THE DIAGNOSIS AND TREATMENT OF CHRONIC ULCER OF THE STOMACH AND DUODENUM.*

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NOTWITHSTANDING the number and excellence of the articles that have been written on this subject during the last few years, it does not seem that the profession as a whole has realized the practical importance of these affections, nor has it acquired the knowledge regarding them like that which it has attained, for example, in the diagnosis of lesions of the vermiform appendix. The difficulties are undoubtedly greater; when the appendix is diseased, it is always appendicitis in one form or another; when, on the other hand, there is a chronic affection of the stomach, there is a much wider field for mistakes, and a greater refinement of diagnosis is called for.

My contribution to the subject is the report of a consecutive series of 50 cases in which a chronic ulcer of the stomach or duodenum was not only diagnosed by clinical methods, but was demonstrated to those present at the operation undertaken for its relief. I may be said, therefore, to be speaking of facts and not of inferences.

The Site of the Ulcer.

The ulcer was situated in the pyloric ring or antrum in 16 (32 per cent.), on the lesser curvature in 12 (24 per cent.), and in the first part of the duodenum in 17 (34 per cent.). In the remaining 5 cases (10 per cent.) there was more than one ulcer, one of these being situated in the duodenum in all of them. This gives a total of 22 ulcers in the duodenum and 28 in the stomach. Bearing in mind that the so-called anterior wall of the pylorus and duodenum is really the right lateral wall, and that with which the acid contents of the stomach are first brought into contact, it is very striking that it is almost invariably the seat of the ulcer. It is true that ulcers on the posterior wall are more likely to escape recognition by the surgeon, because he is unwilling to extend or prolong the preliminary manipulations, but I am confident that the true proportion of anterior ulcers would be something like 95 per cent. When the ulcer is diffuse or affects both walls, the evidence goes to show that the disease commenced in the anterior wall. Ulcers of the lesser curvature specially tend to affect both walls, acquiring the saddle-shape first described by Mayo.

Sex.

There were 30 males (60 per cent.) and 20 females (40 per cent.). Ulcers affecting the stomach alone were equally divided between the sexes; the duodenal ulcers were distributed in the proportion of 18 males to 4 females.

Age.

The range was from 21 to 67 years, the average being 41; the age of the duodenal cases ranged from 25 to 67 years, with an average of 43. If the ages are corrected according to when the symptoms first appeared, the average age for the onset of gastric ulcer is 32 and for duodenal ulcer 38.

Duration and Remission of Symptoms.

The duration of the ulcer cannot always be determined with certainty, as in many cases there is an indefinite period of what is called ill health with indigestion before the onset of symptoms which may be regarded as due to ulcer. In the majority of cases there are periods of remission of weeks, months, and sometimes of years, during which the patient is actually or comparatively free from symptoms. These remissions are most marked in the cases of duodenal ulcer, and are sometimes quite as striking as those so commonly observed in affections of the gall bladder. The remissions tend to become shorter, and in many cases prior to application for treatment the suffering is practically constant.

Pain.

In 3 cases (6 per cent.) there was *no pain*; in one of these the ulcer involved the lesser curvature, the other

two the duodenum, but in all of them the ulcer was small, with little or no induration and a smooth peritoneal scar on the surface. In 3 cases there was *little or no pain*, and all of these involved the duodenum. In 8 cases there was more or less *constant pain*, and no less than 7 of these involved the lesser curvature; in all of them there was very extensive induration around the ulcer, and adhesions to the left lobe of the liver or to the anterior abdominal wall, and in 4 of them there was an hour-glass contraction. In 1 case in which the ulcer was located in the duodenum the pain occurred in definite seizures at intervals of about five days; these seizures closely resembled biliary colic, and necessitated the patient being put to bed with hot bottles and the exhibition of opiates.

Seat of the Pain.—The pain is almost invariably referred to the vicinity of the middle line, and frequently passes through to the back between the shoulders. It may be stated generally that in ulcer of the lesser curvature the pain is to the left of the xiphoid or below the left costal margin; in ulcer at or near the pyloric ring the pain is in the middle line; in ulcer of the duodenum the pain is to the right of the xiphoid or below or over the right costal margin. One cannot rely upon any particular case conforming to these general rules. I have observed patients with left-sided pain and found at the operation that the ulcer was situated in the duodenum, and conversely I have seen patients with right-sided pain and yet operation disclosed an ulcer in the vicinity of the pyloric ring.

Relation of Pain to the Taking of Food.—In 10 cases pain was relieved by the taking of food. In some cases this amounted to the well-known hunger-pain; in 6 of the 10 cases the ulcer was situated in the duodenum. Pain following the taking of food was complained of in 4 cases in which the ulcer was situated in the lesser curvature, and in these the pain occurred from half an hour to an hour after food; in 11 cases in which the ulcer affected the pyloric ring and antrum the pain occurred from one to two hours after the taking of food, and in 9 cases in which the ulcer was situated in the duodenum the pain occurred later than two hours after food, and in 1 case four hours after food. In the case of multiple ulcers the pain sequence is apt to be confusing. In the hour-glass cases the pain corresponds to that of an ulcer of the lesser curvature; it comes on soon after food, is apt to be constant, and is referred to the left side. Several patients, and more particularly those who were the subject of duodenal ulcer, were quite decided in saying that the nature of the diet had no influence on their symptoms. One intelligent man, for example, affirmed that he suffered just as much when he was on a restricted diet as when he took lobster salad and other supposed indigestible foods. In gastric ulcer, on the other hand, the nature of the diet has a considerable influence on the amount of suffering, and the majority volunteered that their symptoms were aggravated when this included butcher meat and potatoes. In cases of pyloric obstruction with butyric and lactic acid fermentation the diet naturally makes a great difference. It was quite the exception to be able to bring out any relationship between the attitude of the patient and the pain, such as would help in locating the ulcer. I should not diagnose an ulcer to be seated in the posterior wall because the patient obtained relief from lying on his face. The site of the ulcer is not to be inferred from any one symptom, but from all the features of the case. The onset of pain in the evening or during the night was a striking feature in at least 7 cases (14 per cent.). In 1 of these the ulcer was in the lesser curvature, in 4 at or near the pylorus, and in 3 in the duodenum. The night pain in the duodenal cases is a variety of hunger-pain; in the pyloric cases it was usually associated with stenosis and distension of the stomach and the accumulation and decomposition of the food taken during the day. If the patient vomited, either spontaneously or by putting his fingers down the throat, the pain was relieved and the patient was able to go to sleep again.

Tenderness in the epigastrium or over the lower ribs was observed in 16 cases (32 per cent.), and in the majority of these the ulcer was situated near the pylorus or lesser curvature. This association would appear to depend on the greater frequency with which gastric ulcer, in contrast to duodenal ulcer, leads to the formation of adhesions between the area of the ulcer and the parietal

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peritoneum. In the whole series of duodenal ulcers there were only two in which there was marked tenderness, and in both there were extensive adhesions to the under surface of the liver and to the parietal peritoneum. Along with the tenderness there is often rigidity of the corresponding rectus muscle.

The Causation of the Pain in Chronic Ulcer.

The pain of gastric or duodenal ulcer is usually ascribed to the contact of the acid contents of the stomach with the raw surface of the ulcer. I believe that hyperacidity is one of the essential factors in the production of an ulcer, but I do not believe it is the cause of the pain. When food is swallowed gastric juice is secreted at once, and therefore in an ulcer situated at the lesser curvature this should be at once exposed to its action, and pain ought to follow immediately. It is the interval which is difficult to account for. I believe that the pain is due to the movements of that part of the stomach in which the ulcer is situated—that is to say, the pain is due to peristalsis and not to contact of acid with the raw surface. We know that the exaggerated peristalsis which is visible through the abdominal wall is always associated with pain, and there can be no doubt of the influence of the taking of food in the production of peristaltic movements.

If pain were the result of contact with the acid contents of the stomach, one would expect that the recent acute ulcer with a raw surface and little infiltration of its base and margins would react most; so far as I can learn, this ulcer is usually insensitive. The ulcer which causes the greatest amount of pain is the chronic ulcer with wide-spread callous infiltration and peritoneal adhesions, precisely the type of lesion that would most interfere with the peristaltic movements of the organ.

In four of my cases the test-meal showed the complete absence of free hydrochloric acid, and yet in all of these pain was a prominent feature, another proof that the pain of ulcer is due to the movements of the viscus and not to the acidity of its contents.

The violent crises of pain which occur at irregular intervals in some cases of duodenal ulcer cannot be related to contact with acid contents; they are much more likely to be due to cramp-like contractions of the wall of the duodenum.

The explanation of the hunger-pain of duodenal ulcer is more difficult. It is usually accepted that the pain of fasting is relieved by the taking of food, because this is followed by the shutting of the pylorus and the arrest of the passage of acid material into the duodenum. This has always appeared to me a fanciful explanation. It presupposes that during fasting acid material is passed into the first portion of the duodenum, which is obviously not the case. Is it not rather that as the stomach empties the pylorus tends to move towards or even to the left of the middle line, thus putting traction on the duodenum, and when it is the seat of an ulcer, there is pain, or at any rate a feeling of discomfort, which is relieved by the ingestion of food? Similarly, when a stomach with an anterior ulcer and with adhesions to the parietal peritoneum becomes distended, whether from accumulation of food or of products of decomposition, pain or extreme discomfort is brought about, because the stomach is displaced downwards and to the right; thus traction is made upon the indurated portion and upon any adhesions which may be present.

Vomiting.

This was present in 42 cases (84 per cent.), and therefore, next to pain, is the most constant symptom of ulcer. In 4 it was occasional; in the great majority it was a prominent feature. It is more constant in gastric than in duodenal ulcer, and attains its acme in ulcer at the pylorus with narrowing of the outlet. In these it is usually cumulative, the patient vomiting at night what has been ingested during the day. It is important to bear in mind that vomiting may be absent; in the present series there were six patients with uncomplicated duodenal ulcer who never vomited. It is more noteworthy that vomiting was absent in two cases of ulcer of the lesser curvature; in one of these there was a large, saddle-shaped ulcer with marked hour-glass contraction.

Haemorrhage.

In 29 cases (58 per cent.) there was haematemesis, and in 11 of these there was also haemorrhage from the bowel.

In 15 cases the patient vomited pure blood, and in 13 coffee grounds; 1 patient vomited blood and coffee grounds on different occasions. My records show that haemorrhage is most frequent in ulcers at or near the pylorus—13 out of 16 (81½ per cent.)—while only one of these had melaena. It is next most frequent in duodenal ulcers—10 out of 17 (59 per cent.)—and it is in these that we have the highest percentage of haemorrhages from the bowel; there is therefore abundant corroboration of the current view that the combination of haematemesis and melaena is strongly suggestive of the ulcer being situated in the duodenum. Haemorrhage was less frequent in ulcers of the lesser curvature—5 out of 12—and in 2 of these there was melaena.

Test Meal.

This was carried out as a routine measure. The gastric contents showed the presence of free HCl, usually to excess, in all of the series except four. These four cases, therefore, merit special consideration; in all of them the ulcer was situated in the lesser curvature. In one case there was also an ulcer of the duodenum, and in one of them there was an hour-glass contraction of the stomach. In two of these cases the provisional diagnosis of carcinoma was made, and in the then state of our knowledge (1906) this sufficed to turn the scale in determining me to resect the affected portion of stomach, with the unfortunate sequel that one of the patients succumbed to what turned out to be a formidable operation, much more difficult than the average resection for cancer. In each of these cases microscopical examination showed the lesion to be a chronic ulcer and nothing more. In the third case the infiltration of the first part of the duodenum was so extensive that, in view of the absence of free HCl and the presence of lactic and butyric acids, one would have been inclined to regard the condition as malignant were it not that the discovery of a second area of induration in the lesser curvature presenting the typical crater of an ulcer to the fingers, turned the scale against the diagnosis of cancer, and enabled cure to be brought about by a simple gastro-enterostomy. The fourth case was one of hour-glass contraction of the stomach, and, in spite of the absence of free HCl and the presence of butyric and lactic acids, there was no doubt of the innocence of the condition, and a complete disappearance of the symptoms was obtained by anastomosing the larger proximal sac with the jejunum.

The presence of butyric and lactic acids along with free HCl is not of much significance. It is merely an indication of the stasis of the gastric contents, and does not support in any way the diagnosis of cancer. This combination was noticed in 2 cases of pyloric ulcer, in 1 hour-glass stomach with saddle ulcer of the lesser curvature, and in 4 cases of ulcer of the duodenum.

Constipation.

This is almost universal throughout the series; there are only three in which the notes record that the bowels moved every day without medicine. It was naturally much more marked in the cases with pyloric stenosis, but it occurs with sufficient frequency apart from any obstruction of the lumen to warrant the inference that the mere presence of an ulcer in the stomach or duodenum interferes with the onward propulsion of the ingesta.

Visible Peristalsis.

This was only observed in 5 cases—4 of pyloric ulcer and 1 of the duodenum. It affords a reliable guide to the degree of mechanical narrowing of the lumen brought about by the ulcer, and is to be regarded as a favourable indication from the operative point of view, as the hypertrophy of the muscular coat of the stomach with which it is associated enables the patient to derive the maximum advantage from a gastro-enterostomy.

The condition of the stomach as revealed by physical examination, distension with air, and other methods, was of service in affording information as to the shape, size, and position of the stomach, but it was only of indirect service in establishing the existence of ulcer, or its position when diagnosed.

The Diagnosis of Chronic Ulcer of the Stomach and Duodenum.

Enough has been said under the heads of the individual symptoms and signs to make it evident that in the great

majority of cases the diagnosis can be made with a reasonable approach to accuracy. There will always remain, however, a minority—and this will probably increase as patients apply for treatment at an earlier stage of the malady—in which the clinical diagnosis will be attended with uncertainty.

A *gastric neurosis*, or a gastric form of neurasthenia, which is met with in both sexes, but especially in women, is one of the affections most likely to be mistaken for chronic ulcer. The difficulty is more likely to occur in the exceptional cases, to which reference has already been made, in which there is no history of vomiting, and in which the pain is both indefinite in character and in location. This, which may be termed the latent duodenal ulcer, is particularly difficult to diagnose, and the records show that several of the cases in which I have operated and found a duodenal ulcer had been previously under treatment for neurasthenia. The risk of confusing duodenal ulcer with an affection of the gall bladder is well known, but the difficulty is usually cleared up under observation, especially by any one who is experienced in both maladies; and, in any case, in either affection a recourse to laparotomy would not be out of place.

Carcinoma of the stomach is not only liable to be mistaken for ulcer clinically, especially ulcer cases in which the test meal reveals the absence of free HCl, but also when the abdomen has been opened and the parts inspected. On looking back I think one is justified in saying that carcinoma, when present, is unmistakable. On the other hand, one is often inclined to look upon ulcer cases as malignant. One is helped in these doubtful cases when there are two apparent tumours, for these are much more likely to be ulcers than cancer. One is also helped if the duodenum is implicated in the tumour, as in gastric carcinoma this is very exceptional.

Carcinoma in the vicinity of the stomach—for example, one in the head of the pancreas—may project forwards and involve the duodenum or pylorus in such a way as to give the impression of a primary growth in one or other of these situations, and as there may be an absence of free HCl in these cases, the correct interpretation of the conditions found at the operation may be very difficult.

The Hour-glass Cases.

In my experience, hour-glass contraction is the most elusive of all the manifestations of gastric ulcer. The four examples in the present series of cases were met with in middle-aged women (38 to 49 years), who had over a period ranging from twelve months to twenty years presented the clinical features of an ulcer situated in the lesser curvature. The hour-glass constriction was only once diagnosed before operation. In this case there was peristalsis of the wall of the pyloric pouch, and the circumscribed, dome-shaped swelling thus formed was obviously too small to correspond to the whole stomach. In the second example an hour-glass contraction was considered and negatived because none of the recognized tests could be elicited; at the operation it was found that the isthmus had been drawn up behind the ensiform cartilage, and that the pyloric chamber did not even attain the size of a golf-ball. In the third and fourth examples the condition was not suspected before operation, chiefly because of the misleading histories given by the patients. It is noteworthy that one of them, a woman aged 49, had had attacks of colic-like pain in the upper and left region of the abdomen for a period of twelve months, and had never once vomited; and yet at the operation the pyloric chamber was found to be fused with the liver, the pancreas, and anterior abdominal wall, and the lesser curvature was the seat of a saddle-shaped ulcer.

Treatment of Chronic Gastric and Duodenal Ulcer.

Whatever difference of opinion may exist with regard to the treatment of the recent or acute ulcer, I expect we shall be unanimous in the opinion that the chronic ulcer can only be cured by surgical means. The histories of our cases furnish the basis for this opinion. Time, the important factor in so many cures, is apparently powerless in a chronic ulcer, judging by the periods of fifteen, twenty, and even thirty years some of the patients have suffered before they come to operation.

Restricted diet and lavage relieve the prominent symptoms for a time and give the ulcer a chance of

healing, which, however, it is apparently rarely, if ever, able to take advantage of. Many of our cases have been dieted and washed out for many years, and the ulcer, when seen at operation, appears as firmly established as ever.

Our reasons for recommending operation are, shortly, as follows: Because the ulcer will not get well otherwise; because the ulcer and its complications are the cause of considerable suffering, and prevent the patient from earning a living; and because the ulcer may become dangerous to life through starvation, haemorrhage, perforation, or transformation into cancer.

The choice of operation lies between resection and gastro-enterostomy. The sphere of resection is very limited; it is often impossible—as, for example, in the diffuse ulcers of the duodenum. It is nearly always difficult, and is by no means free from danger. The resection may bring about narrowing of the lumen, and necessitate a gastro-enterostomy in addition; and, finally, as pointed out by Mayo, it does not get rid of the hyperacidity of the stomach contents, which is an essential factor in the production of the disease, so that, unless a gastro-enterostomy is added, there is the risk of the formation of a fresh ulcer in the future. The claim of those who advocate resection as the routine measure where feasible—Rydygier being one of the best known of them—is that if the ulcer is allowed to remain the risk of its becoming cancerous is considerable. So far as my own experience is concerned, this undesirable sequel has only happened once in 47 cases subjected to gastro-enterostomy. Gastro-enterostomy was performed on September 6th, 1904, for a chronic ulcer near the pylorus. When seen sixteen months later the patient was going downhill; free HCl had disappeared from the gastric contents, and an exploratory operation revealed cancer both in the stomach and in the liver. Personally I should not be influenced by the unfortunate sequel in this case to extend the sphere of resection, and that for the reasons already stated.

RESULTS OF OPERATION IN 50 CONSECUTIVE CASES OF CHRONIC ULCER.

Resections of Stomach.

Three cases with one operation death. Of the survivors, one is perfectly well three and a quarter years later: the remaining one is well two and a third years later, but has occasional pain and flatulence.

Gastro-enterostomies.

Forty-seven cases with three operation deaths = a mortality of 6½ per cent. The deaths occurred in the early members of the series, before the technique of the operation was established. Two were due to a bad form of vicious circle and one to septic peritonitis.

Of those who survived the operation, 1, a tramp, was lost sight of; 5 died at various periods—1 of exophthalmic goitre, 1 of cancer of the stomach, already referred to, 1 of urinary sepsis associated with enlarged prostate, and 2 of what was reported by their doctors as acute enteritis. It is just possible that this may have been perforation of a peptic ulcer of the jejunum.

The remaining 38 are all under observation, and I am very greatly indebted to their doctors for the reports with which they have been good enough to furnish me on the subsequent history of these patients and their present condition. With a few exceptions to be mentioned presently, they all described in enthusiastic terms the benefits derived from the operation; there is an increase of weight, and in individual cases this amounted to 2, 3, and even 4 st.; there is complete freedom from the pre-existing gastric symptoms, a healthy appetite, a capacity of eating and enjoying everything, and, finally, a regular action of the bowels without medicines. There was no discoverable difference in the results, whether the operation had been performed for ulcer of the lesser curvature, for ulcer at or near the pylorus, or for ulcer in the duodenum. Even cases with extensive adhesions and the 4 cases of hour-glass stomach all fall to be included in this group of ideal results. Three of the women have since borne children; there was only a moderate amount of sickness during the later months of pregnancy. One of the male patients passed easily through an attack of typhoid fever.

In a proportion of the cases the gastric functions have been subsequently tested, in some cases years after the

operation. In those in which the stomach was previously dilated it was found to have returned to the normal, or nearly the normal size. If the stomach tube was passed from one to three hours after a meal, the food contents were found to be still present in the stomach, showing that the gastro-enterostomy opening behaves in the same way as the normal pylorus. The contents were usually found to be neutral in reaction, and showed traces of bile constituents, usually bile salts. If the tube is passed in the fasting condition, a small amount of bile-stained mucus is usually evacuated.

The exceptions to the above ideal results are comparatively unimportant; one, for example, has a ventral hernia, one is still a little anaemic, one has fullness after meals, one suffers from flatulence and occasional attacks of bile (the earliest operation case in the series), and one has a feeling of distension, and his gastric contents after a test meal show butyric acid and the absence of free HCl.

I beg to record my sincere indebtedness to my medical colleagues on the staff of the infirmary, and particularly to Dr. Francis Boyd, for their invaluable co-operation in the clinical examination of the cases here recorded.

PRIMARY DIFFUSE PNEUMOCOCCIC PERITONITIS: TREATMENT BY DRAINAGE AND PNEUMOCOCCIC VACCINE: RECOVERY.

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Not many years ago pneumococcic peritonitis was an unrecognized disease, but of later years the attention of the profession has been drawn to its occurrence through the writings of Jensen, von Brunn, and others on the Continent, and by the paper of Annand and Bowen in particular in this country.

The comparatively limited number of cases so far recorded, and the uncertain recognition of the disease, call for the publication of any further experience. I therefore offer the following contribution, which was a case of diffuse and primary pneumococcic peritonitis with an acute onset simulating perforation of the appendix.

Dorothy W., aged 8, was admitted into the hospital on the evening of April 22nd, 1908, under the care of my colleague, Dr. Sharkey, and was transferred to me the next morning.

Personal and Family History.

The father was said to suffer from some chest trouble, and there was a history of tubercle in the mother's family.

She had always been a nervous child, subject to bilious attacks. Three years before she had had measles, and two years before influenza with symptoms very similar to those of the present illness, abdominal pain and vomiting. From the previous November to February she was kept from school on account of her eyes and headache. She had many times complained of abdominal pain, which was generally relieved by micturition; she had rather a habit of holding her water.

History of Illness.

On the day before admission she had been seemingly in perfect health. At 8.30 a.m. on the 22nd she was suddenly taken ill with free vomiting, faintness, and slight abdominal pain centred round the umbilicus; she was very thirsty and feverish. In the evening, fifteen hours after the onset, she was admitted looking ill and complaining of severe abdominal pain and vomiting. The face was very flushed, the eyes bright but not sunken, and the tongue furred generally but rather dry at the tip. The pulse was 130, regular and of small volume; temperature 103.8°, and respirations 36. The chest moved well and equally, and there were no abnormal physical signs detected in heart or lungs. Abdominal movement was restricted but not absent, especially below the umbilicus; there was definite distension, but it was everywhere resonant. Palpation proved an almost universal tenderness, more marked round the umbilicus and in the right lower quadrant; here there was some increased resistance, but no distinct lump could be felt. There was no alteration in the position or size of the liver; the spleen and kidneys seemed normal, and the urine was unaltered except for an increase of urates. Per rectum there was a boggy feeling, especially on the right side, as if there was something in Douglas's pouch.

I was asked to see the child at 11 next morning, her pulse then being 150 and temperature 103.4°. The abdomen moved fairly well on respiration except on the right side below; here and across the bladder region she was tender. There was a

little rigidity over the right rectus both below and above the umbilicus. An immediate operation was decided on, as her condition suggested a perforative peritonitis dependent probably on a gangrenous appendix.

Operation.

A vertical incision was made over the right rectus below the umbilicus, opening the sheath and displacing the muscle inwards. On opening the peritoneum a greenish-yellow fluid escaped, of gummy consistency, with a few flakes of dirty-white lymph in it. Although this was generally diffused through the cavity, and the intestines and omentum were smeared over with it, yet they did not otherwise appear to be in any way altered from the normal; the appendix was absolutely healthy. A good deal of fluid had collected in the pelvis and in the right kidney pouch. There was no sign anywhere of glueing together of the intestinal coils by early adhesions. The right Fallopian tube was very definitely injected. (Subsequent inquiry elicited no evidence, past or present, of any vulval or vaginal discharge.) The glands along the iliac vessels and at the bifurcation of the aorta appeared to be a little enlarged. The peritoneal fluid was quite odourless. Drains with wicks were placed down into the pelvis and up into the kidney pouch, and the main part of the wound was closed in layers. She stood the operation very well, and was put back to bed in the Fowler position, and given $\frac{1}{2}$ grain of morphine. Saline was ordered per rectum.

After-History.

After the operation there was a gentle drop in the temperature to 99° at 8 o'clock the next morning, with a corresponding marked reduction in the pulse-rate. She was feeling much more comfortable, and there had been very little pain and no vomiting. She was given milk and water frequently in small quantities. On April 25th her condition was very satisfactory, but both pulse and temperature had again risen a little. As her bowels had not acted, she was put on magnesium sulphate in the evening. The next morning there was a very slight result after an enema. The wicks were removed from the tubes, and a considerable discharge of turbid fluid came away. Calomel, 2 grains, given at night, followed by magnesium sulphate in the morning; this resulted in four actions during the day. On this day (April 27th) the temperature again began to go up, and, as the clinical report showed that the peritoneal effusion was a pure culture of the pneumococcus, it was decided to use pneumococcic vaccine (see chart). Beyond the variations in pulse and temperature there is now not much to report except her steady progress. On May 5th both drainage tubes were removed and gauze drains substituted. On the 6th, as on removing the gauze a fair amount of pus could be pressed up from the lower abdomen, Bier's cupping for ten minutes was started; this soon produced a marked diminution in the amount of discharge. This, however, did not cease altogether, and apparently came up from the loin, so on May 27th a counter-opening was made here and a piece of gauze pulled through from front to back. This soon had a marked effect both on the discharge and the temperature. On June 6th the front wounds were healed, and on the 10th the drain was left out behind. By this date her temperature had been normal for a week, and she was beginning to get up. She was able to leave the hospital on June 15th.

She was readmitted in capital health on October 19th to have a small ventral hernia through the drainage hole dealt with. Some adherent omentum was set free, the peritoneal bulging cut out, and the freshened fascia brought together in layers. She went out on November 5th with a sound scar.

The clinical types of this disease vary as to whether the peritoneal effusion becomes localized or is diffuse. The localized form starts with acute symptoms, and tends to become chronic; at the same time there is walling-in of the effusion, which usually occurs in the lower abdomen in the region of the umbilicus. This is the type of case which in the past was probably considered to be a tuberculous abscess, and, pointing at the umbilicus, ultimately burst or was intentionally opened, with in many instances recovery.

In the diffuse form the symptoms are more markedly acute and remain so, and the signs those of a generalized peritonitis. Jensen and others have commented on the similarity of the onset to acute perforative peritonitis dependent on the appendix, and this case is another example of such.

These clinical forms of peritoneal involvement are found again, whether the peritoneum is primarily or secondarily affected. In a large number it is secondarily implicated, the primary lesion being most often a pneumonia, or a throat or ear lesion, or a pneumococcal abscess elsewhere; the blood infection from these foci is responsible for the subsequent peritonitis.

In the primary cases of peritonitis the possible origin may be traced in a few cases to an appendicitis or to an enteritis, the initial intestinal symptoms, especially diarrhoea, supporting the latter; neither of these causes appeared to be responsible in this case. As stated before, there was in this patient very great congestion