of scarlet fever. She has never menstruated since, and has remained perfectly free from pain. She is constantly engaged in nursing abdominal sections, and is one of the best nurses I have on my staff.

A CASE OF EXCISION OF THE PYLORUS FOR CANCER OF THE STOMACH.

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RICHARD S., aged 43, gas-fitter, was admitted into the Manchester Royal Infirmary, under the care of Dr. Ross, on March 13th, 1882, suffering from symptoms of pyloric obstruction, which had first shown themselves about four months previously. The patient, who was much emaciated and was rapidly losing flesh, weighing only 8 st. 7 lbs., was, at the time of admission, unable to retain any solid food, as sickness always came on about an hour after a meal, the vomited matter being at times mixed with a little blood. Fluids, however, if taken in small quantities, were retained by the stomach. The bowels were very constipated, only acting about once a week; and the motions were dark and tarry. The patient complained of considerable pain in the region of the stomach, always increased after taking solid food. On examination of the abdomen as the patient lay on his back, a hard, well defined, somewhat nodular mass, apparently about the size of an orange, could be distinctly felt close to and a little to the right of the umbilicus, corresponding in situation with the pyloric extremity of the stomach. The tumour, which was freely movable, shifted its position with the respiratory movements, and also with the position of the patient, falling to the right or left of the middle line according as he turned to either side. On making pressure over it, considerable pain was felt. No dilatation of the stomach could be detected, and the condition of the other viscera appeared to be perfectly normal. From the history and the symptoms which were present, Dr. Ross had little difficulty in diagnosing the case as one of cancer of the stomach; and as, from the mobility of the mass and the fact that it was perfectly free from any connection with the abdominal walls and adjacent organs, the disease appeared to be limited to the pylorus, the case was considered a suitable one for operative interference.

The patient, having been informed of the serious nature of the operation, and of the risks connected with it, readily gave his consent, as he was anxious to obtain relief, at whatever cost, from the symptoms from which he was suffering. Accordingly, on March 30th, he was transferred to the surgical wards, where he was fed by the mouth on peptonised milk and light custard pudding; for it was found that, as long as he was restricted to this diet, no sickness ensued. As he was very rapidly losing ground, growing daily more emaciated, preparations were made for performing the operation on April 5th. In order that the bowels might be thoroughly cleared out, simple enemata were administered the two preceding evenings, and brought away a large quantity of dark-coloured feculent matter. No food was given by the mouth for twelve hours previously.

The operation was performed at 10.30 A.M. on April 5th, according to the method adopted by Professor Billroth and Dr. Wolfner (*Clinical Surgery*, by Dr. Billroth; New Sydenham Society, p. 493), with anti-septic precautions. Chloroform was administered by Dr. Moritz, and Messrs. Whitehead and Howlett very kindly assisted me. To guard, as far as possible, against the effects of shock, the patient's extremities were carefully wrapped up in blankets, and hot bottles were kept applied to the soles of the feet and sides of the thighs and legs. As soon as the patient was fully anaesthetised, a siphon stomach-pump was passed, and the interior of the stomach was several times thoroughly washed out with tepid water. The necessity of this measure was proved by the fact that a large quantity of dark-coloured grumous matter was brought away, which otherwise would probably have escaped into the peritoneal cavity when the viscus was opened.

The operation itself may be divided into five stages.

1. *Exposure of the Tumour.*—This was effected by a transverse incision nearly six inches in length, carried across the abdomen about two inches above the umbilicus, and dividing the recti muscles. All bleeding having been arrested, the peritoneum was divided to the same extent, and the growth was then freely exposed to view. (Fig. 1.) It was found, as was expected, limited to the pyloric extremity and adja-

cent portion of the walls of the stomach, being perfectly free and movable except at its posterior aspect, where there were a few slight adhesions to some enlarged lymphatic glands which lay close to the head of the pancreas. These having been readily broken down with the finger, the pylorus and diseased mass were drawn forwards as far as possible, so as partially to protrude through the abdominal incision.

2. *Isolation of the Pylorus and Tumour from the Large and Small Omenta.*—The tumour having been drawn forwards as far as its connections allowed, the great omentum was first separated from the greater curvature of the stomach by taking it up in three portions between three double catgut ligatures, and then dividing it between each pair of ligatures with scissors. The small omentum was then separated from the lesser curvature in a similar manner, five double ligatures being used. In this way, the pylorus and diseased mass were completely freed from their connections with both omenta without any hæmorrhage; and, being quite isolated, the tumour could now be drawn forwards through the external wound, so as to lie altogether outside the abdominal cavity. This having been done, a large flat sponge was laid beneath the stomach, so as to cover in the greater portion of the wound, and in this way prevent any prolapse of the intestines, and the escape of any blood, or of the contents of the stomach and bowel, after their division, into the interior of the abdomen. By this means, the remainder of the operation was performed altogether outside the peritoneal cavity.

3. *Excision of the Pylorus and Tumour.*—This was effected in the following manner. A thick silk ligature was tied round the duodenum about an inch and a half from the pylorus, so as to prevent any extravasation of its contents from taking place after its division, and also to guard against its slipping away after its separation from the stomach. The duodenum was then divided with a pair of scissors between the ligature and the pylorus, about half an inch from the tumour and well clear of the disease. The distal portion, with the ligature round it, was then drawn over to the right side, while the stomach itself was divided. This was again effected with scissors, the division being commenced about the centre of the lesser curvature, and carried obliquely across towards the great curvature in a line slightly convex towards the left side. (Fig. 1.) In this way, the pylorus, along with

Fig. 1.—Shows Position of Growth, x, and Lines of Division, a a', of Stomach, b b', of Duodenum.

the tumour, was completely removed. The contents of the stomach, which was almost empty, were soaked up with a sponge; and its interior was carefully washed out with a weak carbolic lotion. Contrary to what one would have expected, the division of the stomach was attended by very little hæmorrhage, only two small vessels on its anterior wall requiring torsion—the result, no doubt, of the powerful contraction of its muscular coat. Nor was the division of the bowel accompanied by any bleeding, the pressure of the ligature round it probably preventing any hæmorrhage. After the removal of the tumour, a mass of enlarged glands surrounding the head of the pancreas was freely exposed to view. Some of these were removed; but, as they were found to involve the biliary and pancreatic ducts, it was thought advisable not to interfere too much with them, for fear of injuring those important structures.

4. *Closure of the Opening in the Stomach, and the Insertion of the Duodenum into it.*—The opening in the stomach was next partially closed by twenty-one silk sutures, commencing from above downwards, i.e. beginning at the lesser curvature, a small opening being left at the great curvature for the insertion of the duodenum. The silk

ligature was then removed from around the duodenum, and the orifice of the bowel was attached to the opening which had been left in the stomach at its greater curvature by means of nineteen silk sutures (Fig. 2). The sutures having been cut short and the sponge removed, the stomach was returned into the cavity of the abdomen; all bleeding points were arrested, and the peritoneal cavity was then carefully sponged out.

In the insertion of the sutures two different methods were adopted, with the object in each case of bringing into contact with one another a considerable margin of the opposed serous surfaces of both stomach and intestine. In uniting the posterior walls of the duodenum and stomach, the sutures were inserted from within (according to the plan recommended by Billroth), the needle being introduced between the mucous and muscular coats of the stomach (s), and then made to pierce both muscular and serous coats; it was then passed in the reverse direction through the coats of the duodenum (D), viz., first through the serous and muscular coats, and then between the muscular and mucous coats. In this way, on drawing tight and tying

Fig. 2.—Shows condition of Part after Removal, of Growth and Attachment of Duodenum to Stomach.

the sutures, a considerable margin of the serous coats were brought into contact with each other, and the margins of the mucous membrane at the same time fell into apposition, covering over the knot of the sutures, which in this way was left between the mucous and muscular coats at the point of junction of the stomach and bowel (Fig. 3). In uniting the anterior walls of the duodenum (D) and stomach (s), and also the two cut surfaces of the stomach itself, a

Figs. 3 and 4.—s, Stomach, d, Duodenum. 1, Mucus Membrane, 2, Muscular Coat, 3, Serous Coat. The Dark Line with the Arrow shows the direction in which the Sutures were passed.

somewhat different method was adopted, the sutures being entered from without. The opposed margins of the cut surfaces were slightly inverted (Fig. 4), so as to bring the serous surfaces well into contact with each other; the needle was then introduced from without, so as to pierce in succession the serous, muscular, and serous coats of each opposed surface. On tying the sutures, the knot lay altogether external to the stomach and bowel, and at the same time their serous surfaces were brought well into apposition with each other.*

* The second row of sutures passed so as to include only the cut margins of the mucous membrane (as recommended by Billroth) were not employed, as they seemed unnecessary, the two mucous surfaces falling accurately into apposition with one another without. Silk sutures were used in preference to catgut, as the latter, if acted upon by the gastric juice, might have softened and given way before union had taken place.

5. *Closure of the External Wound.*—This was effected in the ordinary way, by means of nine silver wire and sixteen silk sutures, passed so as to include the peritoneum. Considerable difficulty was, however, experienced in bringing the margins of the wound into contact with one another, owing, no doubt, to the contraction of the divided recti muscles, and I think, therefore, that on this account a longitudinal incision through the abdominal walls would be preferable to the transverse one as recommended by Billroth. The wound was then dressed antiseptically, and, as I regretted afterwards, no drainage tubes were employed. The patient was then removed to bed, the operation having lasted exactly one hour and a half. No sickness occurred during its performance, and a very fair pulse was maintained throughout.

As regards the after progress of the case, nutrient enemata and subcutaneous injections of morphia were administered every four hours. At 1 P.M. (one hour after the conclusion of the operation), pulse 88, full and strong; temperature 97.6°. The patient was sleeping quietly. There was no sickness. The extremities of the skin were warm. At 5 P.M. temperature 98.4; pulse 120. He was quite conscious, and complained of thirst and pain about the abdomen. He appeared to have quite rallied from the shock of the operation. At 10.30 P.M. temperature 99.8; pulse 138, soft but regular. The patient was sleeping quietly; the extremities and surfaces of the body were warm. At 12.30 A.M. temperature 102°. He had been sleeping quietly for some hours. There had been no sickness since the operation. Shortly after this, the night nurse noticed a change come over the patient, and death took place very suddenly about 1.30 A.M., nearly fourteen hours after the conclusion of the operation.

A *Post Mortem Examination* was made the following day by Mr. A. H. Young. He found the internal organs all perfectly healthy. No secondary deposits were present except in the mass of glands, to which reference has been made, as surrounding the head of the pancreas. There was slight injection of the parts in the neighbourhood of the stomach, and a quantity of bloody serous fluid was found in the peritoneal cavity. As regards the parts which had been divided, a certain amount of union had already taken place, a thin layer of lymph having been poured out, as the result of which there was slight adhesion between the opposed serous surfaces of the stomach itself, and also between those of the stomach and the duodenum. The whole of the growth had been removed, the portion of the stomach which had been left, and the bowel itself, beyond the point at which it had been divided, being found perfectly free from any trace of the disease. *Microscopic Examination* of the parts removed at the time of operation (i.e. the pylorus, and about one third of the anterior and posterior walls of the pyloric extremity of the stomach) showed that the growth consisted of scirrhus cancer. The pylorus was entirely surrounded by the growth, its opening being so contracted as barely to admit the tip of the finger. The pyloric extremity of the stomach was also involved, more especially its anterior wall, the mucous surface of which was studded with a number of distinct nodules. The duodenum was similarly affected for about half an inch; beyond this point, the walls of the bowel were perfectly healthy.

Remarks.—With regard to the cause of death, I suppose it must be referred to what is generally included under the term shock; but inasmuch as reaction had become fairly established, the patient appearing to have quite rallied from the effects of the operation, and since death was preceded by a sudden and rapid rise of temperature, may not the fatal result in this, as in many other cases of abdominal surgery, be possibly due to what has recently been described as "septic collapse," or "septic intoxication," that is to say, pure chemical poisoning from the sudden absorption of a large quantity of poisonous material by the extensive absorbing surface of the peritoneum?

From the nature of the operation, involving as it does the division of the stomach and intestine, it is not possible to keep the parts involved perfectly aseptic; and, even if it were, from the physiological law of osmosis, it is not improbable that the fluid, which is poured out into the peritoneal cavity, soon becomes infected by the formed ferments which are present in the alimentary canal, and which may make their way into it through the walls of the intestine. Hence a septic peritonitis is liable to be set up, which may destroy life in a few hours, from a very acute form of blood-poisoning.

The rapid rise of temperature just before death, the sudden collapse after reaction had become established, and the presence of a quantity of sanious fluid in the cavity of the peritoneum are, I think, arguments in favour of this theory.

For these reasons I should, if called upon to perform the operation again, be disposed to introduce one or more drainage-tubes into the abdominal cavity through the external wound, or through a counter-opening made in the loin, and attempt to draw off from time to time, by means of a syringe, any inflammatory effusion which might collect

there, according to the plan sometimes adopted in cases of ovariectomy. As regards the operation itself, which has not hitherto been adopted in this country, it has now been performed on fifteen occasions by Billroth, Wölfler, and others with considerable success, five recoveries having taken place, and one patient was recently described as being alive and in good health—the digestive functions being in no way impaired—eight months after its performance.

It is, I think, therefore well worthy of further trial; but in order that it may be successful, it should only be performed in the early stage of the disease, when the pylorus alone is involved, and where the general condition of the patient is such, that he will be able to bear the severe shock which is necessarily attendant upon so serious an operation.

THE DIAGNOSIS AND TREATMENT OF INTESTINAL OBSTRUCTION.

By H. J. BENHAM, M.D., Ipswich.

Cases of intestinal obstruction are not uncommon; we ought, therefore, to study them carefully: for a prompt and accurate diagnosis of the actual state of matters is of immense importance. Time, instead of clearing up, obscures the diagnosis; superadding symptoms of general peritonitis, which hide the local signs. In acute cases, inflammation of the bowel tends rapidly towards gangrene, rendering operative help more and more useless, if not given at the earliest opportunity. Accurate diagnosis, at the first examination, should therefore be our aim; the right treatment then follows almost as a matter of course. Delay is often more dangerous than the boldest operation.

The diagnosis and treatment of external hernia is tolerably plain and settled. What is needed is, that, in cases where the obstruction is within the abdomen, our diagnosis should become equally certain, and the treatment equally prompt and decided. I would venture to submit that, in forming our opinion, these two great classes of intestinal obstruction (the external and the internal) should be considered together—not relegated, the one to the surgeon, and the other to the physician. Is it not illogical to postpone all thought of operative interference in the one case until it is too late, and the patient is moribund; whilst, in cases of external hernia, with the same general symptoms, the rule would be to operate at once?

The pathognomonic symptoms of intestinal obstruction are absolute constipation and repeated vomiting. If meningitis, peritonitis, renal and biliary colic, can be excluded, these symptoms point to a condition which should forbid all purgatives and irritating measures, and lead to a careful and searching examination. If obstruction be complete, distension of the bowel above soon comes on, with local pain, followed by increasing tenderness from local inflammation; more urgent vomiting; pyrexia; and, ultimately, unless relief be afforded, collapse and death. There is often marked anxiety of countenance, out of proportion to the pain.

In considering these cases, it is well, following Dr. Clifford Allbutt, to divide them, according to their previous history and mode of onset, into three classes.

1. *Chronic*.—Onset gradual, during weeks or months, without any very urgent symptoms.

2. *Late Acute*.—Where, after a chronic course, a more or less acute attack of obstruction supervenes.

3. *Early Acute*.—Where symptoms of complete obstruction develop in a few hours, in a patient previously free from bowel-trouble.

The history should always be carefully noted, if possible, and the order in which the symptoms arose. The more urgent the symptoms, the more prompt must be our treatment; whilst mildness of constitutional reaction, in obscure cases, may justify us in pursuing an expectant and soothing treatment—whereby, perhaps, the inflammation and swelling of the imprisoned bowel may be subdued, and the obstruction relieve itself without operative interference. Enteritis and peritonitis are the complications to be dreaded; should they be increasing, an operation is urgently demanded to save the patient's life; and this is the more likely to succeed, the earlier it is undertaken. In forming our diagnosis, we should first mentally exclude the more chronic causes of obstruction, one by one, till we arrive at the condition present.

Commencing, then, with the *chronic* cases: if there be no abdominal tenderness or pyrexia, the cause may be impaction of fæces; stricture, fibrous or cancerous; polypus; tumour or abscess compressing the bowel. If there be abdominal distension, with some pain and tenderness, this may arise from injury to the bowel (of which the history may tell), or it may indicate more or less enteritis and local peritonitis. Should a chronic

course have been interrupted by an acute exacerbation, we have an instance of the *late acute* class, where the conditions are more urgent. Yet here, if we be sure that the original condition was chronic, and especially if we have evidence of an old fixed cause of obstruction in the writhings of distended hypertrophied bowel above it, we may be able, by giving the parts functional rest by almost total abstinence from food, and by soothing by heat, opium, and belladonna, to subdue the inflammation and restore matters to a chronic state, which can be dealt with at leisure. Hence the importance of obtaining an accurate history.

With the late acute cases may be considered a very important group—that of intussusception—which sometimes belongs to the late acute, and sometimes, as in the typical cases, to the early acute class; though it may almost be considered as a class by itself. When it is acute, with frequent tenesmus and passage of blood-stained mucus, with an elongated, painful, movable tumour, the diagnosis is clear. Chronic forms are not so obvious; and there is one condition—perityphlitis, or inflammation around the cæcum and vermiform appendix, which closely simulates intussusception. It may be distinguished generally by a history of pain and swelling antecedent to the vomiting and constipation; and, if there be a doughy or brawny infiltration of the integuments, the case and the treatment become obvious.

All these cases hitherto mentioned should be considered first. In addition to the soothing treatment, a very valuable plan is for the surgeon himself to inject a cupful or more of olive-oil, and then as many pints of warm water or gruel as he can, proceeding slowly and carefully, lest inflamed bowel be ruptured. With due care, this need not happen; and much valuable information is gained as to the site of the obstruction and its cause. By this means, fecal masses may be broken up, and an intussusception may be reduced. If the lower end of it can be felt getting lower and lower, there is every reason to expect success in reduction; but, if there be much tenderness about the tumour, and it do not alter in shape, much care must be exercised. When once the layers are glued together, the only hope of cure lies in the sloughing off of the contained portion, which may occur in four cases out of ten. If there be stricture, injections will do no good, but the contrary. Then it becomes necessary, when it is no longer possible to obtain ease by regulating the diet, and by saline laxatives, or, in some cases, by dilatation, to consider the question of colotomy. This operation is generally neither difficult nor dangerous, and seems far preferable to the habitual use of morphia for months. Should there be tenderness and distension of the cæcum, colotomy should be performed on the right side, even if the stricture be in the sigmoid flexure; but the operation should not be deferred until this is necessary.

Of course, in considering a late acute case, the possibility of there being an external hernia must not be overlooked. Pain shooting down the inner side of the thigh may lead to the discovery of an obturator hernia.

But, if we can certainly exclude all these causes of obstruction, and the case evidently belong to the early acute group, we are brought face to face with a very important because most urgent case. It is no longer allowable to suspend our judgment and wait, hoping that inflammation will subside and all go well. This may happen under judicious treatment, but not in the acute cases.

The symptoms point to acute strangulation of bowel, either within the abdomen or external to it; and we should judge of the condition of the bowel just as we do in cases of external hernia. Of course, all the usual and unusual sites must be explored; and, if found, the hernia dealt with according to the rules of surgery. But, if none can be found, I contend that these rules are still applicable to the case. If the constitutional symptoms indicate no great amount of damage to the bowel, we may soothe, and wait a few hours, persevering in this line of treatment if there be improvement; but, if the condition of the patient become more and more urgent, there is no time to be lost. If the bowel be running on towards gangrene, it may rupture, and fatal peritonitis rapidly occur. Even the release of the imprisoned bowel may come too late, if its tissues be allowed to mortify first. Therefore it is of the highest importance to realise, as early as possible, the true state of affairs; and, if we feel sure that there is an acutely-strangled loop of bowel somewhere, it is our plain duty to set it free. This can be done by laparotomy, or abdominal section. The abdomen is opened in the linea alba, the hand introduced, and the bowel released, with as little disturbance as possible. But, if it be in a doubtful state, it should be secured close to the edge of the wound, the abdomen thoroughly cleansed, and drainage provided for. In an early operation, this can be dispensed with advantageously. If there be a history of dragging pains at one spot in the abdomen, following an attack of peritonitis, we shall probably find and divide at that spot a constricting band of fibrous tissue. These are the most hopeful cases. But for impaction