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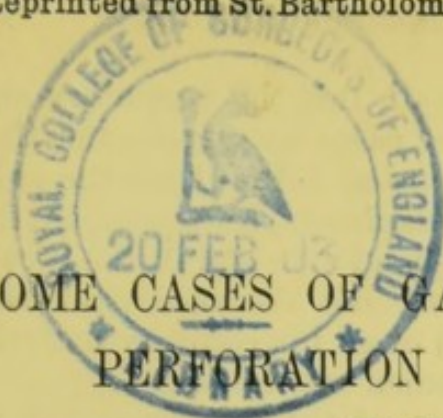
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SOME CASES OF GASTRIC AND INTESTINAL PERFORATION AND THE LESSONS THEY TEACH.

BY

D'ARCY POWER, F.R.C.S. ENG.

Cases of acute perforation of the stomach and intestine are not of very frequent occurrence in general practice, but a surgeon to a large general hospital sees a sufficient number every year to make him think that they require somewhat greater attention than is devoted to them at the present time, more especially in connection with their diagnosis.

Such cases of acute perforation are often difficult to recognise because they do not always offer the classical signs of a rigid and motionless abdomen with absence of liver dulness, and they are, therefore, too often allowed to drift on until evidence of acute peritonitis or the onset of faecal vomiting causes the surgeon to be sent for, when his services are useless. My own experience teaches me that sudden and severe abdominal pain with a tender abdomen and a rapid pulse require early abdominal exploration, and that the need for an operation is instant when the pulse rate increases from half-hour to half-hour, especially if the tenderness be limited to a single point in the abdomen. Neither the temperature nor the respiratory rhythm gives such satisfactory indications as the pulse and the local abdominal tenderness, and one is not justified in delaying an exploratory abdominal operation because the temperature is normal or because the abdomen is moving during respiration. It is of the utmost importance to sew up the perforation at the earliest possible moment, for it is only by this means that life can be saved in acute cases. Free and thorough drainage of the abdominal cavity seems to be of great importance in the after treatment of acute perforation of the stomach and duodenum. In two cases of perforated gastric ulcer recovery took place after I had sewn up the

ulcers and closed the abdominal wall, but the frequency and severity of the suppuration in other cases has shown me that such a fortunate ending is the exception rather than the rule. The suppuration occurs in the subdiaphragmatic space, in the iliac region, especially on the right-hand side and in the rectovesical or Douglas' pouch. I believe that the successful case of perforated duodenal ulcer (p. 14) owed his recovery entirely to the freedom with which his abdomen was laid open.

The delay in operating upon most of the cases was due to the uncertainty of the diagnosis before they came under the notice of the surgeon. The pain was so severe in one or two instances that the patient came straight to the Hospital and was admitted by the house surgeon into a surgical ward, either at once or after a very short consultation with the house physician. When there was a longer delay it appears to have been due to the fact that the patient was thought to be suffering from simple colic, lead colic, or appendicitis. Indeed the local pain and tenderness is sometimes very misleading, as in the case of a perforated duodenal ulcer where I was convinced that the patient was suffering from a perforation of the appendix, so marked were his symptoms in the right iliac region and so slight were those in the upper part of his abdomen. This reference of symptoms to the iliac regions is due to the fact that after perforation of a gastric or duodenal ulcer the intestinal contents pass almost immediately into the lowest parts of the peritoneal cavity. The parietal layer of the peritoneum therefore first becomes inflamed in the iliac region, and acute pain is felt here, whilst there is only local tenderness at the actual seat of perforation. On the other hand, a careful observation of the pulse saved us from operating in a case of gastric crisis due to locomotor ataxy, in the case of typhoid fever narrated at page 21, and in a case of simple colic occurring in a young woman.

LEAKING GASTRIC ULCER—RECOVERY.

Case I.—E. D. (Female Surgical Register, vol. v., 1902, No. 1766), married, aged 21, was admitted into the Hospital on 16th August 1902, suffering from pain in the abdomen, with vomiting. Since her child was born in September 1900 she has suffered from "indigestion." On 14th August 1902 she was suddenly taken ill with a severe pain in her stomach, which came on after taking food. She went to bed at once, and remained there vomiting and in pain until 16th August,

when she was brought to the Hospital. Her bowels had not been open since the 13th inst.

The patient looked very ill on admission : her pulse was 120 : temperature 99.8° F. : her abdomen was distended, tender, rigid and motionless : respirations 32. The rectum contained fæces and there was some tenderness on the right side.

I opened the abdomen by an incision in the middle line above the umbilicus, and found dense adhesions between the great omentum and stomach as well as between the upper surface of the stomach and the under surface of the liver. There was a considerable amount of dark fluid in the peritoneal cavity, but no gas nor any solid contents from the alimentary canal. The wall of the stomach was hard and the mucous membrane was firmly attached to it in part. It seemed, therefore, as if an ulcer on its anterior wall had so nearly perforated as to leak, the leaking point afterwards becoming occluded by the plastic inflammation.

The wound was closed except at a point where a large rubber drainage tube was inserted, and the patient was sent back to the ward. The wound was dressed twenty-four hours later, and the contents of the drainage tube were syphoned off by introducing a small piece of tubing into it. The effect of the operation was to relieve the patient from pain and to restore the normal respiratory rhythm to her abdominal walls. The rubber tube was removed on 18th August, a gauze drain being introduced in its place until the 26th August, when the wound had almost entirely healed.

The feeding of patients after severe abdominal operations is always a matter of interest and importance, and I append therefore the details of diet. They have been kindly given me by Nurse Derrick, who was acting sister of President Ward at the time.

"The operation was performed at 7 P.M. on 16th August 1902, and from 1 A.M. on the 17th inst. the patient was given a drachm of hot water hourly. At 7 A.M. a nutrient enema was administered consisting of three ounces of peptonised milk and an ounce of beef essence, which was repeated every four hours. On the 21st inst. two ounces of milk diluted with two ounces of water were given every hour by the mouth, whilst a nutrient enema continued to be given every four hours, the rectum being washed out with warm water once every twenty-four hours. On the 22nd inst. half an ounce of milk diluted with an equal quantity of water was administered hourly, the nutrient enemata being continued as before. On the 24th an ounce of milk with half an ounce of water was given every

hour, the nutrient enemata being still continued. On the 26th inst. two ounces of milk and an ounce of water were given every eight hours. The nutrient enemata were discontinued on the 29th inst., and the patient was ordered the *dieta tenuis* of the Hospital. It consists of two pints of milk and one pint of tea in twenty-four hours. This diet was supplemented on the 31st August by five ounces of custard, five ounces of arrowroot, and five ounces of mutton essence daily." The patient made an uninterrupted recovery, and left the Hospital for the Convalescent Home at Swanley on 24th September.

PERFORATED GASTRIC ULCER—RECOVERY.

Case II.—A single woman, aged 20, a carpet-sewer by occupation, was admitted to the Hospital on the evening of the 27th November 1900, suffering from abdominal pain. The history obtained with the patient was that she had suffered pain after her food for some months past, but that she had never been sick. On the 23rd November she had an attack of severe pain, which compelled her to go to bed, though she got up on the following day feeling better. On the 27th November she had a meat lunch, and at 6.30 P.M. she was again seized with acute abdominal pain whilst stooping before the fire. The pain was felt in the epigastrium, and she was sick. She was admitted to the Hospital at 11 P.M. On admission she was anæmic, and was evidently in great pain. Her abdomen was motionless, but neither hard nor distended. The liver dulness was present, and there was epigastric tenderness. The temperature was 98.6° F., the pulse 105, and the respirations 28. I opened the abdomen in the middle line above the umbilicus at 12.30 A.M., six hours after the onset of symptoms. Some gas escaped immediately, but there was no other evidence of any extravasation of stomach contents. After a short search a perforation was found on the anterior wall of the stomach towards the pyloric end and near the lesser curvature. There were some flakes of lymph and recent adhesions in the region of the perforation. The stomach was brought out of the wound, and some blood-stained viscid fluid was then escaping. The perforation was closed by two tiers of Lembert's sutures, and after sponging the stomach the abdomen was closed by two layers of sutures. The patient stood the operation well, and on her return to the ward her temperature was 100° F., her pulse 120, and her respirations 44. She received a hypodermic injection of five minims of morphia.

After treatment.—The patient was given nutrient enemata ($4\frac{1}{2}$ oz.) every four hours, the rectum being washed out every twenty-four hours. Nothing was given by the mouth for twenty-four hours, but the mouth was frequently sponged out. After the expiration of the first twenty-four hours a drachm of hot water was given every hour, and after forty-eight hours a drachm of Benger's food. This was gradually increased, and on the 10th December the patient was taking solid food, and the nutrient enemata were discontinued. The pulse only twice rose above 120, and the temperature varied between 98° and 100° F.

On dressing the wound for the second time, on the 11th December, some thick pus oozed out in two places. A small sinus was found, which was plugged for a few days. The wound was almost healed on the 10th January, when a stitch came away, and it was quite healed when she went to the Convalescent Home at Swanley on the 16th January 1901. Her appetite was then good, and she was free from pain after food.

PERFORATED GASTRIC ULCER—RECOVERY.

Case III.—A printer's labourer, aged 34, was admitted to the Hospital on 29th November 1900, the night but one after the preceding case, suffering from acute abdominal pain and collapse. He had suffered from pain after taking his food for the last two years, and he had been compelled to lie up for three or four days at a time. He was walking home after his work on the evening of 29th November, when he was suddenly seized with a pain in his abdomen. He was able to walk a mile further to Liverpool Street Station, where he had a pint of "soda and milk," which increased his pain so much that he was obliged to call a policeman and ask to be taken to the nearest hospital.

The patient was cold, and collapsed on his admission at 8.30 P.M. His abdomen was hard and retracted. There was marked epigastric tenderness, and the liver dulness was absent. The temperature was 97.2° F., the pulse 120. His pulse got weaker during the next hour, and an operation was decided upon and was performed five hours after the onset of acute symptoms. The abdomen was opened in the middle line above the umbilicus, and a large quantity of liquid stomach contents at once escaped. The ulcer was found on the anterior wall, about an inch from the pylorus. The stomach wall was thickened and friable, and on attempting to close the perfora-

tion with Lembert's sutures the stitches at once cut out, so a piece of omentum was first sewn over the perforation, and healthy stomach wall was then sewn over this with mattress sutures. Great difficulty was experienced in closing the end of the perforation nearest the pylorus, as this portion of the stomach could not be drawn up into the wound. As soon as the suturing was complete the abdomen was rapidly flushed out with hot saline solution at 110° F. The wound was sewn up with two layers of sutures, and dressings were applied, although some of the fluid was still oozing from the lower part of the wound. The pulse after the operation was 140, and as the general condition of the patient was good five minims of morphia were injected subcutaneously, and within five minutes of his return to the ward the patient was sound asleep. The pulse varied from 112 to 120 during the night.

The *after treatment* was the same as in the previous case, except that nothing was given by the mouth for the first twenty-four hours. The patient suffered considerably from bronchitis, and solid food was not given until the 12th December, after which he complained of pain in the stomach, and the next day at noon he suddenly vomited nearly two pints of undigested milk and broth. He was therefore put back on his former diet with nutrient enemata for six days, when he was once more allowed solid food. The wound was dressed on 5th December, but it was found to have broken down and to be discharging some thin pus. It healed slowly, and the patient was discharged to the Convalescent Home at Swanley on the 11th January 1901, the wound being then quite healed. I have seen the patient several times since the operation. He remains (October 1902) free from pain, except on one occasion, when he supped too heartily on "whelks and trotters." He has increased greatly in weight.

PERFORATED GASTRIC ULCER—DEATH.

The next case was less fortunate, for though the perforated gastric ulcer was repaired and the girl lived nineteen days after the operation, she died of a subphrenic abscess with pneumonia, which was the direct result of the perforation. The case is interesting, because Mr. Gask took some cultivations of the stomach contents poured out into the peritoneal cavity, which form, I believe, a pioneer attempt to ascertain the bacteriology of this condition. The details of the case were as follows:—

Case IV.—E. M., single, a domestic servant, aged 17, was admitted into Harley Ward on 23rd October 1901 at 2 P.M. She said that she had suddenly been seized with intense abdominal pain shortly after breakfast at 8 A.M. and had vomited. She had previously suffered from symptoms of indigestion, but had never passed any blood. On admission she was found to be an anaemic-looking, badly nourished girl in a state of collapse. Her pulse was beating feebly, 132 times a minute; her respirations were shallow and 34; her temperature was 98° F. Her abdomen was soft, and was moving freely with respiration, but it was very tender when it was touched, and was more tender above than below the umbilicus. The liver dulness was normal in extent. An enema of a pint of saline solution, to which two ounces of brandy had been added, was first administered, and at 2.45 P.M. she was brought into the operating theatre. The ulcer had then been perforated about six hours and a half, and she had been brought a distance of six or seven miles to the Hospital.

I opened the abdomen in the middle line above the umbilicus, drew out the stomach, and quickly found the perforation, which was situated on the anterior wall about an inch and a quarter from the pylorus. The perforation was large enough to have admitted an ordinary cedar pencil. Its edges were tucked in, and the opening was closed with two tiers of Lembert's sutures. The abdominal cavity was then flushed out with hot saline solution, and was drained by an india-rubber tube introduced through an opening made in the right iliac region as well as by a glass tube passed into the peritoneal cavity through the first incision.

The patient soon rallied after the operation, and on the following day her temperature was 98.5° F., but her pulse was 132. On the second day after her operation the temperature was 99° F. and the pulse 130. Mr. Gask made a bacteriological examination of the fluid removed with a syringe from the glass drainage tube, and reported that it was sterile. On 28th October, five days after the operation, a further examination of the fluid from the abdominal cavity showed that it only contained a single colony of streptococcus and one colony of staphylococcus. The girl seemed bright and cheerful, but her pulse was 118 and her temperature was 99.8° F. The temperature did not rise above 100, but the pulse continued rapid until 31st October, when I opened a localised intraperitoneal abscess in the left flank. The pulse still continued to beat from 124 to 128 times a minute until, on 7th November, the patient presented evidence of pneumonia, chiefly on the right

side, when her pulse still further increased in frequency, her temperature rose, and she died on 11th November.

The post-mortem examination, made the day after death, showed that an abscess cavity containing about eighteen ounces of greenish muco-purulent pus lay between the basal portion of the left lung and the upper aspect of the left dome of the diaphragm. The basal portion of the right lung contained several small pneumonic patches, one of which was breaking down to form a small abscess. There was no evidence of recent acute peritonitis in any part of the peritoneal cavity. There were abscess cavities, each localised by fibrous adhesions, situated in the left subphrenic space, immediately below the inferior surface of the right lobe of the liver, on the outer side of the cæcum, on the outer side of the descending colon, and at the bottom of the pouch of Douglas. The first two of these abscesses each contained about ten ounces of pus. The upper part of the cardiac portion of the greater curvature of the stomach was adherent to the lower aspect of the left dome of the diaphragm, and the seat of the perforation was completely closed. Examination of the stomach after it had been hardened in formalin showed that there was no trace externally of the line of suture. The peritoneum was not adherent over the spot, and the omentum had not become attached to it. The wall of the stomach did not appear thinner over the wound when it was held up to the light. The inner wall showed the ulcer as a small circular patch with a base of healthy tissue bounded by a sharply defined edge of mucous membrane. It was evident that the mucous membrane had not been turned in when the gastric wall was invaginated by Lembert's sutures, and they had not formed any ridge of tissue projecting into the stomach.

PERFORATED GASTRIC ULCER—DEATH.

Case V.—A nurse, aged 23, appeared quite well on the 19th August 1899, when she went a cycle ride of thirty miles though she was menstruating. On the following day the catamenia had stopped, and she again went cycling a distance of twelve miles. On the 21st she felt ill and complained of pain in the epigastrium, which radiated between her shoulders. The pain was less severe on the 22nd, when she was sick in the morning, bringing up food but no blood. The pain was gnawing in character, and was localised to the region of her stomach. She did her work for the next five days without much pain and with only occasional sickness. On the 27th August she took

two aperient pills at bedtime, which caused four loose actions of the bowels between 7 A.M. and 1 P.M., each motion being followed by abdominal pain.

Between 7 P.M. and 8 P.M. on the 28th August she was seized with acute and very violent pain in the abdomen, which became easier in a few hours. Her pulse was small and quick, and her temperature sank to 97.4° F. On the 29th the temperature was 100.4° F., and she had slept but little on account of the pain, which was localised to a point one inch above and one inch to the left of the umbilicus. There was also marked tenderness over the cæcum. The liver dulness was obliterated, and the abdomen was resonant everywhere except over the descending colon. The bowels had not been open. The tongue was dry and brown, and the pulse 108 and regular. The patient had been sick six times during the night, but brought up no blood nor foetid matter. The abdomen began to swell at 6 P.M., and it soon got very hard and tympanitic. A small amount of fluid was detected in the flanks, which gradually increased in quantity. The case was then seen by a physician, who suggested the necessity of summoning a surgeon as quickly as possible. I saw the case at midnight, and came to the conclusion that the patient was moribund and no operation was justifiable. She died at 4 A.M. on the 30th August.

The *autopsy* was made at 7 A.M. on the 31st August. Rigor mortis was well marked, and the abdomen was very tense. On opening the cavity much gas escaped. The omentum and coils of intestine looked normal, but upon lifting up the stomach a small circular perforation was found. It was situated on the posterior surface of the stomach, within two inches of the pylorus, and measured three centimetres across. There were many flakes of lymph in the immediate region of the perforation, and the abdomen contained a turbid fluid which corresponded in appearance to the contents of the stomach. There were no signs of any hæmorrhage. On opening the stomach the inner surface was found to be thickened, and round the perforation was an ulcer as large as a five-shilling piece. The ulcer had all the appearance of being chronic. The rest of the abdominal cavity, the uterus and its appendages, the intestines, and the vermiform appendix were healthy.

The patient would have had a good chance of recovery if the cause of her pain had been recognised earlier; but the absence of all symptoms of gastric ulcer previous to the fatal attack misled her attendants and caused them to delay active treatment until the patient was moribund. This absence of previous symptoms in cases of perforating gastric ulcer is now

pretty well known, and in doubtful cases should rather prejudice the surgeon in favour of an early exploratory operation.

PERFORATED DUODENAL ULCER—RECOVERY.

Case VI.—A newspaper manager, aged 26, was admitted to St. Bartholomew's Hospital at 3.50 A.M. on 26th July 1902, suffering from abdominal pain and sickness. He said that he had suffered other attacks of similar pain, but this was more severe and came on suddenly at 7 P.M. on the previous day. The abdomen was hard, tense, and painful. The temperature on admission was 97.2° F. and the pulse 112. I did not see the patient until 11 o'clock in the morning, when he localised his pain over the right iliac region, which was tender and full, the rest of the abdomen moving during respiration. I thought that he was suffering from acute appendicitis which had probably ended in perforation. I therefore opened the abdomen in the right iliac region and found the appendix normal. Gas issued from the wound as soon as the peritoneum was divided, and there was a gush of alkaline fluid which did not smell, but was clearly bile-stained. The end of the ileum was inflamed in patches which seemed to correspond with Peyer's patches. I plugged the wound I had made and opened the abdomen by a second incision carried through the middle line. The stomach was found to be normal, but a perforation was discovered in the duodenum and on its anterior surface, the hole measuring about one-eighth of an inch across. It was closed with two layers of Lembert's sutures. Drainage tubes were inserted at the upper and lower ends of the median incision as well as into the first incision over the vermiform appendix.

The patient bore the operation well, his pulse next day being 116 and his temperature 98.8° F. There was much discharge from the drainage tubes, which were emptied daily by means of a syringe. The wounds were dressed with boracic fomentations on and after 4th August, and the tubes were replaced by iodoform gauze plugs on 5th August. On this day the pulse was 96 and the temperature 98.4° F. The patient made a steady and uneventful recovery, and was sent to the Convalescent Home at Swanley on 12th September 1902, the forty-eighth day after the operation.

I am indebted to Miss Bryan—Sister Kenton—for the following details of the nursing of this case:—

July 25.—7 P.M. Sudden pain.

July 26.—10.30 A.M. Operation.

No vomiting after operation.

Nothing at all given by mouth until after 8 P.M., when he had water $\bar{3}i$. occasionally.

Nutrient enemata were started at 6 P.M. on the evening of the operation, and were continued four hourly for ten days, consisting of peptonised milk with plasmon $\bar{3}iii$., essence $\bar{3}i$., salt $\bar{3}ss$.

Bowel washed out twice in twenty-four hours with plain water. Nutrients all retained.

A good deal of flatus was passed when the tube was inserted for the nutrient enemata.

After the first twenty-four hours the patient began to complain of thirst; this was relieved by constantly washing out his mouth with water, and now and again by the injection of oi . and oss . of water into the rectum.

Bowels.—On the sixth day a soap and water enema was given and continued every other day. Calomel grs. iii . on the eighth day had no result.

Dressing.—The patient was dressed twice a day for the first ten days, the three tubes for drainage being sucked out each time. At first bile-stained fluid was sucked out in small quantities; this lasted about five days, after which there was a thick pus-like discharge. On the eleventh day the tubes were removed, iodoform gauze plugging was substituted, and most of the stitches were removed. The wound gaped a little, and was drawn together with gridiron strapping.

Urine.—Was always passed without difficulty and in normal quantities.

Sleep.—For the first five nights the patient required morphia injections of $m. iv$. (gr. $\frac{1}{2}$).

The first two days morphia was injected twice in the twenty-four hours.

Food given by mouth.

1st 24 hours.—Water $\bar{3}i$. p.r.n. = about $\bar{3}i$.

2nd 24 hours.—Water $\bar{3}i$. p.r.n. = about $\bar{3}iii$.

3rd 24 hours.—Lemon juice and water $\bar{3}i$. p.r.n. = about $\bar{3}iv$.

4th 24 hours.—Benger's food $\bar{3}i$. every two hours, and lemon and water $\bar{3}i$. p.r.n.

5th 24 hours.—Benger's food $\bar{3}i$. every two hours, and lemon and water $\bar{3}i$. p.r.n.

6th 24 hours.—Benger's food $\bar{3}i$.
Beef essence $\bar{3}i$. } Every hour alternately.

7th 24 hours.—Benger's food $\bar{3}ss$.
Beef essence $\bar{3}ss$. } Every hour alternately.

Given for five hours, when patient had some discomfort and felt sick, so *whey* $\bar{z}$ i. hourly was substituted.

8th 24 hours.—*Whey* $\bar{z}$ ii. every hour.

9th 24 hours.—Peptonised milk $\bar{z}$ ii. every hour. (Fresh tea was given at 4 P.M.)

10th 24 hours.—Peptonised milk $\bar{z}$ ii. every hour.

Essence or tea $\bar{z}$ iv. every two hours.

11th 24 hours.—Peptonised milk or mutton essence or tea $\bar{z}$ iv. every two hours.

Solid.—Custard (baked), mid-day.

12th 24 hours.—Peptonised milk, Benger's food, essence, tea $\bar{z}$ v. every two hours; custard mid-day.

13th 24 hours.—Same fluids, custard, small piece of thin bread and butter for tea, fine bread and milk for supper.

14th 24 hours.—Same, jelly added and sponge cake.

15th 24 hours.—Same.

PERFORATED DUODENAL ULCER—DEATHS.

The following three cases died, one because I had not completely closed the perforation, which was very awkwardly placed, the second through no fault of my own, and the third died of shock.

Case VII.—A porter, aged 41, was admitted to the Hospital on 23rd May 1901, saying that he was at work and quite well until 11 A.M., when he was suddenly attacked with pain in his epigastrium. The pain continued, and he vomited several times before coming to the Hospital. He had passed no flatus since the pain began; his bowels were well opened on the previous day. He was a temperate man, and there was no history of indigestion. At 2 P.M. the patient was reported to be a well-nourished man in obvious pain. His tongue was clean and moist; his respirations were very shallow and 60 in the minute; his pulse was of fair volume and tension, regular and 100 a minute. In the chest the percussion note was impaired at the right base, and the entry of air at the right base was weaker than at the left. There were no additional sounds. The pain in the abdomen was not localised, but the patient complained of it chiefly over the upper half and down the right side. The abdomen was not distended, but it moved very little during respiration. The movement, however, was equal all over, though the abdomen was held somewhat rigid. It was tender all over and tympanitic everywhere, except that the liver dulness was present. Nothing abnormal could be felt.

It was impossible at this time to make any definite diagnosis, and directions were left that he should be carefully watched, on the assumption that the case was rather one of pulmonary than of abdominal trouble. There was no definite change at 6 P.M. An enema saponis had been retained, but the pain had not been relieved by poulticing. The temperature at this time was 99.8° F., the pulse was 120, and the respirations 60. At 12 midnight there was still no material change in the condition of the patient, whose temperature was 99.8° F., pulse 120, respirations 60-70. A little liquid had been vomited. At 1 A.M. the abdomen was distended, and the patient was slightly collapsed, with a pulse of 144 almost running. At 2 A.M. the patient was still more collapsed, and I saw him for the first time. He appeared to be so ill that I determined to explore his peritoneal cavity. I therefore opened his abdomen in the middle line above the umbilicus. The liquid contents of the stomach escaped as soon as the peritoneal cavity was opened. The stomach was drawn into the wound, and an ulcer was found apparently upon its posterior surface. The aperture was large enough to admit a full-sized probe, and there was a considerable deposit of lymph all round it. An attempt was made to close the perforation by means of Lembert's sutures, but the operation was very difficult owing partly to the awkward position of the ulcer and partly to the rotten state of the tissues in the neighbourhood. Four sutures were passed, and it seemed as though the opening had been successfully closed. During the suture large quantities of a thin liquid kept welling up from the perforation until the last suture had been inserted. The peritoneal cavity was cleansed and afterwards closed, the edges of the wound being united by a suture of silkworm gut. The patient bore the operation badly, and his pulse was almost imperceptible. At 4 A.M. he was transfused with three pints of hot saline solution passed into the median basilic vein, but at 7.30 A.M. he died.

A post-mortem examination at 3 P.M. on the same day showed that the peritoneum generally was acutely inflamed, its endothelial aspect being covered with a layer of fibrino-purulent lymph. There were collections of purulent matter at the bottom of the pouch of Douglas, in the lumbar region, and in the right subphrenic space, this space being almost completely shut off from the rest of the peritoneal cavity. The beginning of the duodenum, at the upper and posterior part, was the seat of a conical ulcer which measured half an inch in diameter. It had sharply cut edges, but there was no infiltration at the margins. The floor of the ulcer had perforated,

but the sutures were not accurately applied, as water and intestinal contents easily passed through.

The particular interest of this case lay in the fact that the localised peritonitis must have lasted a much longer time than the sudden onset of the symptoms would have led one to suppose, whilst the symptoms, when they appeared, were so obscure as to make it seem as if the patient was suffering from pneumonia rather than from peritonitis.

It is interesting, too, because it is a record of the course taken by a case of perforated duodenal ulcer which, though carefully watched, was practically untreated.

Case VIII.—The second case of perforated duodenal ulcer occurred in a cheery, fat cabman, aged 47, who was admitted into Pitcairn Ward at 8.30 P.M. on 13th July 1901, suffering from intense pain in his abdomen. He waked apparently in his usual good health on the morning of this day, and whilst he was eating his breakfast of tea and bread and butter at 9 o'clock, he was suddenly doubled up with stomach-ache. The pain was so bad that he sent at once for a doctor, who gave him some medicine, but the pain continued all day, and in the evening he came to the Hospital. He had passed neither fæces nor flatus since the pain began, though he had taken a dose of castor-oil on the previous evening. He was quite clear that he had never suffered from dyspepsia and he had never vomited blood, but he was a great beer-drinker. The patient was not collapsed on admission to the Hospital, though he was in great and constant pain, which he referred to the epigastric region. His temperature was 99.8° F., his pulse was 104, and his respirations 24. His abdomen was full but not distended. It moved slightly but equally during respiration, and any deep inspiration caused an increase in the pain. There was some general tenderness, more marked in the epigastric region, and the abdominal muscles were held rigid. The abdomen was everywhere resonant, and there was an absence of liver dulness in the nipple line. I opened the abdomen at 10.45 P.M. in the middle line above the umbilicus, and gas and fluid escaped as soon as the peritoneum was divided. The stomach was carefully examined, and after a short search the perforation was discovered close to and at the back of the pylorus, in all probability in the first part of the duodenum. The hole was circular and accurately defined; it was just large enough to admit the end of a probe. Nothing escaped through it whilst it was being sewn up, but fluid kept welling up from beneath the liver. I was particularly careful to close this perforation completely, as I remembered the fate of the previous duodenal ulcer. I there-

fore put in two tiers of Lembert's sutures, the first row closing the ulcer, the second bringing a piece of omentum over it, and I satisfied myself that the small aperture was closed, although it was very awkwardly placed deep down in the abdomen and under the liver. The duodenal walls were much softened, and the sutures cut out in one or two places and had to be replaced. The abdominal wound was closed completely after the area of the operation had been sponged. The patient bore the operation well and there was no subsequent vomiting. On the following day he was given nothing but a little hot water by the mouth. He had a nutrient enema of three ounces of beef-tea and an ounce of peptonised milk at 12 noon. On the 15th July his bowels were opened thrice, his abdomen was moving well, there was no distension, and his progress seemed perfectly satisfactory until the 20th. The patient did not seem so well on this day, and the wound, which had been healing kindly hitherto, now re-opened and discharged pus. Three stitches were therefore removed from the wound and a large drainage tube was inserted. The patient became more and more collapsed and died on 21st July, eight days after the operation. The post-mortem examination showed that the peritoneal cavity contained about a pint of foul pus. The abscess was situated above the stomach and first part of the duodenum, below the right lobe of the liver and behind a portion of the great omentum. It was strictly localised, and there was no general peritonitis. There was a perforation in the first part of the duodenum, just below the foramen of Winslow and beyond the pyloric constriction. The perforation communicated with the abscess cavity. It was noticed that the ulcer was much larger than at the time of the operation and that several of the sutures had cut their way through the softened tissues.

The result of this case was particularly disappointing, for the patient had felt so well after the operation that there was some difficulty in making him believe that a serious operation had been performed upon him, and he was constantly inquiring when he might get up.

Case IX.—W. W., aged 37, a clerk (Male Surgical Register, vol. iv., 1902, No. 1369), was admitted to Kenton Ward on 18th May 1902, suffering from severe pain in his abdomen. He said that for the last six months he had suffered from stomach-ache, which usually came on about half-an-hour after taking food. On the day of his admission he was attacked with great pain in the abdomen, which was felt more especially round the umbilicus and on the right side beneath the ribs. The pain began at 12

o'clock mid-day, and he felt so ill that he was brought at once to the Hospital in a cab.

On admission he appeared to be a strong man in a state of collapse. His pulse was 120, and his temperature 97.4° F. He lay on his left side with his legs drawn up. The abdomen appeared somewhat retracted, but moved freely and equally during respiration. The abdominal walls felt tense. There was increased resonance on percussion, and the area of liver dulness was diminished.

I opened the abdominal cavity at 6 P.M., by an incision carried through the linea alba above the umbilicus. Free gas and a quantity of bile-stained fluid escaped as soon as the peritoneum was divided. The stomach was examined carefully, but no perforation was discovered; after some search a small hole was found in the duodenum. The hole was circular, and measured about an eighth of an inch in diameter. It had a well-defined edge and a quantity of bile-stained fluid kept pouring out of it. The perforation was closed with two tiers of Lembert's sutures, and the perforation seemed to be completely closed, as all oozing ceased. A counter-incision was then made in the right lumbar region, and a rubber drainage tube was passed from the lower part of the central incision through this opening to ensure a good drainage of the abdominal cavity. A second tube was passed through the upper part of the central wound into the space between the under surface of the liver and the duodenum. The remainder of the wound was closed, and the patient was given an injection of strychnia subcutaneously before he left the operating theatre. At 11 P.M. he was found to be restless, with a temperature of 100.2° F., and a pulse of 120. He remained collapsed, and died at 1.55 P.M. on the following day.

The post-mortem examination showed that the peritoneal cavity contained two ounces of turbid fluid in the pelvis. The stomach was much dilated and contained dark-coloured fluid like "coffee grounds." There was a deep ulcer on the anterior wall of the duodenum just beyond the pyloric orifice, which was large enough and deep enough to have lodged a pea. The edges and parts surrounding the ulcer were hard from the presence of cicatricial tissue which had caused considerable narrowing of the pylorus. The ulcer had perforated into the peritoneal cavity, but it had been effectually closed by a series of interrupted silk sutures.

LEAKING (?) TYPHOIDAL ULCER.

Case X.—A married woman, aged 30, was admitted to St. Bartholomew's Hospital on the 16th December 1900, suffering from an attack of typhoid fever, of which the first symptoms had appeared on 2nd December. The note states that "she was going on well on 18th December; the temperature remains 102° F., the pulse is 104, and Widal's test was positive, though the reaction time was longer than usual. A further note, made on the 28th December, reports that the temperature reached 99° F. on 20th December, and afterwards rose steadily until 25th December, when the patient was suddenly seized with a rigor, followed in an hour by another rigor. The temperature then rose rapidly to 107° F. The patient became pale and anxious, with dark, sunken eyes. She complained of abdominal discomfort without any acute pain, and she was sick twice. The abdomen moved well during respiration, and was not tender. The pulse rose to 120, increasing with the temperature, but it was not thready and was quite regular. The temperature fell again with the pulse; but on the following day, and at the same hour, there occurred another rigor, with a second rise of temperature to 105° F. and an increasing pulse. There was no change in the abdominal symptoms; there was marked constipation, and there was no hæmorrhage from the bowel; the spleen was less enlarged than it had been. The temperature became subnormal on the 27th, and the patient lost her anxious expression. On 28th December her temperature rose to 100° F., and the patient appeared quite comfortable. A further note, made on the 14th February, states that the temperature reached normal on the 30th January, after a severe relapse lasting sixteen days, which reduced the patient to a much lower state than the primary fever."

When I first saw this case on Christmas Day I felt sure that she was suffering from leakage through a typhoidal ulcer, and I was fully prepared to operate should her symptoms become in the least degree worse. We watched her anxiously from hour to hour, and were relieved to find that her pulse became slower by a few beats, whilst her abdominal movement and tension did not show any marked impairment. I am quite aware that such a fortunate case is likely to lead to disaster in the future, for it will tend to make one delay an operation in the next case of a similar kind until it is too late, in the hope that the symptoms will again subside. Very careful watching, however, should help one to elude the danger.

PERFORATION LEADING TO ACUTE SEPTIC
PERITONITIS—DEATH.

Case XI.—G. T., aged 58 (Male Surgical Register, vol. iv., 1902, No. 2300), was admitted to Kenton Ward complaining of a pain in the right iliac region. The patient first noticed a swelling in the right iliac region sixteen months ago, and before its appearance he had been confined to his bed for about a month by an attack of severe abdominal pain. During the whole of his illness he has been losing flesh, and has had periodical attacks of sickness. The pain is not increased by food, nor is the sickness affected by what he eats. The patient is a delicate man, with snowy white hair and beard. He had sinuses of discharging tuberculous glands in his neck. In the right iliac region was a hard oblong swelling, which did not fluctuate, and was dull on percussion. The swelling was fixed to the underlying tissue, but the skin moved freely over it. A slight swelling could be felt on the right side through the rectal walls, the swelling being tender.

I came to the conclusion that the swelling was a mass of caseating tuberculous glands rather than a carcinoma, for the patient had undoubted tuberculous glands in his neck, and it is rare for tubercle and cancer to co-exist in the same patient. On the 26th August I cut down upon the swelling, and found it to be a mass of glandular substance like caseating material which could not be removed without opening the peritoneal cavity. I therefore scraped away as much as possible, plugged the wound lightly with gauze, and sent the patient back to bed. He passed a quiet night, but on the following morning his temperature was 99.8° F. and his pulse had increased to 96. The wound was dressed, and as soon as the packing was removed it was plain that he had a fæcal fistula. The wound was fomented, but at 4 P.M. he suddenly complained of great abdominal pain. His pulse rose to 116 and his temperature to 100° F. In a short time his abdomen became rigid, motionless, and distended, and he died on the following day, 28th August, at 1.45 P.M., twenty-four hours after the operation. The post-mortem examination showed that there was a hole in the anterior wall of the cæcum which communicated with the wound in the abdominal wall. The ileo-cæcal junction was the seat of an extensive malignant growth which was ulcerating. The new growth involved the whole circumference of the cæcum and also affected the orifice of the appendix. There were no secondary growths, and the neighbouring lymphatic glands were not enlarged.

ACUTE PERFORATING APPENDICITIS—RECOVERY.

Case XII.—A schoolboy, aged 10 years (Male Surgical Register, vol. iv., 1902, No. 1365), was admitted to Kenton Ward on Sunday, 18th May 1902, complaining of severe abdominal pain. It was said that he was quite well until 16th May, when he was suddenly seized with severe stomach-ache whilst he was in school. He asked to be sent home, but his teacher refused, and he remained until 12 o'clock, when he crept home and was at once put to bed. He was then sick several times, but he was not brought to the Hospital until the 18th inst., two days after the beginning of the attack. His temperature was 100.6° F. and his pulse 130. His abdomen did not move on respiration. It was rigid, particularly in the right iliac fossa, and was abnormally tympanitic over its whole surface.

I thought the boy was suffering from an acute inflammation of the appendix, and decided to make an immediate exploration. The appendix was easily found and removed. It was congested, ulcerated, and was so nearly perforated in two places that its outline was bulged at each thin spot. The patient bore the operation well, and on the following day his temperature was 100° F. and his pulse 99. On 21st May his pulse was 88 and his temperature 97.6° F. The stitches were removed on 24th May as the wound suppurated, but it soon granulated, and had almost healed by 27th June, when the patient left the Hospital for the Convalescent Home at Swanley.

These cases teach several lessons, some of general importance, others merely of individual interest. They show that the perforation is not always so acute as it often appears when the patient is seen in an agony of pain which is said to have come on suddenly. A little careful questioning will often elicit evidence of preliminary leakage before the occurrence of the actual rupture, even though the discomfort has not been mentioned, and the friends can give no account of any previous symptoms of indigestion. A knowledge of this fact enabled me to act promptly in Case I., and made me hold my hand in Case X.

The symptoms and even the signs of perforation may be trivial, and so misleading, as in Case VII., that competent observers may be led into error. The value of the pulse as a guide has been already dwelt upon in these cases (p. 5), and it appears to be of especial use when its rapidity is out of due proportion to the temperature. On the other hand, the full

force of the perforation is sometimes transmitted along the visceral nerves, and the patient, as in Case IX., dies at once of shock, when there is no widely spread peritonitis or extravasation of the contents of the alimentary canal to account for his rapid collapse.

The prognosis must not be too sanguine in cases of gastric and intestinal perforation, even when the hole has been sutured securely. Repair takes place readily as a rule, but there is a serious risk of death from suppuration, especially in the sub-phrenic and iliac regions, whilst in Case VIII. it seemed as if the ulceration had continued after suture, and in spite of it. An unfavourable prognosis should be given in every case when the pulse remains unduly quick after an operation, however good the general condition of the patient may seem to be, and in spite of a temperature but little if anything above the normal. I should prefer to see a rise of temperature and a fall in the pulse rate after the suture of a perforated ulcer rather than an acceleration of the pulse, even though it were accompanied by a fall of temperature and a return of appetite.

The after treatment, especially in regard to appropriate feeding, is, I think, fully dealt with. We have always found that the sensations of the patients have furnished the best indications of what is good for them, and that if they were unduly pressed with food they vomited.