A clinical lecture on seven cases of perforated gastric ulcer treated by operation, with three recoveries : delivered at University College Hospital on Oct. 20th, 1896 / by Arthur E. Barker.

With the Authors Compts

(2)

A Clinical Lecture

ON SEVEN CASES OF

PERFORATED GASTRIC ULCER

TREATED BY OPERATION, WITH THREE RECOVERIES.

Delivered at University College Hospital on Oct. 20th, 1896,

BY

ARTHUR E. BARKER, F.R.C.S. Eng.,

PROFESSOR OF THE PRINCIPLES AND PRACTICE OF SURGERY AND PROFESSOR OF CLINICAL SURGERY AT UNIVERSITY COLLEGE, AND SURGEON TO UNIVERSITY COLLEGE HOSPITAL.

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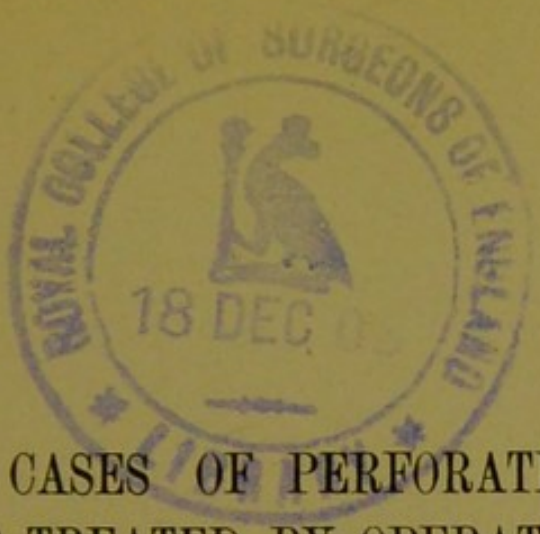

SEVEN CASES OF PERFORATED GASTRIC ULCER TREATED BY OPERATION, WITH THREE RECOVERIES.[1]

GENTLEMEN, — Among the most recent advances in abdominal surgery none is more interesting or more likely to yield good fruit than the operative treatment of perforating gastric ulcer. This hitherto terribly fatal accident is now shown to be well within the reach of surgery if taken in hand promptly. And there seems to be good reason to hope that as time goes on our achievements may be crowned by a success which as yet we can hardly estimate. For just as in the case of other intra-abdominal lesions the study *in vivo* by the operator has cleared up many pathological and clinical questions impossible of solution by those who only had an opportunity of examining regions and tissues after death, so may it be in the case of gastric ulcer. Much light is almost certain to be thrown upon its anatomy, pathology, and clinical history by this "*autopsy in vivo*." And this is as likely to prove of service to the physician in his endeavour to arrest the progress of gastric ulcer as it will be to the surgeon who has to deal with the latter when it has perforated. It is almost impossible to gauge the influence which the study of the next few score of operations for perforated gastric ulcer may have upon the knowledge and treatment of stomach disease. And here physicians and surgeons are more than ever dependent on one another for mutual help. What we want now, it appears to me, is a careful detailed record of the cases operated on and of the impressions produced by the various procedures adopted on the minds of the operators

[1] The original number of cases on which this lecture was based was five. Since it was sent to THE LANCET I have operated on two more and have incorporated them here to save separate record.

themselves. I propose, therefore, now to record my three successful cases in detail and to refer very briefly to the only four other unsuccessful cases in which I have operated for this condition. Three of these are referred to generally in a lecture published some time ago, but a short allusion to them here with one since operated on will make the present a complete record of all my operative experience up to the present in this particular field of gastric surgery. Finally, I propose to give my impressions upon some interesting points which must occur to all who deal with these cases. For the following abstract of the voluminous notes of Case 2 I am indebted to my late house surgeon, Mr. J. H. Cook, to whose untiring attention and intelligent care much of the success of our interference must be attributed. The other cases, taken in the order of their occurrence so as to avoid repetition, I have myself abstracted. It may be stated at once that before, during, and after the operation they received the same general treatment. The patients' bodies were in every case wrapped in warm wool from head to foot to avoid chill and all means were adopted to avoid prolonging the operation unnecessarily. All delay, too, in commencing the latter was avoided in every way possible.

CASE 1.—A young woman aged twenty years was admitted into University College Hospital on Dec. 19th, 1895. She had been a hard-worked housemaid for the last six years. For a year past she had been typically anæmic, with irregular menstruation, constipation, pain in epigastrium and mid-dorsal region, also retching, anorexia, drowsiness, "hollow cough," and shortness of breath. There had been no hæmatemesis or headache. On Dec. 19th the patient had breakfast at 8 A.M., consisting of bread-and-butter, tea, and an egg. After this there was some pain, but not enough to prevent her going about her housework. At 11.40 A.M. while going down stairs empty-handed she coughed sharply and thereupon was seized with severe gastric pain followed by fainting and a semi-comatose condition, which lasted until her admission. At 12.30 P.M. the patient vomited, and again at 2 P.M. A hypodermic injection of morphia was given and hot poultices were applied. She was admitted into the hospital at 8 P.M. At this time there was not much shock. The pulse was 120 and the temperature in the rectum was 103·2° F. Her breathing was shallow (30). The abdomen was not distended, but was slightly prominent below. The respiratory movements were limited to

the upper part. The abdominal wall was rigid and tympanitic all over, including the liver area. It was less resonant in the right flank and splenic dulness was present. The diagnosis being clear, the operation was performed at once—eight and a half hours after perforation A median incision five and a half inches long was made above the umbilicus, and another from the middle of this through the left rectus transversely. A great escape of gas and turbid fluid followed, with a return of the liver dulness at once. When the stomach was handled severe vomiting set in, requiring both hands to keep the organ within the abdomen. The perforation was found in the anterior wall high up to the left near the lesser curvature. It measured one-third of an inch across. Its edges were much indurated, but there were no adhesions round it. It gave exit to green fluid. The abdomen throughout contained a large quantity of thin yellowish fluid, most abundant in the left flank and pelvis, less in the right flank, and a little in the right groin. A few flakes of lymph were seen. All this was removed by sponges passed into the various regions with the hand. This sponging occupied twenty-six minutes, and was most carefully carried out between the liver and diaphragm on either side of the falx and on the under surface of the liver round the sp'een. Then the opening in the stomach was closed with seven fine silk sutures taking up about half-an-inch of the stomach wall on either side and placed about a quarter of an inch apart. The row of stitches was vertical. After a final sponging on the same lines a piece of omentum was laid over the line of sutures in the stomach, and the abdominal wound was partially closed by interrupted silk sutures, only enough being left open to hold three strips of iodoform gauze, one running down to the lesion in the stomach and one to the liver border on the right and left. But before closing the wound a puncture was made in the abdominal wall below the ribs on the left side and a seven-inch drain tube was inserted so as to lie between the liver and the diaphragm. The operation lasted one hour and twenty-five minutes. The after-treatment was practically the same as in Case 2. There was but moderate shock, and when this was overcome convalescence was uninterrupted.

CASE 2.—This is of special interest as illustrating the possible difficulties which may arise in the diagnosis of a condition usually regarded as presenting an obvious and unmistakeable clinical picture. The patient was an unmarried

parlourmaid aged twenty-four years. She came from Norfolk, and had always been regarded as a typically robust country girl, well nourished, and of fresh colour. She remembered no previous illness, and her family history was good. She had never had any symptoms pointing to disorder of the stomach, except occasional trifling dyspepsia. Six years ago she noticed a right inguinal hernia, followed in a few months by one on the left. On June 12th, 1896, I saw her at 9.30 P.M. apparently quite well. At 10.30, contrary to her usual custom, she took off her truss before getting into bed feeling quite well. Thereupon the hernia came down on the right side, but she pushed it back herself. On turning over in bed shortly after she was seized with violent pain in the right inguinal region so severe that she roused the household with her cries. I examined her an hour later and there was no abdominal distension and no symptom of collapse. The pulse was about 80 and the temperature 99·8° F. There was no sickness and the colour was good. Both inguinal rings were empty. There was no clear indication as to the cause of the pain, but appendical colic was suspected. A hot stimulant was given and a hypodermic injection of morphia, and the abdomen was covered with a belladonna fomentation. Early next morning, the pain still persisting and the temperature having risen to over 100° and the pulse also to over 100, the patient was sent to the University College Hospital. On admission it was noted that there was no abdominal distension, nor had there been any vomiting or even inclination thereto, but the temperature had risen to 101·8°. The colour was still good and there was no collapse. The pulse was 134 and of low tension with occasional intermission. There was no dulness in the flanks but great tenderness on palpation, especially in the inguinal regions. The rings were clear, but there was fluid now in the right inguinal sac which could be reduced. The patient lay supine with the legs straight out. She had passed no flatus or motion since the onset. Vaginal and rectal examination was negative. Under observation during the forenoon the temperature gradually rose to 102·2° and the pain increased. It was therefore decided to operate without delay. This was done eighteen hours after the onset of the attack, the provisional diagnosis being either reduction *en masse* or appendicitis. In view of the provisional diagnosis an incision four inches long was made through the right rectus muscle parallel to, and half an inch internal to, the linea semilunaris and ending about one inch above the inguinal ring. After

opening the abdomen a quantity of turbid fluid like thin custard, alkaline in reaction, welled up from the pelvis. The omentum close to the ring was chronically thickened as by the pressure of a truss. Both rings were found to be empty as well as the other apertures. The right hernial sac was full of the fluid referred to. The vermiform appendix was normal. There were no signs of strangulation anywhere and no particularly distended coils of intestine. The pelvic organs, which were bathed in the fluid named, were examined and found healthy. There was some recent lymph on the small intestines, which were slightly injected. After the pelvis had been dried out a sponge was thrust on a holder upwards towards the liver on the right side, when a gush of gas and fluid revealed the nature of the case. On percussion the liver dulness was found to be obliterated. This part of the operation had lasted nearly an hour. The inguinal incision was now covered with a flat sponge, and a second five-inch median incision above the umbilicus was immediately made. The right upper quadrant of the abdomen was now found to be quite full of the same fluid already described, which was dammed back from the left side by a screen of great omentum. After sponging out this fluid in large amount a small perforation the size of a crow-quill was found at the right end of the stomach in the anterior wall close to the pylorus. Its edges were clean cut and soft. The peritoneum between the upper surface of the liver and the diaphragm was coated with lymph, and was cleansed by a flat sponge passed many times between the two structures on both sides of the falciform ligament with the hand. The perforation was then closed by a double row of 6 × 2 silk stitches by Lembert's method for quite three-quarters of an inch on each side Before this was done, however, the stomach had been emptied as completely as possible through the perforation by pressure with the hands. The peritoneum was now sponged finally all over, special care being given to the subphrenic spaces, the flanks and the pelvis, where any residuum of fluid would have collected. Then the upper incision was partially closed by stout silk sutures, leaving room for four thick strands of iodoform gauze for drainage Two of these passed upwards, one on each side, between the border of the liver and diaphragm, one dipped down behind the gall-bladder and one to the line of suture in the stomach. The latter was finally covered by a fold of omentum. Then the inguinal incision was completely closed by deep silver and superficial silk sutures. A

salicylic wool dressing all over the abdomen completed the operation, which had lasted nearly two hours. At the close of the operation the patient was extremely collapsed; there was no perceptible pulse at the left wrist; at the right it could just be felt, beating 144. In three hours, however, matters had improved. Feeding by the rectum was begun at once, nutrient suppositories and enemata of peptonised milk alternating every four hours with small hot water enemata. There was still no vomiting until next morning, when some perfectly undigested broad beans and their pods were brought up twice. The temperature at this time was 100°. Food by the mouth was given from the first—two drachms of a mixture of the white of an egg beaten up with two ounces of warm water and half an ounce of brandy every two hours. From this time the pulse improved greatly. On the fourth day the patient vomited four times, bringing up a mixture of undigested beans and asparagus to the amount of five ounces in twenty-four hours. On this day the gauze drains were partially loosened. On the fifth day the rectum rebelled against the nutrient enemata. The egg mixture was therefore increased to three drachms every two hours, and one drachm of brandy in six drachms of soda-water besides frequently. One of the gauze drains was removed on this day with some difficulty and pain. On the sixth day the white of an egg mixture was increased to one ounce every two hours. A small stitch abscess was now found in the lower part of the upper incision: it was quite superficial. Alternating with the other food half an ounce of milk was now given every two hours. On the seventh day the remaining strands of iodoform gauze were drawn out of the abdomen. The yelk of the egg was now added to the mixture and one ounce of the latter was allowed every two hours. Also one ounce of chicken broth alternating with this every two hours. A pint enema of hot water opened the bowels to-day (the seventh) for the first time. On the eighth day the egg mixture was doubled and alternated with Benger's food, beef tea or chicken broth. Suppositories of peptonised meat were given as before. The ninth day saw the complete healing of the lower wound and the removal of the stitches. On the tenth day the egg mixture was increased to three ounces every two hours; once a day one drachm of Brand's essence of meat was given, and chicken broth as before. The stitches were removed from the upper incision, which was now syringed out and lightly dressed with iodoform gauze, the edges being brought

together with American rubber plaster. Once a day the patient was from now given half an ounce of juice scraped from lightly cooked fresh meat. Feeding was continued during the day as before every four hours, but not at night. On the twelfth day a cup of weak tea was added to the other food. On the sixteenth day the patient had an attack of follicular tonsillitis, which soon passed off. The diet was varied with several kinds of jelly. Soon after this the patient was allowed pounded chicken and then gradually returned to a normal light diet. By July 27th the wounds were soundly healed and the patient was practically well She did not, however, leave the hospital until the end of August, and then only for the Convalescent Home at Eastbourne. When she returned to service on Oct. 1st she looked quite well, and said she was getting stronger daily. Since then the lower wound has been rubbed by her truss and has discharged a little, but this has not interfered with her duties. The latter are made light, and she is constantly under observation in the house of the medical man in whose service she is.[2]

CASE 3.—A woman aged twenty-seven years, a housemaid, was admitted into University College Hospital on Nov. 2nd, 1896. She had only been a short time in service with the medical man in whose house the perforation took place, so that her previous habits were imperfectly known. She had come from Scotland a few weeks before, a strong, well-built girl, but very anæmic, very dyspeptic for several years, and with very bad teeth. She had never had hæmatemesis. The bowels were habitually confined. On Nov. 2nd she went to her room to dress at 11 A.M. when a fellow servant hearing an unusual noise looked into her room and saw her fallen back on her bed pale, motionless, and apparently dead. The medical man, on being immediately fetched upstairs, found her pulseless and in deep collapse. Restoratives were administered and she revived She was then sent to University College Hospital On admission it was noted that she lay on the back with the legs extended complaining of severe pain in the epigastrium somewhat to the left of the

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[2] The patient remained well and in active service up to Nov. 15th, 1896, when she felt pain in the abdomen and vomited a little blood. The next day she looked ill and was sent to the hospital, and while there had a severe attack of abdominal pain and some sickness with a temperature of 102°. She is now (Dec. 1st, 1896) well apparently but still in bed.

middle line. Respirations were shallow and frequent. The pulse was from 80 to 90, full and compressible. The abdomen was not distended; movement was almost gone except above. There was epigastric tenderness, but no general tenderness; the wall was hard; and there was an absence of liver dulness. The temperature before operation was 102·2° F. in the rectum. At 6.30 P.M., seven and a half hours after perforation, I operated precisely as in Case 1, finding gas and abundant effusion throughout the whole abdomen, but most on the left. This was dealt with by sponging, as in all the other cases, the transverse incision through the left rectus giving free access to the left side especially. There was a little difficulty in cleansing the right sub-phrenic space. The manipulation of the stomach had a bad effect on the breathing for a few seconds. The perforation lay near the lesser curvature at the cardiac end of the stomach. It was oval, half an inch by a quarter of an inch in dimensions, sharp-cut, with very little induration around; there was no lymph about it. The opening was closed by two rows of silk stitches, the first nine and the second eight. The greater part of the abdominal wound was closed by deep silk sutures, three strips of iodoform gauze being inserted for drainage. One of these ran to the stomach suture, another to the border of the right lobe of the liver, and a third passed down behind the gall-bladder. The operation lasted one hour and twenty-three minutes. The patient bore the operation well and was soon comfortable. Next morning the temperature was 100°, the pulse 96, and the respirations 30; there had been some retching. Rectal feeding was resorted to, as in the other cases, with small quantities of albumen, water, and brandy by the mouth from the first. For the first week there was steady improvement, the temperature falling steadily to below 100° and the pulse to from 76 to 86. On the seventh day she looked bright and well, had passed flatus, and ceased retching. At 1 P.M. I removed the gauze drains, which were bathed in a small quantity of pus. At 3 P.M. the temperature was 99·4°. At 5.30 P.M. it rose suddenly to 102·8° and she felt ill. At 8 P.M. the temperature was 104°, at 9 P.M. 102·8°, and at 11 P.M. 100·8°. From this time onwards it fluctuated between 103° and 99 8° for ten days, during which I carefully drained the tracks from which I had removed the strands of iodoform gauze. These tracks were soon almost dry, but still the fever remained at night and the respirations corresponded. At the end of the second week there was well-marked fine crepitation or friction over the

side and base of the right lung with deficient resonance on percussion and absence of vocal fremitus as high as the fourth rib in the nipple line. Some of my colleagues referred this to dry pleuritic rub; to me it was rather more like a fine bubbling crepitation. On the eighteenth day I felt that there must be some matter in the sub-phrenic space; and at 10 P.M. I punctured with an aspirator needle in the eighth space in the posterior axillary line, and at a depth of two inches from the skin surface reached pus and drew off thirteen ounces of thin, pale fluid, quite sweet, and not blood-stained. This gave relief and lowered the temperature. It also caused total and immediate disappearance of the fine crepitation previously heard. The next morning the patient was better, and I thought it well to resect one and a half inches of the ninth rib opposite my puncture, stitch the phrenic and parietal pleura together, and puncture again. But though I did this in various directions I found no matter. The wound was packed with iodoform gauze. The patient remained much better for the next couple of days, and on the twenty-second day I punctured again opposite the proximal end of the excised rib and at a distance of half an inch from the rib reached pus. A narrow-bladed knife was thrust along the needle and the opening was enlarged and with forceps I inserted a drain tube which slid in some three inches. About five ounces of odourless pus were thus evacuated containing white clots of lymph. I confess I am uncertain as to whether this was a sub-phrenic collection or a localised empyema lying under the base of the lung upon the diaphragm. It certainly was reached at no more than half an inch from the outer surface of the ninth rib Nor do I know any way of settling the difficulty. On removing the first thirteen ounces of pus the fine crepitation completely disappeared, which seems to me to negative a parietal friction rub and to favour the view I personally held from the first, that it was a fine mucous crepitation in compressed lung. This sound, however, reappeared the next morning over a diminished area and not so loud. The patient's present condition (thirtieth day) is as follows. She takes nourishment well by the mouth; the bowels act without enemata; the abdomen is painless, and the wound in the abdomen is clean and closing steadily; the pulse is from 90 to 104, the respiration about 20, and the temperature from 100·6° at night to 99·2° in the day; the rib wound is draining well; the patient is feeling well and is cheerful; and although it is too soon to pronounce her out of danger I think I am justified in calling

this so far a successful case in adding it to my previous list.

CASE 4.—A woman aged twenty-three years, a housemaid, was seized with severe epigastric pain after breakfast on Dec. 1st, 1895. She was able to do her morning's work, however, and did not go to bed until about noon. She was treated with morphia and hot fomentations. When I saw her for the first time at noon the next day the symptoms of perforation of the stomach were obvious. There was collapse; the pulse was 110 and the temperature 102° F.; the respiration was shallow, and there was distension and great tenderness. The operation was performed at 4.30 P.M., some thirty-two hours after the perforation. A median incision was made above the umbilicus; there was a great escape of gas and fluid which contained food. The abdomen was cleansed as in the other cases, except that the hand was not carried between the liver and diaphragm as was done in all the other cases. A perforation of the size of a goose quill was found to the left of the middle of the anterior wall. This was closed by a double row of sutures, and the wound was treated as in other cases. The patient bore the operation without particular shock, and was soon doing very well until the third day, when the temperature had fallen to normal. There was no vomiting and the tenderness soon disappeared. After this the temperature gradually rose, but everything else was satisfactory, the bowels resuming their functions. About the tenth day I felt almost sure there was a subphrenic abscess on the left side and went to the bedside prepared to explore it. I could not, however, make up my mind to do so. The temperature from this time rose to 106° and the patient died on the fifteenth day.

Necropsy.—Post mortem the abdomen was found in a very satisfactory state except above the left lobe of the liver, where there was a large subphrenic abscess and commencing basal pleurisy. Had the abscess been opened the result would probably have been good from all appearances. It was clearly limited and shut off from the rest of the abdomen.

CASE 5.—A woman aged twenty-three years, a housemaid, was admitted to University College Hospital on Jan 10th, 1896. She was a vigorous-looking woman and had been very

energetic in her work. She had suffered from epigastric pain after food for some years. There had been no vomiting or hæmatemesis before this attack. At 2 P.M. on the 9th she had been attacked with severe epigastric pain, which gradually spread over all the abdomen. There was repeated vomiting, but no hæmatemesis. On admission on the 10th, at 5 P M., she was found to be pale, ill, and collapsed. The pulse was 160, small, and thready; the respiration was 60, and chiefly thoracic. The abdomen was extremely distended and rigid and resonant everywhere, even over the liver and as high as the fourth space. There was slight dulness in the right side. The operation took place at 6.15 P.M., twenty-eight hours after the rupture. A median incision was made from the ensiform to the umbilicus, followed by a great escape of gas and yellow turbid fluid containing fragments of the last abundant meal, with return of the liver dulness and improvement of pulse. The stomach was strongly adherent by recent lymph to the parts around, and a firm, old, fibrous band, an inch long and as thick as a goose-quill, united it with the abdominal wall. This had to be divided in order to bring the perforation into view. This lay about the middle of the anterior wall of the stomach just below the edge of the left lobe of the liver. It was surrounded by much old half-organised and recent lymph and the wall of the stomach around was hard and gristly. The organ was now emptied by gentle pressure, green fluid escaping by the perforation. This manipulation had a very bad effect upon the pulse and respirations. The lymph having been wiped away thoroughly from around the perforation the latter was closed as in the other cases with a double row of silk sutures. Then the same elaborate mopping with sponges introduced everywhere by hand was done and a drain opening was made in the left flank for a tube passing between the liver and the diaphragm. The closure of the wound over iodoform gauze strips was effected in the same way as in the other cases. The operation lasted sixty-five minutes, during which time the patient's condition was very critical. She only lived four hours, never having properly rallied.

CASE 6.—This patient, a housemaid aged seventeen years, was admitted to University College Hospital on Feb. 29th, 1896. Her history showed indigestion for six months, with pain a quarter of an hour after meals, which had become much worse during the last week. There was constipation,

but no vomiting or hæmatemesis at any time. On the 28th she experienced severe pain in the abdomen half an hour after breakfast, but not enough to prevent her undertaking the ordinary housework. At 1 P.M. the patient ate a heavier dinner than usual, and at 1.30 P.M. she had very severe pain in the abdomen, necessitating her taking to bed up to her admission to hospital at midnight. The patient subsequently vomited several times on trying to take food, and had been very much collapsed. The last stool had been on the 25th after an aperient, and a slight motion came away on the 28th after repeated enemata. On admission she was found to be a well-nourished girl. She was in a state of collapse. The pulse was 90, the temperature, taken in the rectum, was 99° F., and the respirations were quick and shallow. The abdomen was generally distended and tender. There was no dulness anywhere, even over the liver. The respiration was almost entirely thoracic. The operation was performed at 1.30 A M. on Feb. 29th, twelve hours after rupture (? seventeen hours). An incision from the ensiform cartilage to the umbilicus was made, which was followed by a gush of gas and two pints of fluid, containing potatoes and greens, with a return of the liver dulness. A transverse incision was then made from the middle of the first incision through the left rectus muscle. A perforation measuring half an inch by one-third of an inch was found in the anterior wall near the lesser curve. The contents of the stomach were squeezed out of the perforation until it became empty. The abdominal cavity was cleansed methodically with hand and sponge as in the last case. The aperture in the stomach was similarly closed by six silk sutures. The final treatment was as in the previous case. The operation lasted about an hour and a quarter. There was much shock, from which the patient hardly recovered, and she died within twelve hours.

Necropsy.—On post-mortem examination septic peritonitis was found generally, with collections of semi-purulent fluid. The line of suture in the stomach was watertight. The mucous membrane of the stomach was healthy except at the edges of the ulcer, which were turned in.

CASE 7.—A young woman aged twenty years, a housemaid, was admitted to the University College Hospital on Oct. 25th, 1896. For the last year she had suffered from dyspepsia, but otherwise she enjoyed good health. At 5.30 P.M., whilst alone in the house, she had been seized

with sudden pain in the abdomen and was found in a collapsed condition. Dr. Ringer, who lived close by, was called, and at once diagnosed perforated gastric ulcer. There were collapse, general abdominal pain, and epigastric tenderness. She had had a full meal of beef and cabbage at 1.30 P.M. On admission at 7 30 P.M. there were still collapse, hurried breathing, and great abdominal pain. Pallor was marked and the surface was cold. The pulse was 108 and the temperature 100·6° F. The abdomen was somewhat distended; the liver dulness was gone in front, but remained behind. There was some loss of resonance in both flanks. The tenderness was limited to the upper part of the abdomen. At 9 P.M.—i.e., three and a half hours after perforation—I operated precisely as in Case 3 except that the left rectus was not divided transversely. The subperitoneal fat before opening was observed to be œdematous. When the abdomen was opened there was a great gush of gas, followed by opaque turbid fluid containing flakes of lymph and fragments of green cabbage and other food. This fluid was faintly alkaline. The whole abdomen had been infected and it was necessary to sponge every part of it from diaphragm to pelvis. The perforation in the stomach was circular and about a quarter of an inch across. It lay near the lesser curve to the left of the middle of the organ. Its edges were clean-cut and surrounded by an area of induration as large as a shilling. After squeezing the stomach empty the opening was closed by folding in its edges by a row of seven silk stitches reinforced by a second row of ten stitches. The general treatment of the abdomen was the same as in the other cases except that there was no lumbar drainage-tube. All the drainage was through the anterior wound and consisted of strips of iodoform gauze. The operation lasted one hour and twenty minutes. The pulse improved when the gas and fluid escaped; it deteriorated during the sponging and again improved when this was completed. There was comparatively little shock, which soon passed off, and the condition next morning was good, the temperature being 100·6°, the pulse 116, and the respirations 28. But from this time on the temperature and pulse rose through the day and following night and the patient died at 6 A.M. on Oct. 27th, thirty-six hours after the operation, with a temperature of 106·2°.

Necropsy.—The post-mortem examination showed general septic peritonitis, the only clean part of the abdomen being the area round the seat of incision drained by the iodoform gauze.

It will be first noticed in regard to these cases that they were all young female domestic servants. Further, it is remarkable that in five out of the seven cases they had only been for a short period in the situation in which the accident occurred. This suggests the possibility of previous privation (certainly present in one) followed by abundant supply of unwonted food having played a part in the causation of the ulcer. Extreme anæmia was marked in five of the cases and not in the others. It was conspicuously absent in Case 2, the patient looking typically healthy. As to the immediate exciting cause of the giving way of the ulcer, it is noted in three of the cases that a heavy meal had just been taken (Cases 5, 6, and 7), all of which were fatal. In the other four (Cases 1, 2, 3, and 4) the patients may be said to have been fasting. In Case 2 the rupture occurred long after a light meal at 10 P M., when the patient was in bed and without the slightest premonitory sign. In Cases 1, 3, and 4 the perforation appears to have taken place early in the morning, some time after a light breakfast. It is further worth emphasising that of the four who had only had a light meal some time before three recovered and one lived fourteen days after operation. All of those who had had heavy meals shortly before died. Physical exertion does not appear to have caused the final perforation in any of these cases, but in Case 1 the latter may possibly have been produced by an attack of coughing. As to premonitory symptoms there were none at all in one case. In none was there hæmatemesis. Pain was present after food in four and sickness in two cases.

The condition of the patients at the beginning of the operation varied. In Case 2 there was no shock and the colour was very good, but the temperature was 102·2° and the pulse 136 and intermittent; the abdomen was not markedly distended. In Case 1 there was not much shock, the temperature was 103·2°, the pulse was 120, and the abdomen was not distended. The same was the case at the time of operation in Case 3 though the perforation produced shock. All of these recovered. In Case 4, too, in which the patient lived fifteen days, there was not much shock although the temperature was 102°, the pulse was 116, and the abdomen was somewhat distended thirty-two hours after perforation. In Case 6 there was much collapse, the temperature was 99°, the pulse was 140, and the abdomen was generally distended twelve hours after perforation. Extreme collapse was also present in Case 5, with the pulse

160 and the respiration 60, the abdomen being greatly distended all over twenty-eight hours after perforation. Both of these cases died soon after operation. The three cases which recovered were operated on respectively at eight and a half, eighteen, and seven and a half hours after the accident. The other four at thirty-two, twenty-eight, twelve, and seven hours after.

In all seven cases the perforation was on the anterior stomach wall; the largest was only half an inch across. There was no evidence in any of a second perforation. The duration of the several operations were :—In Case 1 one hour and twenty-five minutes (recovered), in Case 2 just two hours (recovered), in Case 3 one hour and twenty-three minutes (recovered), in Case 4 one hour and a quarter, in Case 5 one hour and five minutes, in Case 6 one hour and a quarter, and in Case 7 one hour and twenty minutes. The last four died.

In regard to the operations themselves they were carried out on the same lines except in Case 4. Everything was done as quickly as possible. A median incision was made in all; in three a transverse cut through the left rectus muscle was added to this, the perforation being difficult to reach. In one an inguinal incision had been previously made which probably facilitated the cleansing of the pelvis very materially. In cleansing the peritoneal cavity dry sponging was employed in all without flushing of any kind. In doing this particular care was observed to carry the hand and sponge between the liver and diaphragm in order to wipe away lymph, fluid, and food. In my first case (Case 4) this point was omitted, with the result of a left subphrenic abscess. Taught by this I was more careful in all the other cases and was surprised in each by the amount of matter which could lodge between the liver and diaphragm. Round and behind the gall-bladder also required special cleansing as well as the flanks and pelvis. There was no very special difficulty in carrying the hand into all these regions through the median incisions. After a large experience of flushing the abdomen I prefer dry sponging for this class of cases. A drainage-tube was inserted through a special hole in the flank in two cases, but in each appeared to do but little work, and I think now might have been dispensed with except in Case 3, where a subphrenic abscess formed and had to be opened between the ribs. The anterior wound was drained with strands of iodoform gauze in four cases and with the best results.

One strand reached deeply between the liver and diaphragm on each side, another to the suture in the stomach, and a fourth down behind the gall-bladder. They remained *in situ* until the fifth or sixth day, when there was always some difficulty in removing them. But I have been greatly impressed with their value; they drained well, and on removal the edges of the wound came together wonderfully. In Case 2 the scar has all the appearance of one healed by first intention, without the least bulging. *In no case was the ulcer cut out.* The edges were simply folded well in and the closing silk stitches were deeply inserted in one or two rows by means of round sewing needles.

In the after-treatment great reliance was placed on feeding by the mouth (see Case 2). Small repeated doses of egg albumen and water, of brandy, beef-tea, and chicken broth were begun as soon as the patient had recovered from the anæsthetic. But besides this peptonised suppositories were introduced into the rectum, alternating every two hours with five ounces of hot water.

From the experience gained in these cases I am inclined to think that the success or failure in their treatment depended in the first place upon the moment after perforation at which they were treated. In the next place the condition of the stomach contents which escaped among the intestines must have influenced the result. In Cases 2 and 3 the fluid found round the perforation was thin and without visible fragments of food; it was also slightly alkaline. The characters of the fluid in two other cases were the same to all appearance. One of these recovered and the other lived fifteen days. In the three remaining cases, where solid meals had been taken shortly before, large fragments of food (potatoes and greens) were present among the intestines and were producing much irritation, as evidenced by the presence of abundant lymph and dirty serum. Of course, this produced much more profound shock and great distension. Whether in these two cases the abdomen could have been better cleansed by flushing is, I think, a question easily answered. Very voluminous and prolonged flushing would probably have done more in carrying away débris of food than simple sponging with the hand. But in the state in which these patients reached the operating-table they would not have tolerated any prolonged operation. As it was, one died four hours after of shock where the operation only lasted sixty-five minutes. On the whole I have formed the impression that dry sponging, as employed in all these cases, is prefer-

able to flushing. But then it must be carried out with method.

In the worst of these cases (Case 5) where there was terrible shock before the operation and in Case 6 the pulse and general condition improved greatly on the opening of the abdomen and the escape of the gas and fluid pent up under great pressure. This ought to encourage us to operate where collapse is present rather than wait on the chance of its subsidence. But it should also be noted that handling of the stomach produced violent vomiting which only ceased when the chloroform was pressed. It was necessary to evacuate the stomach by pressure in all cases and I venture to think this is better done with the hand through the perforation than by washing out, which is tedious. As to the after treatment in these cases the immediate feeding by the mouth appeared to be as beneficial as after other operations on the stomach. It is hard to imagine how this could be injurious at first while the stitches hold. And the benefit in rousing the patient from collapse is a justification for running some risk. I should feel more anxious about mouth feeding after two or three days than at first, for then the stitches might be cutting. Of course, food and plenty of fluid must also be given by the rectum at the same time. Finally, I have been careful in the two cases which recovered to keep the patients for a long period in bed under strict treatment for the gastric ulcer. For though the perforation may be soon soldered up after stitching there is good reason for believing that the gastric ulcer and the generally vicious condition of the digestion takes a long time to repair, as was evidenced in Case 2.

In the two cases referred to the patients are still under observation. Case 2 is seen daily and appears now, four months after the operation, to be in excellent health. She is in service again and doing her work cheerfully and well (*vide* footnote). Case 1 was also quite well and in service when I last heard of her. Through Dr. Coode Adams of Hampstead, to whose rapid diagnosis and prompt action in sending her at once to hospital, she owes her life as much as to the operation. Case 3 is still in hospital, going on well more than a month after operation.[3]

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[3] While correcting these notes I have been called off to an eighth and ninth case and have just finished the operations. Here I had to do with males aged forty-six and twenty-four years respectively These cases will be duly recorded in a future paper. Dec. 1st: Case 8, operated on eight hours after perforation, has so far had no bad symptom, and now, a week later, appears to have every prospect of recovery. Case 9, operated on seventy-six and a half hours after onset, died the next day of collapse.

PRINTED AT THE LANCET OFFICE, 423, STRAND, W.C