very high. The Seoni Jail was also infected. The first arrival in the Main Hospital was a Muhammadan family of seven members—2 adult males, 2 adult females, and 3 boys.

The spirochæta was found in most of the cases. They could not be detected on the first day of the fever nor during intermission. I always stained the blood films with fuchsine and used a high power (17") objective. The oil immersion lens was rarely used. With fuchsine, for a few seconds only, the films were beautifully stained and the spirochætae looked prominent. In the beginning corkscrew-like spirals were seen, but later on in the fever the shape was very much contorted, and balls and masses were seen in large numbers. In the intermission I could not detect spirochætae in a single film, and seldom in relapses.

There was a certain amount of leucocytosis found amongst poor, ill-fed, and ill-nourished people with dirty clothes, and surroundings. Adults were more affected than children. Boys and girls were equally affected. Among

adults, the number of males preponderated. Muhammadans were more susceptible than Hindus. Very few cases were found amongst well-to-do people with clean habits.

Symptomatology.—Fever was almost always sudden, the temperature ranging from 102° to 104° in most cases, attended with slight chill and headache. The fever was continuous, and the symptoms attendant on it were thirst, anorexia, and dry skin, etc. In about 75 per cent. of cases headache was the most prominent symptom. It was frontal and boring in character. The prostration due to the headache was extreme, and the patients disliked opening their eyes. The pain all over the extremities and in the back was constant. I saw that many people in the out-door department had cauterized their forehead with a hot iron for the pain. It persisted all along with the fever. Aspirin, phenacetin and other anti-neuralgic drugs had absolutely no effect. The symptom next in prominence was pain and tenderness in the abdomen and lower thoracic region, especially the right side. In one case it was so severe that the patient could not breathe properly, and mustard plasters and other counter-irritants were useless. The right rectus muscle was almost always rigid, and the liver just palpable below the costal margin. The spleen was slightly enlarged. Slight jaundice was a very common symptom. The tongue was slightly coated, thirst inordinate, and the bowels constipated. In my series of cases vomiting was very rare and this alone helped me to diagnose my cases in the early stage from small-pox which broke out at the time in the town. Constipation was very common, and in some cases diarrhoea and dysentery were seen. In cases without specific treatment the temperature always came down by crisis on the eighth day with profuse perspiration, and, in ill-nourished patients, with collapse. I have seen the temperature coming down to 95°, and remaining like that for over 36 hours. I always used stimulants on the seventh day of fever as a routine procedure. With intermission all the symptoms disappeared and the patients fell into sound sleep. There was delirium in three cases, out of which one during the first attack, and two in relapses, recovered. The interval between the first attack and the first relapse was seven days. This was so constant that I could anticipate the date of the relapse. The first relapse lasted from four to five days, followed by an interval of three or four days, with a second relapse of three or four days. I did not see more than two relapses in any case. In three cases with specific treatment the fever re-appeared on the fourteenth, twentieth and twenty-ninth day. I am not sure whether these were cases of relapse or reinfection.

Epistaxis was a very common symptom. It was sometimes very severe and a repeated administration of ergotin citras, calcium salts, adrenaline solution, and the other hæmostatics

were used to check it. In two cases hæmostatics had absolutely no effect and the patients died eventually of hæmorrhage. Epistaxis started generally on the fourth or fifth day of fever, and in a few cases after the crisis. Two cases had hæmoptysis, but that was not severe and was checked easily. There was only one case of hæmaturia—in a chronic gonorrhœal patient. I did not see any bleeding under the skin. In one case the face was flushed on the second day along with slight congestion of the eyes, and as the blood examination was negative till the fourth day I mistook it to be a case of small-pox of which there was an epidemic at the same time. Dry cough and congestion of the base of the lungs were present in about 50 per cent. of the cases. For these complications, many cases were wrongly diagnosed as influenza, before we had recourse to the microscope. The sputum was examined in some cases, but no spirochæta were detected. In one case the lungs were full of râles and rhonchi, and after crisis he used to get a rise of temperature, but with ordinary expectorants he made a rapid recovery. Arthritis was a rare complication. In one case the right knee-joint was much swollen, and the patient was kept in bed for over a month. In a girl of 14 the wrist and knee-joints were so painful and tender on the second day of fever, with pain in the ribs, that it was diagnosed as a case of rheumatic fever before the blood was examined.

I never saw so much prostration in fever of seven days' duration in any other disease, including dengue or influenza. Strong men could not even stand up after an attack of fever of so short a duration.

Treatment.—As I had no novarsenobillon in stock when the epidemic broke out in the town, and thinking that as it is a spirochætal infection mercury and arsenic will have some effect, I tried remedies orally administered, without much influence on the course of the fever. For the out-door patients I prepared a stock mixture consisting of:—

Liq. Ammon. Acetas ..	1 dr.	} One dose four times a day for an adult.
Liq. Hydrag. Perchlor. ..	$\frac{1}{2}$ dr.	
Liq. Arsenicalis ..	4 mm.	
Ammon. Chlor. ..	10 grs.	
Aqua ad one oz.		

The mixture had no influence on the course of the fever, but pulled the patients through without so much anxiety and complications. I gave soamin in some cases without any benefit. My stock mixture was ordered by the Civil Surgeon to be distributed throughout the district, and was in great demand everywhere. So soon as I got the novarsenobillon I started with injections. I used the direct injection into the veins, as this does not cause any pain or panic amongst illiterate people, as they were already used to the plague inoculation in the arm. I had to give many intramuscular injections into

buttocks when the veins were not prominent, or the light was insufficient, or through fear of sepsis in the patient's house, or in case of children, who might move their arms. We used the ordinary plague syringe with a hypodermic needle attached to it. A dose of 0.3 gram of novarsenobillon was used in the case of adults, and proportionately reduced doses in children. With these doses, I had only one relapse out of 60 injections. We kept sufficient double distilled water in sterilized stoppered bottles for the purpose. The other articles required were one sterilized measure-glass and syringe with needle. About 10 c.c. of sterilized double distilled water was poured into the measure-glass and novarsenobillon added. As heat decomposes this drug, the water used should always be cool. A tight bandage or a tourniquet was put on the upper arm to make the vein at the bend of the elbow stand out. The part, after being scrubbed with soap and water, was swabbed with tincture iodine, and, when dry, was washed with boiled water or absolute alcohol to remove traces of iodine. The needle of the syringe was pushed into the vein in a slanting position and, when the venous blood was found oozing out through the needle, the nozzle of the syringe was fixed on the needle and the bandage removed. The injection of 10 c.c. of fluid takes about 8 to 10 minutes. No pressure should be applied on the piston, but by keeping the thumb steady on the thumb-piece of the syringe the piston would be felt moving down; when the whole quantity was in, pressure was applied in the part with the left thumb and the needle drawn out quickly, so that there was no leaking out of blood or solution into the subcutaneous tissues. The wound was closed with collodion, or tinctr. benzoin co. Patients were asked not to take any food for an hour before, and two hours after, the injection. The out-door patients were sent home in a few minutes in some conveyance. I did not notice any untoward effect, nor did any of my injected cases die. I observed from my Civil Surgeon's cases that the old, debilitated, delirious and bronchitis patients cannot stand the injections. I injected 26 cases intramuscularly in buttocks about four finger breadths below the crest of the ileum. In this region the injection is not so painful. In many cases a lump formed, which gradually resolved with massage after a few days. By whatever method, intravenous or intramuscular, the injection was given, there was a rise of temperature up to 104°F. or 105°F. in four to six hours, and then the temperature came down within 30 hours. I did not see a single case where the fever lasted more than 30 hours after the injection. I used to start with stimulants 24 hours after injections and continue for two days. In relapses injected a similar dose, and the temperature came down in a shorter period. In convalescence iron and arsenic, etc., were administered for some days.

The epidemic still continues, but, as I was transferred in the beginning of May, my work in connection with the epidemic ceased. On my arrival here I saw a few cases and showed some of them to my Civil Surgeon, Dr. Bhagwan Das, who kindly confirmed my diagnosis under microscope. I take this opportunity to thank Dr. W. G. Wince, Civil Surgeon, Seoni, under whom I worked during the epidemic, for his giving me every facility for the work and his kind advice.

HÆMOLYTIC TEST IN KALA-AZAR.

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CHRONIC MALARIA and kala-azar are so closely allied conditions that it is very difficult to differentiate them clinically. The only reliable way by which a definite diagnosis of kala-azar can be made is by the discovery of Leishman-Donovan bodies. As the parasites are so rarely found in the peripheral blood, one has to puncture the spleen or liver to find them in a smear of the pulp. As such a procedure always involves some risk, it should not be undertaken lightly, and as a routine examination it can only be possible in a well-regulated hospital where the preliminary preparation and the after-care of the patients can be rigidly enforced.

Without spleen puncture the general blood picture is in many cases a great help. The high grade of leucopœnia, and the increase of the small mononuclears, help in differentiating kala-azar cases from those of chronic malaria where parasites cannot be found.

Every clinical pathologist who has to deal with such patients will admit that, though in a certain percentage of cases a typical blood picture of kala-azar is obtained, there remains a great number where, from the general blood examination, it is almost impossible to give a definite opinion as to whether a particular case is one of kala-azar or chronic malaria.

Dr. U. N. Brahmachari, M.A., M.D., Ph.D., has suggested a new test—the globulin test—for the differentiation of malaria and kala-azar. I have tried his test in many cases, and it can safely be said that the test is really useful if it is done with proper care.

Another test which I wish to describe in this paper is simpler than that of Dr. Brahmachari, but I think equally satisfactory.

It has been found that red blood corpuscles of kala-azar cases do not undergo complete hæmolysis when mixed with water as red blood corpuscles from healthy subjects generally do. This fact was first noticed while estimating hæmoglobin in kala-azar cases. Ordinarily one does not find any difficulty in

matching the colour of the hæmolysed blood with that of the standard colour in Gower's hæmoglobinometer, provided the colour of the standard tube has not deteriorated, which is often the case, especially in tropical climates. With the blood of kala-azar it is almost impossible to match the colour accurately, because one always finds that the solution, instead of being red, clear and transparent, is turbid and opaque, with whitish flakes all through the fluid. The first thing that came to my mind was that the turbidity is due to Dr. Brahmachari's globulin; but on examining the sediment under the microscope it was found that it mainly consists of "shadow corpuscles," and hence it is obvious that the turbidity is mainly due to incomplete hæmolysis of the red blood corpuscles.

This incomplete hæmolysis may be due to changes in the corpuscular spongioplasm or the different constituents of the serum, especially its salts and protein constituents. From the preliminary experiments which have been carried out, I believe that it is in the serum rather than in the corpuscular spongioplasm that we shall have to look for the cause of the incomplete hæmolysis. If erythrocytes obtained from kala-azar be centrifugalised and washed in the serum of healthy blood, they undergo complete hæmolysis on the addition of water, whereas healthy corpuscles in kala-azar serum do not do so.

These questions can only be properly discussed when the full chemistry of kala-azar blood has been studied. As the work is in progress and not yet complete, I hope to give the details of the experiments in a future paper.

Technique of the test.—The blood is taken in the same way as for the estimation of hæmoglobin by Gower's hæmoglobinometer, and mixed with distilled water. There is no hard and fast rule about the relative proportion of blood and water,—two drops of blood in 20 drops of distilled water seems to be quite satisfactory. Instead of a clear, transparent solution the blood of kala-azar will show itself by its turbidity. On keeping the solution for some time a white flocculent precipitate will appear all through the fluid, which on further keeping forms a marked deposit. The test is so simple that it can be done by the busy physician himself at the bed-side. A test-tube of small calibre, a capillary pipette and a little distilled water is all that is required.

Reliability of the test.—For the diagnosis of kala-azar the test is quite reliable. My series includes 55 cases of kala-azar where L. D. bodies were found by spleen puncture, and in all these cases the "hæmolytic test" was positive, whereas in other cases, *e.g.*, chronic malaria, splenomedullary or lymphatic leukæmia, it has always been found to be negative. In two cases where I was fortunate enough to