

tissue. The pleura was greatly thickened. The left lung was healthy. The heart and abdominal organs were healthy.

Chief symptoms, physical signs, and cause of death.—The patient was admitted on Jan. 12th, 1859. He was much emaciated and of cachectic aspect. The right chest was quite dull and flattened; the infra-clavicular region was depressed. No respiratory or bronchial sounds were audible. There were no vocal resonance, no vocal fremitus, and no hæmoptysis. The left side was resonant. There were râles in the large tubes. Expectoration was muco-purulent. He died on June 19th, 1859.

CASE 11.

Pathological appearances.—Fibrous mediastinitis. With regard to the pericardium there were old adhesions around the great vessels and at the base of the heart. The heart was enlarged. There were fibrous changes in its walls, one pulmonary valve was absent and here the greatest amount of mediastinal change was found. The left ventricle was hypertrophied and the aorta was atheromatous. The anterior jugulars and large veins behind the sternum were dilated. The left superior cava was obliterated (? congenitally). The axillary and sub-clavian were dilated. There were pneumonia of the lower lobe of the left lung and oedema of the lower lobe of the right. The liver weighed 59 oz.; its capsule was thickened; the organ was healthy. The capsule of the spleen was thickened the kidneys were healthy. There was chronic peritonitis with ascites. The peritoneum was much thickened.

Chief symptoms, physical signs, and cause of death.—The patient had a sudden attack of swelling of the face and neck in 1867; he was unable to work for two years and then did light work till admission in June, 1874, when he had ascites, oedema of the arms and lividity of the face and head. On stooping the lips and ears became purple. The heart's action was feeble; the sounds were distant, the first was almost inaudible; the impulse was scarcely perceptible. The area of cardiac dulness increased. The pulse was 70, irregular, feeble, and compressible. The anterior jugular veins and the veins on the anterior surface of the abdomen were much dilated. A large vein passed across the trachea. Ascites was present. The temperature was 98.6° F. and the respiration was 20. The urine was scanty, highly coloured, of specific gravity 1030, and loaded with urates; it was slightly albuminous but free from sugar. Syphilis and abuse of alcohol were denied; there was no evidence of the former. He died on April 10th, 1875.

CASE 12.

Pathological appearances.—There was no post-mortem examination.

Chief symptoms, physical signs, and cause of death.—The patient was thin; there was puffiness of the eyes; the cheeks, lips, and tongue were dusky. There was no dropsy on admission, but much ascites. The respirations were short and rapid; there was no dyspnoea or cough. Expansion of the chest was limited; percussion was impaired. Respiration was harsh posteriorly and in front. Cardiac impulse was imperceptible; the area of dulness apparently was not enlarged. The sounds were weak and regular; there was no evidence of valvular or other organic disease of the heart. The urine was healthy. The spleen was probably not enlarged. There was gradual increase of ascites; the heart became weaker and irregular with dyspnoea. The face was more puffy and cyanosed and albumin was present in the urine. The liver was enlarged downwards to the level of the umbilicus. "The abdominal wall seems thickened as if from peritonitis." Cough was paroxysmal, causing hæmorrhage in the lids and under the conjunctiva and vomiting. There was oedema of the chest wall; the veins over the upper part of the thorax were dilated. There was pleuritic friction on both sides but no pain; also dulness over the anterior mediastinal region and harsh bronchial breathing. The abdomen was tapped 11 times.

Grosvenor-street, W.

REMARKS UPON EXPLORATORY OPERATIONS UPON THE STOMACH FOR OBSCURE AND OBSTINATE GASTRIC SYMPTOMS,

ILLUSTRATED BY A CASE OF GASTRORRHAPHY FOR DILATED STOMACH.¹

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IN 1895, when writing the article upon Diseases of the Stomach in my work upon "The Surgery of the Alimentary Canal," I ventured to predict that the time was not far distant when we should think as little of exploring the stomach without and within as we then thought of examining the brain in cases presenting obscure and indefinite cerebral symptoms. While it is still not possible to say that that time has yet arrived one can safely assert that considerable advance along such lines has been made in recent years. The way has been largely paved by the success which has followed the treatment of gastric ulcer and tumours involving the gastric parietes. We know how successfully and with what surgical simplicity an ulcer or tumour may be excised and the wound united by simple suture. If in a diseased area, accompanied frequently with grave complications, we can successfully operate upon the stomach, it is only reasonable to suppose that with all

our modern precautions and complete equipments we may still more successfully operate upon a comparatively normal region or organ; in other words, that we may cut down upon the stomach, incise its walls, explore its cavity, and stitch it up again without any fear of producing results which would militate against any such endeavour, even when the investigation proved purely negative. Indeed, such treatment on the healthy stomach is now frequently resorted to by surgeons and with the best possible results for the ends in view. Thus in cases, for instance, of intractable stricture of the œsophagus it is found possible to successfully dilate the constriction from below through the stomach when it is impossible to do so from above through the mouth.

If, then, we may safely assert that no harm need follow an operation upon the stomach for purely exploratory purposes, the question next arises, What are the circumstances connected with any case which might reasonably be benefited by such an investigation? I think I am right in saying—although it is only the expression of the opinion of a surgeon—that very many cases come before the physician in his hospital wards or the practitioner in his private practice which excite little more than a vague suspicion as to the true nature of the gastric symptoms of the patient; indeed, the obscurity and indefiniteness of the symptoms in some cases are such as even to defy an approximate approach to a diagnosis. Changes are rung upon every stomachic remedy. Lavage is practised with a persistency which does credit to the forbearance of the patient, and yet improvement neither follows nor is any better knowledge obtained regarding the true cause of the patient's sufferings. I trust I am not drawing too exaggerated a picture of the physician's fruitless efforts. But I have heard it said by practitioners that few cases are more trying to their patience and endurance, more obstinate in resisting all remedial measures, than those of the particular class here referred to.

No doubt many chronic gastric troubles arise from causes which no operative intervention could possibly remove; but there is equally no doubt that there are many obstinate cases, many more, indeed, than is usually supposed, which could undoubtedly be operated upon with the best results. It is with the hope that these cases may be submitted to surgical treatment that I am endeavouring to hold out the practically safe measures which the surgeon is prepared to adopt in order to assist the practitioner, if not directly by curing his patient, at least in guiding him, it may be, into better and more suitable lines of treatment.

I feel that it would be somewhat beyond my sphere to attempt to indicate how many of these obstinate and indefinite gastric disturbances are brought about. Many are, of course, of a distinctly organic nature, such as early gastric ulcer (whether of an innocent or malignant character), commencing obstruction at the pylorus, &c. Conceive what bright prospects are held out for the life of the patient it may be if instead of persisting for months possibly in treatment by medication symptoms dependent upon early gastric carcinoma the case is submitted to exploratory operation. I do not wish to express too hopeful an opinion, but in the light of what we know about carcinoma in other parts of the body it is at least reasonable to suppose that early excision of a carcinomatous focus might end in permanent cure. As surgeons our experience at present is that hardly a case of gastric carcinoma is brought under our observation till the disease is so far advanced that a tumour can actually be felt through the abdominal parietes. I need hardly say that with comparatively few exceptions our operative treatment in this disease resolves itself into measures of a purely palliative character; we may alleviate the more troublesome symptoms, but we cannot effect a cure because our intervention is too late.

Then, again, there are classes of cases of a particularly obstinate and obscure character which from the absence of any more definite causes seem to indicate purely functional disturbance. They may be neurotic, whatever that may signify, but while they defy all the usual and conventional remedial measures succumb in some mysterious way to an exploratory operation.

Dyspepsia, I take it, is in some shape or form the all-embracing symptom of almost every gastric trouble. It is therefore significant of so many different complaints, both functional and organic, that the tendency is in the absence of any very distinct contra-indication to treat every case in the first instance as of the less serious class, and thus as being possibly functional to follow out in consequence some conventional line of treatment in the way of medicine and

¹ A paper read at a meeting of the Glasgow Medico-Chirurgical Society on March 17th, 1899.

diet. Doubtless in the vast majority of cases such treatment soon realises the best possible results and the rapidity with which recovery takes place sufficiently indicates the correctness of the diagnosis and the success of the treatment. There are few diseases, indeed, even of an organic nature which are not temporarily improved by the simple measures at first employed. In one sense it is unfortunate that it should be so because the deception thus wrought only serves to prolong the time for the pernicious advance of the disease and the delay of those measures which alone could be productive of permanent benefit. It is, indeed, difficult to say how long measures of a purely medicinal—or shall I say conservative?—character should be persisted in before operation should be advised. There must be a period, however, when the practitioner feels that his treatment is failing to produce the permanent good effects which he anticipated. I can only hope that the harmlessness and simplicity of the exploratory operation which I have briefly endeavoured to indicate will induce him not to persist longer in efforts obviously fruitless, but to be persuaded and to persuade his patient that an operation might serve to explain the persistency of the symptoms if not actually to cure or relieve the complaint.

Just as an illustration of what I mean, what can be more useless as regards permanent results, and I might add even more harmful, than the continuous daily lavage of a stomach which has become more or less permanently dilated, either from some obstructive pyloric disease or from some chronic defect in the digestive function of the organ? I use the expression "more harmful" advisedly, because I believe that whatever good may follow the removal of products likely to remain in the stomach and ferment the amount of fluid constantly thrown in has some deleterious mechanical effect in maintaining—if, indeed, it does not increase—the dilatation. But however this may be, a dilated stomach, irrespectively of the removal of the cause which may have produced it and irrespectively of the removal of that cause, will remain a source of persistent pain, discomfort, and dyspepsia with all their attendant ills and possibly subsequent dangers, and until that dilatation is efficiently dealt with no amount of lavage or medication will effect the necessary relief.

What, again, I may ask, can be more useless than the endeavour to alleviate symptoms dependent upon adhesions interfering with the normal freedom of movement of the organ? I must not, however, pursue this line of reasoning further. But before introducing the case which I trust will illustrate many of the points which I have brought forward I should like to add a few more facts in support of the contention herein set forth.

So recently as October of last year (1898) Professor Kocher of Berne, one of the most distinguished continental surgeons, pleaded for a more extended use of exploratory incisions in doubtful cases of gastric disease and in words the weight of which it is difficult to over-estimate he says: "I have regretted delay in operating often, in operating never." Keen of Philadelphia, in the Cartwright Lectures, delivered at the beginning of last year (1898), expressed his opinion in similar terms; "in any case," he says, "in which by other means at his command no positive diagnosis can be reached the surgeon is thoroughly justified in opening and exploring the stomach." I have in "Surgery of the Alimentary Canal"² quoted two cases in support of exploratory incisions into the stomach, one by Dr. Bradford and the other by Mr. Frederick Treves. In neither, strangely, was anything definite found and yet the immediate relief obtained in each case was marked. In Dr. Bradford's case the following operation was performed. An incision was made in the median line from the xiphoid cartilage downwards. The stomach was found to be somewhat distended, but without thickening. The appearance of the viscus was perfectly normal. Two fingers were inserted into the abdominal wound; the anterior surface was palpated, but no thickening or adhesions were discovered. The stomach was pulled from one side to the other so that the whole anterior surface could be palpated without difficulty. The lesser cavity of the peritoneum between the stomach and the large intestine was opened a short distance from the border of the former, two fingers were inserted beneath the stomach and two fingers of the other hand were placed so as to palpate the anterior surface. Between the two the posterior surface of the stomach could be extensively and thoroughly explored and also any thickening ascertained. No adhesions were

found on the posterior surface and nothing which was abnormal was observed. The stomach was then incised to see if any small ulcerations existed. An electric light was inserted and the inside of the stomach was easily seen; neither by this nor by the fingers could anything abnormal be determined. The wounds were therefore sewn and dressed with the ordinary aseptic dressing. The patient made a good recovery and was relieved of all the symptoms.

I think you will acknowledge that this operation was a pretty thorough exploration of the stomach and yet not only did no ill-effects follow the performance of the operation itself, but, on the other hand, its influences seem to have been fraught with the very best results. The cause of the patient's sufferings were certainly mysterious, but equally mysterious must be considered the beneficial effects worked by the exploration. It is not, however, only in the case of the stomach that we are familiar with the beneficial effects of an operation which so far as could be gathered at the time seemed to have been perfectly negative in its object. The case attributed to Mr. Treves was as follows. A man, aged 40 years, who was admitted to the London Hospital had been ill, according to his own report, for 12 years with pain in the stomach and vomiting. He had vomited blood. He was greatly emaciated. The pain in the stomach was evidently very severe. The stomach was exposed by operation on Oct. 11th, 1895. It was much enlarged, but exhibited no abnormal appearance beyond this. The stomach was then opened and emptied. The pylorus was examined from within and every part of the gastric surface was explored. No ulcer or other morbid condition was discovered. The gastric and other abdominal wounds were closed. The patient seemed well and by January of the next year (1896)—that is to say, about three months after the operation—all pain in the region of his stomach had practically disappeared.

In this case, as in that under the care of Dr. Bradford, the operation was performed under the impression that the gastric symptoms were due to ulcer. The operations negatived any such supposition and although they failed to settle the question of diagnosis they apparently managed to cure or at least relieve the patients.

Mr. Mayo Robson, acting on lines somewhat similar, has by exploratory laparotomies discovered certain obscure gastric symptoms to be due to adhesions involving some part of the external gastric parietes the separation of which resulted in complete relief. The same surgeon, in a paper recently published in THE LANCET,³ has shown that exploratory gastric operations have been the means of revealing obstruction at the pylorus as the cause of dilated stomach and that the treatment of this obstruction has led to the disappearance of all symptoms of tetany from which the patients had suffered.

Such, then, are some of the facts and opinions which I think tend to support and to encourage the views and practices which I am endeavouring to inculcate. And now let me ask your attention for the case which I have to show you this evening. My attention was first drawn to the patient by my colleague, Dr. Ebenezer Duncan, who expressed the difficulty which he had in determining what could be the cause of the patient's persistent gastric trouble. The prolonged suffering which he had endured made him readily consent to operation. Dr. Duncan proposed an exploratory laparotomy, but on hearing my arguments both he and the patient agreed that I should extend my operation to an exploratory gastrotomy if such should be considered advisable at the time of operating. Without further comment I will give the report of the case as taken by Dr. Charles Fleming and Dr. James McHaffie.

A man, aged 55 years, was admitted to the Victoria Infirmary on Sept. 6th, 1898, under the care of Dr. Ebenezer Duncan. He stated that his illness commenced about two years before by more or less pain in his back. At the time he thought that he was suffering from lumbago, but the pain soon shifted to the epigastrium where it has remained continuously ever since. He described it as a burning, gnawing character located mostly just below the ensiform cartilage. Its presence was very constant here though sometimes passing through to the back. It was somewhat aggravated by hunger and it was frequently relieved by the ingestion of food. He never vomited, but suffered considerably from flatulency. The bowels have always been costive, requiring

² Vide p. 174.

³ THE LANCET, Nov. 26th, 1898, p. 1352.

patients. To his knowledge he had never passed blood. An examination of the abdomen revealed some pain on pressure over the affected area and the stomach gave signs of being considerably dilated, extending an inch below the umbilicus and laterally as far as the left axillary line. The heart manifested a marked mitral murmur. The other organs appeared to be healthy. He had lost flesh considerably, his weight being 9st. 4lb. While in the medical ward he was treated with the usual gastric remedies and his stomach was washed out from day to day. As no improvement followed he was removed to the surgical ward. On Nov. 9th, 1898, he was admitted to Ward 3 under my care with the object of having an exploratory operation performed upon the stomach.

The abdomen was opened by a three- to four-inch incision above the umbilicus and the anterior surface of the stomach together with the pylorus were examined with the finger. Nothing of the nature of adhesions or other complications were detected. The stomach was then partially withdrawn through the parietal wound and its anterior wall was incised for about an inch in the long axis of the organ and about midway between its two curvatures. The pyloric orifice and the interior of the stomach were examined with the index-finger, but here also the result was negative. No constriction or thickening was felt at the pylorus, the apex of the finger being admitted easily into the opening. The internal lining of the organ, as far as it could be investigated, also appeared to be normal; there was no thickening or ulceration. The exploratory incision was then closed by a continuous Lembert suture and steps were taken to lessen the dilated stomach. After withdrawing the organ to as great an extent as possible a longitudinal fold in the anterior wall was tucked in and the two curvatures were approximated and secured by a series of interrupted Lembert sutures. The stomach was then returned and the abdominal parietal wound was closed by three separate rows of stitches—peritoneal, aponeurotic, and skin. The operation lasted 55 minutes.

After the operation the patient continued to vomit small quantities of blood-stained mucus and he complained of some pain in the epigastrium. At about 1 A.M. the next day he vomited something like eight ounces of pure blood. From that time onwards till 10 A.M. it was computed that he brought up at least 35 ounces of blood. His condition when seen by me was such as to indicate free hæmorrhage into the stomach from the gastric wound and the necessity of immediate removal of the patient to the theatre. An anæsthetic was administered and the exploratory incision into the stomach was at once exposed by the removal of all stitches. It was then found that some small veins were bleeding at the margin of the incision. These were secured, the edges of the mucous membrane were stitched together, and a continuous Lembert suture was applied to the peritoneal coat. The gastric plication was re-sutured and the abdominal wound was re-closed. The median cephalic vein was now opened and three pints of hot normal saline solution were injected. The pulse and respiration at once commenced to improve. Finally, the patient's stomach was freely washed out, much blood-clot being thus removed. From this period onward uninterrupted improvement took place and he left the infirmary about two months later for the convalescent home at Largs. On Feb. 10th, 1899, he came to the infirmary to report himself. He had put on flesh, was feeling strong, was quite free from his old pain, and was taking his food well. When last seen on March 15th the improvement had still continued and his weight then reached 11st. 4lb. against 9st. 4lb. when he left the infirmary.

In reviewing the case and its treatment it will be observed that the operation verified the diagnosis of a dilated stomach and, further, that it proved the absence of any gross lesion which could explain the dilatation. This latter information paved the way for the treatment adopted. The case was then taken as one dependent for its symptoms mostly upon an unduly enlarged stomach, the lessening of the cavity of which might afford the relief required. Accordingly gastrorrhaphy was performed. A considerable fold of the anterior wall of the stomach was tucked in and secured by stitches. The untoward result which immediately followed of excessive hæmorrhage into the stomach from the gastric wound must be looked upon as a very unusual and unfortunate but perfectly preventable accident in the performance of the operation. Rather let it be taken as showing how much can be done upon the stomach without any ultimate

ill result, for this patient practically underwent two consecutive operations upon the same region.

It would unduly lengthen my remarks did I attempt to dilate upon the particular operation performed in this case. I have introduced it simply as a basis for the larger and wider discussion of gastric exploration. The diagnosis and treatment of unobstructive dilatation of the stomach by operation is merely one aspect of the question and that neither the most important nor, it might be added, the most commendable, because although several successful cases have been reported sufficient time does not yet appear to have elapsed to ensure that the relief at first obtained has proved lasting. With regard to the case shown this evening I can only say that the man has been greatly relieved from his original trouble, he has lost his old continuous pain, he enjoys his food when taken with proper precautions, and he has gained greatly in weight and strength. Whether this general improvement will be lasting it is impossible to say, but I think that it may be fairly concluded that but for the exploratory gastrotomy there is little reason to believe that the apparently true cause of his trouble could have been determined or the proper treatment employed.

Glasgow.

EXPERIMENTS WITH PANE'S ANTI-PNEUMOCOCCIC SERUM.

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AN anti-pneumococcic serum was first prepared on a large scale by one of us in February, 1897.¹ This serum was obtained by injecting a pony with increasing doses of cultivations of the pneumococcus. The potency of the serum was tested by mixing varying quantities with a ten-fold fatal dose of a living cultivation of the pneumococcus and injecting the mixture into the peritoneal cavity of a rabbit. It was found that 0.03 cubic centimetre of the serum was the smallest quantity which, when tested in this way, protected the animal from death. Animals which had already been infected could be cured by injecting larger quantities of the serum, provided the treatment was adopted not later than in the first quarter of the disease. The serum was thus shown to possess a distinct therapeutic action.

Two cases of pneumonia which were successfully treated with the serum were recorded in the above-mentioned paper and others have been reported in the journals. A full account of the action of the serum and of the method of standardising it appeared in a later paper by us conjointly.² The pony after a time, in spite of further injections, ceased to yield a potent serum, so that we were unable to make further trials of its efficacy in the treatment of pneumonia.

On March 14th, 1897, Dr. Pane brought forward a communication upon Anti-pneumococcic Serum before the Medico-Chirurgical Academy of Naples, which was also published in the *Centralblatt für Bakteriologie* of May 27th, 1897. In this communication he gave an account of sera which he had obtained by immunising a cow and a donkey and which he had used in the treatment of pneumonia. Since then he has continued his researches and is now supplying the serum in large quantities. The present serum is obtained from donkeys and is of two qualities, No. 1 and No. 2. Of these No. 1 is stated to be of such a strength that one cubic centimetre neutralises in the rabbit 1000 fatal doses of the pneumococcus, while No. 2 neutralises 3000 fatal doses.

Through the kindness of Dr. T. J. MacLagan we obtained a sample of No. 2 serum which we have tested in order to ascertain whether it would exert the same protective influence upon our cultivations of the pneumococcus as upon those used by Dr. Pane. The results of our experiments are here recorded.

The method of mixing the serum with the cultivation and injecting the mixture into the peritoneal cavity of a rabbit

¹ Washbourn, Brit. Med. Jour., Feb. 27th, 1897.

² Further Researches upon the Pneumococcus, Journal of Pathology, January, 1898.