due to mischief in the appendix. It is infinitely commoner than ruptured gastric ulcer, acute pancreatitis, impacted gall stones, or strangulated bowel. Remember that the pain in the first instance is not always localized to the appendix region, but may be referred to the umbilicus or elsewhere in the abdomen. There may be nausea, there may be rise of temperature and accelerated pulse, but there nearly always is as a constant symptom tense rigidity of the right rectus. This, to my mind, is the key to the situation. It is Nature's effort to protect a sick appendix. This rigidity in conjunction with two or more of the recognized classical symptoms should make diagnosis no very difficult matter. In women it is not always easy to differentiate chronic appendicitis from chronic right tubal or ovarian mischief, but these are chronic cases, and careful examination per abdomen and per vaginam may help one, but I have seen several cases where even at the time of operation, and subsequently by pathological examination, it was quite impossible to say whether the appendix or the right tube and ovary were first affected. Both appendix and tube have been matted together, both inflamed and involved in a similar infective process. It is safe, perhaps, to conclude that if the opposite tube is normal the mischief arose in the appendix, but if both tubes are the seat of pyosalpinx or salpingitis then it is probable that the appendix became involved secondarily, but to enter into this question is beyond the scope of this paper. It has been said that he gives twice over who gives quickly, and I am sure that that surgeon confers a double benefit upon his patient who operates quickly as soon as appendicitis is diagnosed: I shall be amply repaid if anything I have said will add by ever so little to the accumulating weight of evidence in favour of early operation in this disease.

CASES OF PERFORATIONS OF THE STOMACH AND DUODENUM.

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ALTHOUGH the four cases here reported are none of them complete as regards their histories, yet I think each presents some feature worth attention.

Two are cases of perforated gastric ulcers in men aged 45 and 40 respectively; one is a perforated ulcer of the duodenum in a woman aged 37, and one is a traumatic perforation of the stomach in a boy aged 10. The latter was interesting from the fact that although the perforated stomach was for about nine hours full of rice and curry, yet no leakage occurred. I omit this case in the following general considerations:

The three cases of perforated ulcers came in as abdominal emergencies so far advanced that operation, though undertaken, was little more than a forlorn hope, especially in Cases I and III, where interference perhaps only served to precipitate otherwise certain calamity.

In Case II, although two perforated ulcers existed, only one was detected at operation; but I doubt that, even if both had been dealt with, death would have been prevented, owing to the involvement of the ascending colon in an extensive gangrenous process. However, this case proves the necessity of a careful examination for two or more perforated points, which has occurred in as many as 20 per cent. of the recorded cases of gastric ulcer (Mayo Robson).

Only in Case II was there any clue to a correct diagnosis as to the cause of the peritonitis; and here, too, the clinical picture was clouded by signs of appendicitis—a complication more usually associated with perforated duodenal than with gastric ulcers.

The apertures were all on the anterior surfaces, two close to the lesser curvature, one close to the greater. Here the common rule of perforation was not transgressed. For although the location of peptic ulcers is much less frequent in the anterior wall (being commonly situated on the posterior wall of the pyloric end, at or near the lesser curvature), yet the chances of perforation of an ulcer of the anterior wall are 5 to 1 in its favour, owing to mobility which prevents adhesions (Kemp).

In all the cases the ulcers were of the chronic indurated

variety; Case II was complicated by a subacute perforation as well.

Sex and Age.—Perforation of duodenal ulcers is more frequent in men (10 to 1, Eisendrath). My case occurred in a woman 37 years of age. Perforated gastric ulcers are more frequent in women (4 to 1, Eisendrath). Robson states that five-sixths of the perforations of gastric ulcers occur in women, but perforation is *relatively* more frequent in men, especially in men over 40. The two gastric perforations here reported occurred in men of 40 and 45 respectively. In the BRITISH MEDICAL JOURNAL of February 17th, 1912, Moynihan makes the following statement: "The disclosures upon the operation table prove that duodenal ulcer is decidedly commoner than gastric ulcer. The ratio is probably about 5 to 1."

Complications.—General peritonitis in all my cases—a gangrenous colon in one, with extensive perigastric adhesions; although free gas was present in the peritoneal cavity of two of the cases, I did not observe subcutaneous emphysema in any. Case II presented extensive perigastric adhesions which bade fair to avert death had not a second subacute rupture supervened.

CASE I.—Perforated Chronic Gastric Ulcer.

J. S., 45, male, Cingalese coolie, came walking into hospital one morning, and was not seen by me until four and a half hours later, when I found him lying in bed profoundly ill. He presented the following symptoms: Restlessness and an anxiety of expression which asserted itself in spite of the drowsiness and apathy which seemed to overcome him. His pulse was imperceptible and his breathing thoracic. He was intolerant both of questions and physical examination. All I could obtain as regards his previous history was that he had asserted on admission that he was an opium eater and had partaken of a quantity of this drug to allay the pain he experienced in his abdomen. This circumstance, although it gave him the energy to walk into hospital, tended to obscure considerably the symptoms of the case and to entail a delayed diagnosis of abdominal emergency on the part of those in immediate attendance. Even when I saw him, drowsiness and apathy coexisted with anxiety of expression, a paradoxical grouping which I was at first at a loss to explain. Whether or no the opium habit was initiated by the pain of chronic gastric ulcer I was unable to determine. The abdomen was uniformly tender and distended, the flanks were dull. No specially painful or tender area could be determined. The bowels had not moved for four days, but responded slightly to an enema of soap, castor oil, and turpentine. Vomited four times since admission. Liver dullness diminished. Duration of illness was said to be three days, although what precisely this term implied was not clear.

Operation.—As a forlorn hope (which, perhaps, would more justifiably have been abandoned owing to the patient's moribund condition) I undertook operation. Air escaped with a rush as soon as I opened into the peritoneal cavity, which was found full of purulent fluid. This was swabbed out and irrigated with warm saline as quickly as possible, and suprapubic and loin drainage established. To look for the causative lesion was hopeless, owing to the patient's condition, and I had at this stage to relinquish the operation, which had not taken more than fifteen minutes. The patient expired a few minutes later.

Post-mortem Examination.—There was an ovoid perforation on the anterior wall of the stomach half an inch from the lesser curvature and pyloric sphincter respectively. The perforation was found to occupy the

Diagram to illustrate sites of perforation. The figures 1, 2, and 3 correspond to the cases to which they refer.

expanded extremity of the anterior limb of a saddle-shaped chronic ulcer with markedly indurated edges. The ulcer rode the lesser curvature quite close up to the pyloric sphincter, and braced up the first part of the duodenum by adhesions.

CASE II.—*Perforated Chronic and Subacute Gastric Ulcers.*

W., 40, male, Cingalese, was admitted with a history of pain in the abdomen for the last six months. The present illness was of six days' duration, during which time the patient had experienced increasing pain and discomfort. No vomiting.

Present Condition.—Abdomen distended, tympanitic, and tender. Both pain and tenderness were specially marked down the right side of the abdomen and in the epigastric region to the right of the middle line; this was also the case with rigidity. Liver dullness normal. Right flank dull; left tympanitic. Expression anxious. Tongue glazed. Pulse rapid and feeble, 154 per minute. Breathing thoracic. Scanty response to soap and castor-oil enema.

The symptoms referable to the stomach (pain aggravated soon after ingestion of food and relieved on vomiting, etc.) and the site of tenderness and rigidity enabled me to come to a diagnosis of perforated ulcer of the stomach rather than one of the duodenum, although symptoms simulating appendicitis more often accompany perforations of the duodenum. Against appendicitis were the facts that the rigidity was not confined to the right iliac fossa and its environment, but encroached significantly on the epigastric region; added to this was the history of marked digestive disturbance.

Operation.—An incision was made through the right rectus, and disclosed at the very outset dense adhesions between the stomach, liver, colon, and small intestines, disfiguring considerably their normal relations. On cautiously separating the more superficial and tractable of these, gas was heard to escape, and a large opening was found high up and far back against the under-surface of the liver to which its edges were firmly fixed. No attempt was made to close this opening for fear of breaking through adhesions which seemed to shut out the general peritoneal cavity. A drainage tube was inserted into the stomach through the perforation and brought out at the abdominal wound to which it was fixed. The area round the perforation and tube was packed with gauze and a suprapubic drain inserted. The patient expired ten hours after operation.

Post-mortem Examination.—Dense adhesions of stomach to liver, colon, small intestine, and pancreas. Two perforated ulcers were found: (1) Chronic perforated ulcer with indurated edges and dense adhesions to under-surface of liver; situated on the lesser curvature midway between cardia and pylorus. The floor of the ulcer was partially formed by the liver and pancreas about their tuber omentale. It admitted the index finger. This was the ulcer into which I had introduced the drainage tube. (2) A subacute perforated ulcer, admitting index finger, situated on anterior stomach wall in the lower segment of the antrum pylori about 1 in. from the greater curvature. This ulcer was subacute in type, presented no indurated edges or stable adhesions, was the ulcer which I failed to detect at operation, and was, I have no doubt, responsible for extravasation down the colon, and death.

The extravasated stomach contents were shut in by adhesions which limited them to the epigastric region except for a leakage which had tracked down to the right kidney pouch of Morrison, and thence down the ascending colon to the region of the caecum; both the latter were gangrenous, putrid, and perforated, and were responsible for the tenderness and rigidity simulating appendicitis. The appendix itself was neither inflamed nor adherent.

CASE III.—*Perforated Duodenal Ulcer.*

S., 37, female, Tamil, was admitted in an exceedingly serious condition. The pulse was quick, feeble, and scarcely perceptible. The extremities were cold; facial expression very anxious; respirations hurried and thoracic; temperature 98°; vomiting not present. The abdomen was rigid and tender all over; when asked to show painful and tender area, she passed her hand above, below, and around the umbilicus.

I was only able to gather the following meagre previous history: Duration of illness two days; the onset did not appear to be strikingly sudden. No previous history of gastric pain or dyspeptic symptoms. Pronounced constipation, not relieved by enema.

In view of the general tenderness, rigidity, and pain, and the absence of a definite localizing sign or symptom, I could arrive at no definite diagnosis as to the cause of the peritonitis.

Operation.—I made a subumbilical median incision and encountered, free in the peritoneal cavity, a large quantity of grumous bile-stained fluid redolent of a native decoction of offensive odour called a "Kassaye." There was some plastic peritonitis and lymph flakes were adherent to coils of intestine. The omentum was invisible. I next explored the stomach by an incision through the right rectus and found the omentum tucked away and adherent in the direction of the pylorus and duodenum. The omentum was easily dislodged, and a perforation about $\frac{1}{2}$ in. in diameter was noticed on the anterior surface of the duodenum about $\frac{3}{4}$ in. from the pylorus, and through it bile-stained fluid and gas escaped. The tissues round the perforation were much indurated and tore through when I began suturing; however, with great care I succeeded in placing a continuous Lembert in the direction of the long axis of the gut, doubling in the edges of the perforation. On this an

omental graft was secured. The patient was in a bad way, and I was constrained to mop up quickly the extravasated contents of the stomach, to insert drains into the pouch of Douglas and the vicinity of the perforation, and to close the greater part of the abdominal wounds. The operation lasted twenty minutes. The patient succumbed one hour after operation. Saline proctoclysis, adrenalin, and stimulants proved of no avail.

Post-mortem Examination.—Perforation on anterior wall of the duodenum. Looked at from inside (see illustration) the ulcer presented the appearance of a longitudinal fissure situated in the midst of an elevated and indurated ridge which not only encroached on, but also extended across the pyloric sphincter. In this connexion W. J. Mayo's finding that often pyloric ulcers are found to have their origin in the duodenum and differentiation between the two is difficult, is of interest.

CASE IV.—*Traumatic Perforation of the Stomach.*

J., 10, male, Cingalese, came in with an oblique wound in the epigastrium, said to be the result of an accidental impalement on a stick which he happened to be carrying in his hand, and on which he fell over whilst running. His appearance gave not the slightest clue to a severe abdominal injury. However, as the wound was penetrating, I had the patient anaesthetized for exploration.

Operation.—At the inception of anaesthesia a large quantity of undigested rice was vomited, which I afterwards ascertained he had partaken of just before the accident occurred. I did not wash out his stomach for obvious reasons. The wound was enlarged upwards, and on exploration with the finger I found it enter easily into an opening in the anterior wall of the stomach a little above the attachment of the great omentum. The abdominal and stomach wounds did not correspond in position, the former being placed at a higher level, owing to the oblique direction of the injury. There was not the slightest trace of leakage of the stomach contents, although the stomach had received a large meal of rice and curry just before the receipt of the injury, and had remained full until a few minutes prior to operation.

The opening in the stomach was carefully closed by a double row of sutures, and a cigarette drain was inserted down to it. The greater part of the abdominal wound was closed—at the time I did not think further interference indicated. Twelve hours later, however, when tympanitis began to appear, I made a suprapubic incision, and removed a small quantity of clotted blood which had gravitated down to the pouch of Douglas. The pelvis was drained, and saline proctoclysis administered. Evening temperature, 102°. The next day it came down to 99°, and from that time onward convalescence was uninterrupted, and the patient made a good recovery.

The most feasible explanation I can offer for the absence of escape of the contents of the stomach through a hole which admitted the index finger easily is that the rice was welded into a plastic coherent mass; also, owing to the obliquity of the wound, the aperture was perhaps valvular. The meal had been taken ten hours before the operation, and had apparently remained in the stomach for that time; whether Nature had suspended gastric motility and function as a means of protection is a point open to speculation.

RUPTURE OF THE ABDOMINAL WALL, POST-OPERATIVE AND SPONTANEOUS.

BY

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RUPTURE of the abdominal wall is a post-operative sequel of which little mention is made in the textbooks of surgery, although it is not a very rare occurrence. I refer to the cases in which the approximated edges of the abdominal wound completely separate, and the intestines are extruded through the opening, not to the common presentation of a knuckle of bowel after removal of a drainage tube.

It is most commonly found after suppuration, and frequently after a stitch abscess which burrows amongst the muscles. It would appear that the omentum, in addition to its many other uses, tends to prevent such an accident. In a series of experiments on cats, Wilkie¹ found that when sepsis developed after abdominal operations, 5 per cent. died from rupture and prolapse of the viscera; where, however, he had removed the omentum, 85 per cent. died from prolapse. He therefore advises that when an abdominal wound has been exposed to infection the omentum should be spread out behind it before suturing up the abdominal wall.