which ceased after vomiting or after washing out. The food was neither digested or acidified.

Professor Swaine had already come to the conclusion that there was no oesophageal pouch. A full-sized oesophageal tube always passed with ease and never got entangled. To make sure we administered about a pint of rather thick fluid with some bismuth in suspension, and then with the *x* rays saw quite clearly the shadow of the dilated oesophagus; the dilatation was fusiform, and reached from about the left bronchus to the diaphragm. It was large enough to hold about half a pint. About this time Dr. Gottstein was at St. Bartholomew's Hospital and very kindly tried to insert his oesophagoscope, but the attempt was not successful.

The patient was very anxious to submit herself to any operation, for she was living in great discomfort. For two years she had fed herself twice a day with an oesophagus tube and funnel. She had been sent up with the view of having gastrostomy done. My own experience of that operation has shown me that its dangers are small, but that its discomforts are considerable. The latter she was prepared to face. But it was difficult to see how a mere gastrostomy could succeed. It is true that it would obviate all swallowing of food, and might thus be supposed to give the oesophagus rest. But it could have no influence whatever upon the swallowing of mucus, and that is always going on to a larger extent than many are aware of. Clearly gastrostomy required to be supplemented with forcible dilatation of the cardiac opening of the oesophagus. But my experience of forcible dilatation of other orifices, more particularly of the anus, teaches that the paralysis can only be relied upon to last for a few days. Besides, as I shall presently show, it is quite feasible to dilate the cardiac aperture without resorting to a cutting operation.

Hardly anything is known about the causation of this fusiform dilatation of the oesophagus. I suppose we may assume that it is due to some disturbance of the nervous mechanism. The history of the onset in the case under discussion seems to me to support this view. The history says that four years ago she fell from a bicycle with such violence that she remained unconscious for several hours, and was confined to bed for five weeks. The difficulty in swallowing began soon after the fall. At first the food could be got down with the help of mouthfuls of water, but afterwards, as I have said, it had to be introduced with a tube. It is of course difficult to see how a mere fall could affect the nervous mechanism of the oesophagus. But I attach great importance to another point in her clinical history. After the accident her right kidney was found to have been loosened, and has remained loose and displaced ever since. Now there exists a nervous intercommunication which would be profoundly influenced by a sudden displacement of the right kidney.

The accompanying semidiagrammatic figure shows how each great splanchnic nerve swells out into the semilunar

Fig. 1.—C., coeliac axis; R.S., right great splanchnic nerve; L.S., left great splanchnic nerve; R.V., right vagus, giving off branches to the plexus gulæ; S.R., suprarenal branches of semilunar ganglia; K., branches to kidneys.

ganglion. Next, how nerve branches run from the convexity of the semilunar ganglia into the kidneys and suprarenal

bodies. So far this anatomical arrangement has nothing to do with the oesophagus. But now observe how the right vagus passes down the back of the oesophagus and joins the right semilunar ganglion. It joins in such a manner as to form a loop with the right splanchnic nerve, and this loop is known to anatomists as the Memorable loop of Wisberg. I have never been able to find out why it goes by this strange name. In its course down the oesophagus the right vagus unites with the left to form the plexus gulæ, from which the nerves of the oesophagus are supplied.

It is hardly necessary to point out how a sudden and violent displacement of the right kidney would act almost directly upon the right vagus. This is as far as it seems reasonable to go. The anatomy and physiology of the solar plexus do not seem to have received from physicians the attention which they undoubtedly deserve, nevertheless they are probably the clue to many hidden mysteries. A patient under my care has a pulse-rate of 73 to 75. During a moderate attack of appendicitis it fell to about 50. There seems no impossibility in this to the anatomist who traces the continuity of nerve tissue from the appendix to the solar plexus, and thence to the right vagus and onwards to the heart. The whole of this important branch of anatomy has been rendered difficult by the habit which the systematic anatomists have, with the exception of Hirschfeld, of describing the visceral nervous system as though it consisted of separate and distinct parts. Biologists have done much to inculcate more general ideas. Even the admirable Sappey gives but a truncated figure (vol. ii, fig. 608).

Acting upon the assumption that the dilatation of the oesophagus was secondary to spasmodic contraction of the cardiac orifice, I determined to try the effects of stretching. Acting under my instructions Messrs. Krohne and Sesemann made an instrument which consisted of an ordinary oesophagus tube with a distensible rubber bag around the last four or five inches of its stomach end. This bag could be distended with air by means of an ordinary hand-pump, the air being transmitted by a small tube which ran down the inside of the oesophagus tube. Inasmuch as the patient had become a great adept in passing tubes down her oesophagus there was no difficulty whatever in using this instrument. The immediate effects seem to have been excellent. Dr. Fraser, to whom I am much obliged, writes that at first it was used thrice a day before meals and afterwards twice a day, until it burst. After this she had no pain or difficulty in swallowing ordinary meals, whilst on a holiday she put on 14 lb. in weight. But inasmuch as some difficulty returned a stronger airbag was obtained, and I understand that the distressing symptoms have gone and that the patient can again swallow with comfort.

NOTE.

¹ Professor Swain says she fell downstairs and remained unconscious two hours.

THE

BENEFICIAL RESULTS OF GASTRO-ENTEROSTOMY IN SOME CASES OF IRREMOVABLE CARCINOMA OF THE STOMACH, IN WHICH THE PYLORUS IS NOT OBSTRUCTED.

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IN cases of carcinoma of the stomach presenting symptoms of obstruction of the pylorus, other surgeons besides myself must have opened the abdomen with the intention of either removing the diseased portion of the stomach or of performing gastro-enterostomy, and have been placed in a dilemma by finding that in spite of the symptoms the growth did not obstruct the pylorus. Removal of the growth would be the proper course if the growth were a small one and favourably located for removal. But if the growth were not favourably located for removal, and if it were thought that the risks attendant on removal were too great to warrant the attempt being made in the particular case, the surgeon would have to decide between doing nothing for the patient's relief and doing gastro-enterostomy without much hope of benefit in the absence of recorded cases or personal experience of beneficial results. The difficulty in deciding whether or not to do gastro-enterostomy would be still further increased in cases where the growth extended so far over the anterior and

posterior walls of the stomach as to make it likely that the gastro-enterostomy opening would be obstructed as soon as the pylorus.

During the last two years I have operated upon three very similar cases in which these difficulties presented themselves. In the first two I closed the abdomen without further ado; in the third I did gastro-enterostomy with very marked benefit.

CASE I.—A woman, aged 40, was admitted to University College Hospital on October 28th, 1901, with a history that in the previous June she began to suffer from pain in her stomach after food. This symptom continued, and in the last week of September she vomited a quantity of coffee-coloured frothy material with immediate relief from the intense pain from which she was suffering. From that time onwards the sickness frequently recurred, and the patient steadily lost flesh. On admission to the hospital she was very emaciated, but she was not anaemic in appearance, and she was bright and cheerful. In the epigastric region there was a slightly movable lump which descended during inspiration. There was a well-marked succussion splash, and the stomach resonance extended from the fourth costal cartilage to the umbilicus. The residual contents of the stomach were usually about a pint, and three pints could be introduced without discomfort. Analysis of the residual contents of the stomach showed the presence of free hydrochloric acid and the absence of lactic acid. On November 1st I operated, and found a hard new growth occupying the pyloric portion of the stomach without involving the pylorus itself, and without causing mechanical obstruction. The growth involved almost the whole of the lesser curvature of stomach, and extended thence into the upper part of the anterior and posterior walls. In the patient's condition it appeared to be too extensive for removal. I was preparing to do posterior gastro-enterostomy when the wisdom of subjecting the patient to the risks of that operation when the pylorus was not obviously obstructed was questioned. I deferred to this view and closed the abdomen. The patient was none the worse for the operation but her symptoms continued unabated. She was unable to take solid food owing to the pain it caused. Even on a liquid diet she suffered severely from pain, which disturbed her sleep, and she vomited a quantity of brown liquid nearly every day. She began to get up on the twentieth day after the operation and was discharged three days later. She lived about two months after leaving the hospital.

For some unexplained reason this patient had much less discomfort than before the operation, but she got rapidly very anaemic and cachectic. Although there was no mechanical obstruction the patient had obstruction of some kind, for her stomach never emptied itself, and she usually vomited a quantity of fluid every day. This may have been due to spasm of the pylorus set up by irritation of the growth by food, and the pain after food was doubtless due to the same cause. If a free opening between the stomach and the small intestine had been established, it is reasonable to expect that the stomach would have quickly emptied itself into the bowel, and that the pain after food would have been relieved, and that the patient's nutrition would have been kept up for a longer time.

CASE II.—The patient was a woman, aged 51, who had suffered from dyspeptic symptoms, chiefly flatulence, for about two years, and from severe pain in the region of the stomach after taking food, together with vomiting after nearly every meal for about six months. There had been no haematemesis. During this time the patient had wasted considerably. On admission to the surgical wards at University College Hospital on August 14th, 1902, there was a tumour just above and to the right of the umbilicus, which was thought to be carcinoma of the pyloric portion of the stomach. On August 16th I did an exploratory laparotomy, and found that the growth involved nearly the whole of the small curvature of the stomach and extended over both surfaces, especially in the pyloric region, but it did not involve the pylorus itself. It was possible to invaginate the wall of the stomach near the large curvature, and to pass two fingers through the pylorus. In this case, as in the first, the growth was too extensive to be safely removed; the pylorus was not implicated, and it seemed probable that a gastro-enterostomy opening would be invaded by the growth as soon as the pylorus. I therefore again decided against gastro-enterostomy, and closed the wound. The wound healed by first intention, and the patient was sent back to the medical wards on the fifteenth day after the operation. Her symptoms continued unabated. She got steadily thinner, and every day or two she vomited large quantities of dark-coloured fluid and partially-digested food. She had a good deal of pain, for which opium was given. She went home about six weeks after the operation, and died about three weeks later.

Both these patients went downhill very rapidly, and died from two to three months after the exploratory laparotomy, and about nine months after the onset of acute symptoms. Many patients suffering from carcinoma of the stomach, which involves and partially obstructs the pylorus, live in comparative comfort and freedom from pain for nine months or more after gastro-enterostomy. In these cases, because the condition of the stomach was thought to be more favourable, owing to the freedom of the pylorus, nothing was done, with the result that the patients suffered more pain and died more rapidly than is usually the case with patients affected

with carcinomatous obstruction of the pylorus who have been treated by gastro-enterostomy. These considerations led me to think that I had made a mistake in not performing gastro-enterostomy, and I determined that in future, in cases of irremovable carcinoma of the stomach, with pain and symptoms of pyloric obstruction, even though no mechanical obstruction of the pylorus was found at the operation, I would unite the stomach to the jejunum, and so by means of the short-circuit allow the food to avoid the ulcerated carcinomatous growth, and pass quickly into the intestines.

CASE III.—The patient, who came under my care at University College Hospital in September, 1902, was a man aged 39. About eighteen months previously he began to suffer from vomiting after food. The vomiting occurred about two hours after a meal, and at first was only occasional. The vomiting became more frequent—once a day, then twice a day, and on admission it occurred after every meal. He had never noticed any blood in either the vomit or the motions. He had a dull aching pain in the epigastric region. Solid food caused so much pain that for nearly eighteen months he had been living almost entirely on liquid nourishment. He was much troubled with flatulence. On admission the patient was a thin, pale-looking man with every appearance of having lost a good deal of flesh. He weighed only 9 st. 2 lb., whereas two years previously he weighed 11 st. The area of stomach resonance was increased, and there was a well-marked succussion splash. Three and a-half pints of fluid were received by the stomach. After digestion the residual contents of the stomach varied from 15 to 20 oz. On September 28th I opened the abdomen in the middle line above the umbilicus, and found a tumour involving nearly the whole of the small curvature of the stomach, and extending on the one hand upwards into the small omentum and on the other downwards over both surfaces of the stomach in the pyloric region without actually involving the pylorus. By invaginating the wall of the stomach near the greater curvature, two fingers could be passed through the pylorus. Altogether the conditions presented were almost the exact counterpart of those met with in the other two cases. Removal of the growth seemed quite out of the question, and so I did posterior gastro-enterostomy. The patient made a normal recovery, and on the twelfth day after the operation he was taking without any discomfort jelly-bread and butter, and eggs, in addition to liquid diet, whereas for eighteen months before the operation he had rarely succeeded in retaining any solid food. The patient was discharged to a convalescent home on the twentieth day after the operation. He was then looking much better, and felt much better, and was putting on flesh. As already mentioned, the patient on admission to the hospital, weighed 9 st. 2 lb. Between then and the operation he lost a good deal, but there is no record of his weight until his discharge, when he weighed 8 st. 6 lb. He returned from the convalescent home in a month, and reported that he had been taking ordinary solid diet just like the other patients, and that he had been free from pain, and had not been sick since he left the hospital. He weighed 10 st. 1 lb., that is 1 st. 9 lb. more than he did when he left the hospital. A month later his weight was 10 st. 13 lb. 8 oz., which is only 8 oz. less than his weight before the onset of his illness. It is now six months since the operation, and the patient continues well and maintains his weight. For a time he went back to his work as a scaffolder, but he has now relinquished that for lighter work.

This case has been very successful, and has more than justified the hopes entertained of gastro-enterostomy, and is, I consider, valuable as showing that at least temporary relief can be obtained by gastro-enterostomy in cases of carcinoma of the stomach in which there is no mechanical obstruction; for although there was no mechanical obstruction in this case there was in it, as in the other cases, an obstruction of some kind which interfered with the passage of food from the stomach to the duodenum. And just as in simple ulceration the irritation of food causes pain and vomiting and interference with nutrition, which can be relieved by gastro-enterostomy, so also in malignant ulceration similar relief, if only for a time, can be given by the same operation.

My conclusion is that the clinical signs afford the most important indications for treatment, and that in cases where these indicate obstruction to the passage of food from the stomach to the intestines, and that where in cases of malignant disease of the stomach feeding causes pain and vomiting, the surgeon may perform gastro-enterostomy with every hope of benefiting his patient even when the growth does not obstruct the pylorus.

MEDICAL STUDENTS IN GERMANY.—The following are the numbers of medical students on the books of the several German universities for the current semester: Berlin 1,219, Bonn 240, Breslau 204, Göttingen 149, Greifswald 186, Halle 188, Kiel 315, Königsberg 203, Marburg 167, Erlangen 231, Munich 1,057, Würzburg 461, Freiburg 287, Heidelberg 235, Giessen 351, Jena 133, Leipzig 529, Rostock 132, Strassburg 259, Tübingen 181. The total number of students of medicine in Germany at present is therefore 6,727. Of these, 2,871 belong to Prussia, the remaining 1,855 being distributed through the other German universities.