The natural process of repair in cases of damage to the mucous membrane of the stomach is really very remarkable. We have only to reflect upon the successes following the different kinds of suturing adopted by skillful surgeons, which, if applied to the skin, would lead to some risk, and certainly to ugly scars. An example of the extreme limit of Nature's energy for repair of gastric mucous membrane appeared in a paper published in the *BRITISH MEDICAL JOURNAL* of July 13th, 1907, by myself, in which I recorded two cases of perforative peritonitis in patients *in extremis*, upon whom nothing was done except to mop out stomach contents from the general peritoneal cavity and drainage of the abdomen.

Excision of a gastric ulcer is very risky in cases in which the serous membrane has been previously damaged through extension of inflammation from within the stomach.

I believe that this method of treatment will replace that of excision of the middle portions of the stomach which is now so frequently employed, because gastro-enterostomy has proved to be a disappointing operation in ulcers of this area; it is less risky and easier of performance.

The method described above appears to me to be new, for I had the privilege, when on a visit to my friend Sir Berkeley Moynihan last year, to obtain the views of himself and Dr. William Mayo, two of the greatest living authorities on the subject of surgical procedures in gastric surgery.

CHOLECYSTOTOMY IN LIEU OF CHOLECYSTOSTOMY IN CERTAIN CASES OF CHOLELITHIASIS.

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THE employment of cholecystostomy, and more recently cholecystectomy, in the treatment of gall stones has, I venture to think, somewhat overshadowed the simpler operation of cholecystotomy. There are not a few cases in which this operation might with greater advantage be adopted.

Each of the three operations has its own peculiar sphere of application. When the gall bladder itself is so affected that it is functionally useless, and when its retention might prove a source of subsequent trouble, there can be no doubt regarding the advisability of total extirpation. Equally, when drainage of the bile for a time may prove of advantage in secondary pancreatic involvements, the gall bladder should be retained and utilized as a temporary fistula by the performance of cholecystostomy. This same operation is also advisable when there is reason to believe, from their number and small size, that some of the stones may have escaped removal at the first attempt to extract them. Experience teaches in many of these cases that small stones are liable to be retained in the hepatic duct, and only after a few days find their way again into the gall bladder and escape through the temporarily constructed fistula.

There are, however, cases occasionally encountered in which, from the absence of symptoms suggestive of common duct or pancreatic complications, and from the size and shape of the stones, cholecystotomy might quite properly be performed.

The advantages of cholecystotomy lie in the short time the operation takes to perform and the restoration of the gall bladder to its normal condition both anatomically and physiologically. The indications for the performance of cholecystotomy in any particular case may be briefly summed up as follows:

1. *Prior to Operation.*—The symptoms are those of repeated attacks of biliary colic, the pain being located mostly in the gall bladder region with possibly referred manifestations in the back and shoulder; gastric disturbances may be present, such as flatulence, pain, or a sense of heaviness after food, sickness or vomiting, anorexia. Usually there is neither fever nor jaundice; some tenderness may exist on pressure over the gall bladder. The more certain indications, however, are those which are revealed at the operation.

2. *At the Operation.*—The gall bladder is not tensely distended, and when tapped contains practically normal

bile with loose floating stones. The stones are comparatively large, too large for transit through the natural passages. There is absence of inflammatory adhesions, so that the gall bladder is quite free but for its hepatic attachment. In some instances a "flexible gall-stone probe" can be passed through the cystic duct into the hepatic; whether this can be accomplished or not, the permeability of the duct is an essential to the operation; this, however, is sufficiently proved by the comparative flaccidity of the gall bladder prior to its being opened.

As regards the operation, after the removal of the stones, the opening in the gall bladder is surrounded by a purse-string suture, the stitch embracing in its passage about two-thirds of the thickness of the visceral parietes. When this suture is tightened and tied it invaginates the opening and renders impossible any escape of bile. The gall bladder is dropped into the peritoneal cavity, and the parietal wound completely closed.

Within the last six months 15 operations have been performed for gall stones; 7 were colectomies, 5 cholecystostomies, and 3 cholecystotomies—that is to say, 20 per cent. of the cases were considered suitable for the simpler operation of cholecystotomy.

THE URINARY DIASTASE TEST AND LOEWI'S REACTION IN PANCREATIC LESIONS.*

BY
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CASES of pancreatic disease are admittedly difficult of diagnosis. In the more acute forms the clinical signs and symptoms often simulate those of other abdominal emergencies, and in the chronic affections the symptoms are common to other diseases, and may be wrongly interpreted. Among the more recent laboratory tests which have been introduced for the diagnosis of pancreatic disease, the quantitative estimation of diastase in the urine and Loewi's mydriasis reaction are easily and promptly carried out, and the question of their value in diagnosis can only be solved by trial in a number of cases.

The urinary diastase test does not appear hitherto to have received sufficient attention. In a paper on amylolytic ferments in the urine,¹ Dudley Corbett, following Wohlgemuth's work, describes fully the technique for making this estimation. He finds that the amount of starch-reducing ferment passed in the twenty-four hours is fairly constant, the *d* value or index being 10 to 20 units, each unit representing 1 c.cm. of 0.1 per cent. starch solution converted into dextrine in half an hour by 1 c.cm. of urine. The values found in the urine are not affected by ordinary changes of diet in adults, by the reaction of the urine, the presence of bacteria or other abnormal constituents except blood, the ferment being also present in normal blood serum; in fact, provided the kidneys are healthy, the index value of any given twenty-four hours' specimen of normal urine keeps so closely within certain limits, that for clinical purposes no greater accuracy is required. In a variety of cases of disease examined by him, high readings were found in all cases of undoubted pancreatic disease, and also in certain acute infective conditions without pronounced renal damage, and in some forms of eclampsia.

Loewi's test is now well known; a few drops of adrenalin chloride solution of $\frac{1}{1000}$ strength are instilled into the eye, previously examined to ascertain that the cornea is intact; if dilatation of the pupil takes place within an hour the test is positive. In cases of pancreatic inefficiency, and occasionally in Graves's disease, the test is positive. Beyond the fact that in these cases there is increased susceptibility of the sympathetic to stimulation by the adrenalin, there is no known explanation of the reaction.

The two following cases are worth recording, inasmuch as the laboratory tests just mentioned were very helpful in arriving at a diagnosis.

* Communication made at the meeting of the Association of Physicians of Great Britain and Ireland, held in Cambridge, March 20th, 21st, 1914.

CASE I.—*Pancreatic Cyst.*

A labourer, aged 47, was admitted into Addenbrooke's Hospital on December 24th, 1913, with severe haemorrhage from the stomach and bowels; he was very collapsed, and was unable to keep anything down. On examining his abdomen there was no general distension, but a swelling was present in the epigastrium of the shape and size of a dilated stomach. The swelling was tender, and waves of peristalsis could be seen passing over it from left to right; after vomiting, the swelling diminished considerably in size. The pulse was very feeble and the temperature was subnormal. The urine was acid, and contained a distinct trace of albumin, but did not reduce Fehling's solution.

The history of the case was that in the previous September, four months before admission to the hospital, he had received a severe kick in the abdomen from a horse; he vomited soon after, and was obliged to keep his bed for a week. After this he suffered from indigestion and got much thinner, but was able to do light work. Three weeks before he came to the hospital he had suffered from constant sickness, the vomit containing much blood.

From the history and clinical symptoms the supposition was that he had received a kick on a full stomach, and that subsequent to the injury ulceration of the stomach or duodenum had taken place. He was placed on saline injections in the hope that he might recover sufficiently to undergo an exploratory laparotomy. The haematemesis and melaena, however, continued; he could retain nothing in the stomach except a little whey, and he had constant diarrhoea of thin, greenish fluid. It was noted that, after vomiting, the whole of the swelling in the epigastrium did not disappear, but a tender soft mass, dull to percussion, was left.

The diagnosis was revised, and in view of the possibility of a pancreatic lesion a twenty-four hours' specimen of the urine was sent to Mr. S. W. Cole at the physiological laboratory, to be examined for diastase. It was found to give a high diastase index of 50 units; also a trace of sugar was found by Benedict's method. Loewi's reaction was also tried, and marked dilatation of the pupil was produced in a short time by two drops of 1 in 1,000 adrenalin solution. Taking into account the clinical conditions associated with these tests, the diagnosis of a pancreatic lesion was rendered highly probable. The patient, unfortunately, never rallied sufficiently for an operation to be performed, and he died soon afterwards.

The post-mortem examination showed, on opening the abdomen, a distended stomach, and immediately behind and closely adherent to it was another sac with thick walls containing fluid. There were abundant submucous haemorrhages at the cardiac end of the stomach, and a few patches of fat necrosis in the mesentery. The sac, which was a pancreatic cyst, was closely adherent to the posterior wall of the stomach, and of about the same size; it contained over a quart of thin fluid rich in ferment, which gave a diastase index of 6,600 units. On the posterior wall of the sac, at either end, were the remains of a thin layer of pancreatic tissue. The other organs were healthy.

The pancreatic duct towards the duodenum was compressed between the stomach and the distended cyst, but the greater part of it was incorporated in the cyst wall and could not be identified.

CASE II.—*Probable Pancreatic Infection.*

A woman, aged 55, was admitted into Addenbrooke's Hospital on September 20th, 1913. The history was not very reliable, but she had had jaundice on several occasions during the last two or three years; she had had no attacks of pain, but some indigestion and loss of flesh. Her teeth and gums were foul, and there was some pyorrhoea. The skin was yellowish, and there was a tendency to pigmentation. The liver dullness was as high as the fourth rib in the nipple line, but could not be distinctly felt below the costal margin and the gall bladder was not palpable. There was no ascites. The urine contained some bile, a trace of albumin, no sugar; the stools were normal in colour.

During the next two months she lost considerably in weight, the jaundice was intermittent in intensity, the stools sometimes light in colour, at other times normal, and the urine nearly free from bile; she had no attacks of pain. There was an intermittent pyrexia of moderate degree. Early in November the urine began to contain small quantities (about 1 to 2 per cent.) of glucose, no diacetic acid or acetone; for the next few weeks there was a condition of intermittent jaundice and intermittent glycosuria, the urine on a few occasions being free from either. On two occasions a twenty-four hours' specimen of the urine examined for diastase gave an index of 40 to 45. Loewi's adrenalin test was positive in less than half an hour. The stools contained much fat, and a Cammidge reaction was negative on one occasion.

The differential diagnosis lay between malignant disease of the pancreas and chronic pancreatitis due either to a gall stone or to infection of the ducts from oral sepsis, the latter being the more probable. The patient declined any operation, and was treated with urotropin and pancreatin. The amount of sugar in the urine steadily increased up to 6 and 7 per cent. in spite of a diabetic diet. However she gained 6 lb. in weight, the temperature became normal and steady, and she went home feeling considerably better.

In both these cases the urinary diastase index was distinctly high, though not so high as in some recorded

cases of pancreatic disease, but taken in conjunction with the positive Loewi's test and the clinical history, pointed strongly to the diagnosis of a pancreatic lesion. There may be more causes than one of an increase in the diastase ferment in the urine, but it is probably due to some degree of obstruction in the course of the pancreatic ducts which causes reabsorption into the blood stream. This may take place in pancreatitis, cysts, or growths of the pancreas; but each case must be judged by due consideration of all the surrounding circumstances, and with our present knowledge it would not be safe to place too much reliance on a single test.

REFERENCE.

¹ *Quarterly Journal of Medicine*, April, 1913, p. 351.

ACIDOSIS TERMINATING CHRONIC
MYOCARDIAL DISEASE.

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THE two cases recorded here displayed certain features in common which can scarcely be explained away as an example of mere coincidence. Both patients were elderly men with chronic myocardial degeneration, and in both the last phase was characterized by symptoms suggestive of acid intoxication.

CASE I.

A dairyman, aged 62, was admitted to the Bristol General Hospital on August 4th, 1913, to Dr. Parker's beds, when I was in temporary charge. He had been ill five weeks with dyspnoea and swelling of the legs, the onset of which is attributed to getting wet through at work. Four weeks before admission the dyspnoea became so bad that he had to give up work, and at the same time the other symptoms became troublesome. He had felt a little pain over the left hypochondrium. The dyspnoea was very severe at the time of admission, and came on in paroxysms, during which he sweated profusely. In his previous history there was nothing of importance.

On admission he was found to be cyanosed and very dyspnoeic. The heart was dilated to the left and feeble in action, and a gallop rhythm was heard at the apex. The chest was emphysematous in shape, and some expiratory rhonchi were heard. The belly contained free fluid, and the legs were very oedematous. The blood pressure was 120 mm. Hg (systolic); the pulse beat at 80-100 per minute regularly, and very feebly. The pupils were equal and contracted; the knee-jerks were not obtainable. The breathing was definitely of the Cheyne-Stokes type, most violent respiratory excursions alternating with periods of complete apnoea.

Three days after admission the characteristic ethereal smell of acetone was noted in his breath, and he complained of thirst, asking continually for hot water. The urine contained neither sugar nor albumin; but two days later it gave a faint positive reaction with the ferric chloride test for β -hydroxy acids, and a day after this a trace of acetone was found also. At times he was delirious; his tongue became dry and furred, and the sweet smell persisted. The conjunctivae became yellow, the legs became more oedematous, and the general condition passed from bad to worse, till he died on August 15th. The bowels were opened daily without medicine while he was in hospital, and the average daily output of urine was over 30 oz. The percentage of urea was not ascertained. Of the various drugs given none made any difference; large doses of alkalis by the mouth had no effect.

CASE II.

A warehouseman, aged 60, came to my out-patient department on November 13th, 1913. He was so ill that he was admitted at once to the wards. His replies to questions were vague, and he could not even remember the word "warehouseman" when asked about his occupation. His history, gathered mainly from relatives, showed that for three or four weeks he had been short of breath and oedematous. A cough had been noticed during the same period. Cyanosis had been present for a week. He had been in hospital for lead poisoning over a dozen years previously, and also for cardiac symptoms in 1907. There was no history of rheumatism or syphilis, but his friends said he had been a heavy drinker.

He was cyanosed about the nose and ears and fingers; he gasped for breath, but was not orthopnoeic, and his respiratory movements showed a rhythmicity or grouping qualifying them for the title of Cheyne-Stokes breathing, except that the apnoeic pauses were rarely complete. The pulse was 110 and regular, except for periods of alternating extra-systoles; the systolic pressure was 175 mm. Hg. The ventricular impulse was feeble and diffused, the only visible cardiac pulsation being in the epigastrium. There was occasionally a *bruit de galop*, and the first sound, which was feeble, was followed by a systolic murmur at all areas. At the bases of the lungs crepitant râles were heard. The legs and abdomen were anasarctous, and the peritoneum contained some fluid. Two days after admission a very distinct acetone smell was noticed in the breath; the