THE CAUSES OF ACUTE ABDOMINAL PAIN IN THE HEALTHY, EXCLUSIVE OF TRAUMATISM.

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IN comparing textbooks upon abdominal surgery of 1892 with those of 1902 one cannot help being astonished at the extraordinary progress that has been made in this department. Operations such as pylorotomy and removal of large portions of the stomach were within the last five years looked upon as nothing more or less than "surgical exercise." In 1896 the late Mr. Greig Smith, who was one of our most able surgeons as well as a pioneer in abdominal surgery, wrote thus: "It is doubtful if it can ever be the surgeon's duty to advise the operation; he ought to undertake it only at the patient's urgent request."

Under the subject of this paper are included all those conditions which are comprehended under the designation of acute intestinal obstruction, and also that most important class which should be separated from the above, that is, perforation or rupture of the viscera in the abdominal cavity covered by peritoneum. It should always be borne in mind that a considerable number of cases of acute abdominal pain call for prompt surgical interference long before the classical symptoms of so-called acute intestinal obstruction show themselves. Waiting for these symptoms often means the loss of the best opportunity for saving life. What can possibly be the diagnostic value of the act of passing flatus, or of the time which has elapsed since the last defaecation in cases of ruptured Fallopian tube or perforation of the stomach or of the appendix? The symptom of vomiting in some of the most fatal cases of gangrenous appendicitis is of very little value and is frequently absent. The assemblage of symptoms which in cases of acute abdominal pain forms the basis for operative interference may be discussed separately, firstly (1) pain, (2) condition of the abdominal parietes and of the abdominal contents, (3) facial expression, (4) pulse, (5) temperature, and (6) vomiting.

1. Pain.

It is a matter of prime importance to have the patient's version of the onset of the attack; whether it started in (a)

Fig. 1.—A, Biliary, renal, pulmonary; B, Appendicular, volvulus; C, Tubal, ovarian; D, Gastric; E, Renal, pulmonary; F, Tubal, ovarian. Figure shows areas of pain with surgical significance. When pain is in the umbilical area marked with ??, the surgeon should operate below the umbilicus in the middle line. Sudden pain may start at umbilical area and afterwards radiate to one of the other areas.

the umbilical area, (b) epigastric area, (c) caecal area, (d) hypogastric, or in the regions of (e) the right or left costal margin. I have found the diagrams (Figs. 1 and 2) useful in assisting me to estimate the value of pain in many cases and to unravel the common assemblage of symptoms:

Fig. 2.—A, Biliary, renal, pulmonary; B, Appendicular, volvulus; C, Gastric; D, Renal, pulmonary; E, Tubal pregnancy, strangulated ovarian cyst. When pain is exclusively in area marked ?? (umbilical), the abdomen is to be opened below the umbilicus in the middle line.

Suddenness of onset is a characteristic of all the cases I am discussing. The intensity of the pain, its continuity, with or without exacerbations, will depend upon the site, the extent, and the nature of the cause.

Umbilical or circum-umbilical pain is a common sign of grave abdominal lesions in any locality, and it is in these cases when an operation is decided upon that one should always perform coeliotomy in the middle line below the umbilicus.

Pains which start in the other regions, marked in the diagrams as tubal, volvulus, appendicular, gastric, have all a tendency to merge into the umbilical area as the disease progresses, whilst those of the biliary, pulmonary, and renal areas tend to subside into their recognized spheres.

It is very significant that small perforations of a viscus may be accompanied by a very profound shock, whilst the surgeon can crush an inch or more of the intestines with powerful clamps without giving rise to any appreciable shock. It is a subject for speculation why a surgeon, after deliberately opening the abdomen, can evacuate the intestines through several incisions without causing shock, whilst a small penetrating stab is usually accompanied by profound collapse.

2. The Condition of the Abdominal Wall and of the Abdominal Contents.

Personally I attach very little significance to the absence of hepatic dullness, as I have so often found it absent in cases of distension of the bowel alone without there being any free gas in the abdominal cavity; and, on the other hand, hepatic dullness has been present and well marked in cases of free gas in the abdominal cavity with slight distension of the intestines.

What is of much more importance is the degree and continuity of rigidity of the abdominal muscles under prolonged examination with the patient's thoughts diverted. A rigid abdominal wall with no respiratory movements in it is very significant of perforation of stomach, duodenum, appendix, or some other viscus. It is present also in ruptured tubal pregnancy, but it lacks the continuous board-like condition of perforation of any portion of the intestinal canal. When the pain is in the upper abdominal areas, it is important to observe the effect of fixing the lower ribs by means of our hands placed firmly upon the chest wall; in cases of perforation

of the intestine I have never seen this manœuvre make the slightest difference to the degree and the continuity of the rigidity, but in cases of incipient pneumonia or pleurisy there was a distinct modification of the condition of the abdominal parietes with an expression of slight relief from pain.

Distension of the intestines with gas is a very dangerous complication. I know of no single symptom which at the present time is so adverse to successful surgical interference as that of being "very much blown out." It is next in importance to hiccough, which is too frequently the harbinger of the coming end; but I am glad to say that a few patients can be saved by evacuating the distended coils, thanks to the pioneer work of the late Mr. Greig Smith in this direction.

3. The Facies.

I think the most difficult sign of all is to express in words the significance the facies convey to the observer. One often says, after a glance at the patient's face, that "he is dying, unless there is a change very soon." I am sorry I do not know of any word picture to convey to you the mental image of this condition. It is not very long, unfortunately, that one has to wait in our profession before this haunting picture appears in real life.

It is extremely rare for a patient suffering from perforation of an abdominal viscus to demur to operation, unless he has reached the stage of non-responsiveness to pain. It is a singular fact and matter of common experience that the last stages of perforation are accompanied by a mental condition which is decidedly optimistic as regards the prospects of recovery without the surgeon's aid. The surgeon who takes the hint is acting wisely.

4. Pulse.

The frequency and the condition of the pulse are of considerable value in estimating the gravity of the patient's illness. One must discriminate between the pulse of the nervous and the pulse of the acutely septic patient suffering from perforative peritonitis; it requires some experience to differentiate them, but a pulse that keeps at a rate of over 95 a minute for a few hours has serious surgical significance in a patient suffering severe sudden abdominal pain.

5. Temperature.

Temperature is a factor of questionable value in forming an opinion as to the necessity of surgical interference; a small, flickering, rapid pulse, with a normal temperature, is of much graver importance than a pulse of 85, with a temperature of 103° F. Some of the deadliest septic poisons do not possess pyrogenic properties.

6. Vomiting.

I have purposely left the symptom of vomiting to the end, as it is one of the least significance from a purely surgical standpoint. If it is of an urgent, persisting, and distressing occurrence, such as in acute strangulation of the bowel, the surgeon is, as a matter of course, sent for; but if it is of only an occasional occurrence, or complicated with recurring spasms of the diaphragm or of an occasional hiccough, as in cases of acute or primary gangrene of the appendix, or of some cases of perforation of the stomach, I think that the proper interpretation of this condition needs recognition as being of vital surgical significance.

I deliberately refrained from alluding to shock, chiefly because if the conditions of the patient's facies, the intensity of the pain, the character and rate of the pulse, and the nature of the vomiting or its allied phenomenon of diaphragmatic disturbance be carefully observed, there is no need to use a term which is very elastic, very misleading, and conveying nothing but a misty conception of the symptom-complex.

I will now refer very briefly to three specimens and to some cases illustrative of the difficulty and sometimes the disappointment in dealing with them.

(a) Gall Stone.

A gall stone passed through the common bile duct without giving rise to obstruction, and got impacted in the ileum about 1 yard from the ileo-caecal valve, and caused death from obstruction within three days. I got it through an insurance company questioning the cause of death of a man who was struck on his right side whilst getting into a dogcart through his horse running away; slight umbilical pain came on at once, and passed off for a short time, to recur and develop

within twenty-four hours into a case of acute intestinal obstruction. I made the necropsy nine years ago; no operation had been performed. The stone is remarkable as being conico-cylindrical in shape like a pom-pom shell; it is $1\frac{1}{2}$ in. in length, and its base is $1\frac{1}{4}$ in. in diameter, and its point had travelled in front. There were no adhesions round the gall bladder and bile duct.

(b) Thrombosis of the Superior Mesenteric Veins.

I have come across two cases of thrombosis of the superior mesenteric veins, and both of them simulated acute intestinal obstruction. My friend, Dr. Mitchell Stevens, Pathologist to the Cardiff Infirmary, has carefully dissected out a specimen which shows well the character of the lesion. The extent of small intestine involved is just under one yard. The history of one of the cases illustrates well the extreme difficulty of differential diagnosis.

A doctor and two members of his family partook of supper on a Monday night, and the three suffered more or less from ptomaine poisoning before the following morning. The old lady did not completely recover from the effects of the poison, and towards Tuesday evening showed symptoms of increasing pain around the umbilical region. Early on the Wednesday morning I was called in to see her, and found the abdomen fairly rigid with tenderness on deep pressure a little to the right of the umbilicus; there was occasional vomiting, with a quick, small pulse, and temperature a little subnormal, and an expression of face designating serious intestinal trouble. Three doctors agreed that an operation should be done immediately, as the condition of the patient was getting from bad to worse. Whilst making the necessary preparations for operation, the patient passed a copious offensive motion with a great deal of blood mixed with it; then she became rapidly worse and died in the course of the day, the illness not lasting much over 36 hours.

The history of my other case is practically the same and death supervened before operation was performed.

It is interesting to know that similar cases have been operated upon and have recovered. It would have been extremely difficult to advise laparotomy in my two cases in time to save the patients on account of the absence of acute and serious symptoms until the time when the end came on rather quickly with blueness of the nails and lips.

(c) Extrauterine Pregnancy.

Mrs. X. had been married a few weeks, and had a past history of having suffered severely from ulcer of the stomach, with haematemesis. When I saw her she was blanched, abdomen moderately distended, with slight rigidity of the abdominal muscles. She had had sharp pain in the hypogastric region, had missed one period, and these facts, combined with pallor and only slight rigidity of the abdominal muscles, justified, the diagnosis of rupture of a tubal pregnancy, with intraperitoneal haemorrhage, and not that of perforation of the stomach. In the latter condition we should have found quickened, laboured breathing, and an extremely rigid abdominal wall. These are the special points which seem to me to be of the greatest importance in the differential diagnosis of such cases. She recovered without any trouble, and has since had three boys.

There is one type of rupture of an extrauterine pregnancy which is rather uncommon, and therefore a little liable to put one off making a correct diagnosis: it is the one that takes place during the inter-menstrual period. I have come across but one case (with Dr. Skyrme). The accident came on suddenly in the usual manner, with acute pain and the ordinary accompaniments of such a lesion. Laparotomy was performed immediately, and the patient recovered. This case might possibly have got well without an operation, but as recurring sudden pains supervened, with pulsation in the left broad ligament, we considered that the indications for operative interference were sufficient.

It is well to bear in mind that a certain number of cases of undoubted perforation of the stomach, or of the vermiform appendix, and of rupture of a pregnant Fallopian tube, get well without the surgeon's aid, and on that account it is desirable to explain the remote possibility of such an occurrence in order to avoid the risk of becoming a false prophet in cases where surgical aid is declined by the patient or his friends.

(d) Gastric Ulcer.

I have opened the abdomen on ten occasions for perforating gastric ulcer, and in two of them I was unable to find the opening on account of the patients being in *extremis*.

The first occurred in 1893, a patient of Dr. A. C. Taylor, and the other one in 1896, a patient of Dr. E. Traherne. In the two cases I performed laparotomy above the umbilicus, and not finding the perforation the abdominal cavity was mopped dry, and large drainage tubes put in through a separate opening above the symphysis pubis and packed with iodoform gauze; one of them recovered without further surgical attention.

In another case of Dr. Sparrow's, I opened the abdomen at midnight

within twelve hours of perforation and found a small opening where the oesophagus comes through the diaphragm. As it was impossible to apply a suture in that situation I determined to pack with iodoform gauze for thirty-six hours, and recovery was uninterrupted, and three years afterwards she was in perfect health.

I think it is quite possible that in this case Nature could have effected a cure if no operation had been done, because the opening was very small and in a position which would be in favour of only a small leakage of the gastric contents taking place. It is in the lower dependent positions along the greater curvature of the stomach that we get large quantities of the gastric contents rapidly effused into the general peritoneal cavity.

HERNIA OF THE BLADDER AS A COMPLICATION OF INGUINAL HERNIA.

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MR. H. J. CURTIS's paper published in the *BRITISH MEDICAL JOURNAL* of July 11th, on a case in the practice of Mr. Bilton Pollard, induces me to publish another example of the condition illustrated by him, and referred to above. Though uncommon, it is of sufficiently frequent occurrence to put all operating surgeons on their guard, with a view to its recognition. I must confess that I was not aware of such a condition, as of practical importance, before I was recently introduced to it in the case which I will now briefly narrate.

It is that of a young man who sought relief for a large irreducible left inguinal hernia, recurrent after an operation for radical cure. This hernia proved to be mainly omental, together with a small knuckle of the transverse colon. The operation done by me was made difficult by adhesions, though it was satisfactorily accomplished at last. Some pounds' weight of omentum was removed, and the neck of the sac was closed, though its total extirpation was impracticable. At the end of the operation a thin, blue, and distended cyst, about the size of a pigeon's egg, was noticed in the immediate proximity of the spermatic cord, and adherent to the remains of the sac. It was mistaken for a hydrocele of the cord, and was punctured, when a considerable amount of clear fluid escaped, and the finger introduced into the cyst passed, at a deeper level, through a constricted neck, into the bladder. The cyst was of extreme thinness, consisting of little more than attenuated mucous membrane. Regrettable as such a mishap was, I am glad to add that no harm followed it. The mucous membrane was stitched together continuously with fine silk, which I used in preference to catgut, feeling more confidence in its asepticity, and trusting that from its fineness it would not project into the bladder to originate incrustations therein; and this continuous suture was completely covered in by a layer of interrupted Lembert's. *Cæteris paribus*, catgut would, of course, have been safer for the mucous suture. A catheter was tied into the bladder for a few days, and I am pleased to add that uneventful healing by first intention ensued. Still and nevertheless the puncturing of vesical cysts is clearly a practice to be avoided, and I am grateful to Mr. Pollard for the simple suggestion that the diagnosis can be quickly cleared up by a sound passed through the urethra.

In the case treated by me the bladder hernia was extraperitoneal, and its mechanism was very evident. After the first operation there was inflammation with suppuration, and an adhesion resulted between the remains of the sac and the bladder, the former of which in its re-descent drew down with it a diverticulum of the mucous lining of the latter.

I suspect that there have been many more cases of vesical hernia observed than have found their way into medical literature, and I am permitted to refer to another case in the practice of my friend, Mr. E. Dykes Bower, Surgeon to the Gloucester Infirmary. Here an innocent-looking little cyst, projecting, as in Mr. Pollard's case, into the hernial sac, was removed, after ligaturing its neck. As in my case, the man had previously undergone an operation for radical cure, also on the left side, and fortunately here again no harm resulted from the injury to the bladder, and the patient made a good recovery, though during the next day, and for some time afterwards, there was a copious flow of

urine through the wound. Clearly, however, it must be the rule hereafter to leave all such suspicious cysts untouched, and surgeons are much indebted both to Mr. Pollard for indicating the proper treatment of such cases, and to Mr. Curtis for his clear and helpful diagrams and descriptions.

FURTHER OBSERVATIONS ON ALCOHOLIC AND ARSENICAL NEURITIS.

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It will probably be remembered that in 1900 there was an outbreak of arsenical neuritis amongst beer drinkers, especially in the North of England and in the Midland Counties. This was due to the accidental contamination of glucose with arsenic. In various papers which I wrote in connexion with this epidemic, and in my evidence given before the Royal Commission on Arsenical Poisoning, I contended that by far the greater number of cases of so-called alcoholic paralysis, at any rate in the Manchester district, were in reality due to chronic arsenical poisoning, and were not due to alcohol, and that this had been the case for years, probably apart altogether from the use of contaminated glucose. Subsequent investigations showed clearly that malt, especially when prepared by the use of certain cokes, was largely contaminated with arsenic, and that beer prepared from this malt also contained heavy traces of arsenic. Indeed, a small epidemic of marked arsenical poisoning occurred in beer drinkers at Halifax last year quite apart from arsenicated glucose, and was probably due to the malt having been prepared with gas coke.

In evidence given before the Royal Commission in 1902 I stated that I had seen cases of peripheral neuritis in pure spirit drinkers where there was no evidence of arsenical contamination. These cases, however, are very different from the cases of so-called alcoholic paralysis with which we have been so familiar for many years. They show some loss of power in the legs and arms, absent knee-jerk, paraesthesiae of the feet and hands, only slight tenderness on pressure of the muscular masses, very little atrophy, no loss of memory, and no oedema. Such cases are, moreover, considering the large amounts of alcohol consumed in this country, very rare, and during the last two years I have certainly not seen half a dozen in my private practice, in a large out-patient practice at the Manchester Royal Infirmary, and at the Manchester Workhouse Infirmary, where I have 800 medical beds.

By the old so-called alcoholic paralysis I mean those cases of peripheral neuritis, with much paralysis and atrophy of the legs and arms, loss of knee-jerks, great tenderness on pressure of the muscles, and peculiar and typical loss of memory for time and place, and often oedema of the legs—sometimes general oedema—from dilatation of the heart. This was the type found so commonly during the arsenical poisoning epidemic, when with it there were also found various skin lesions—notably pigmentation, keratosis, various erythematata, and herpes.

These cases (even apart from the epidemic), I venture to think, were in reality due to arsenical poisoning and not to alcohol, but many observers have thrown doubt on this view. It is interesting, therefore, to be able to send a short report of what has happened in Manchester during the last two years, in which period Manchester beers have contained perhaps not $\frac{1}{10}$ gr. arsenic per gallon. A close look-out has shown that these cases have practically disappeared (up to about three months ago, about which more presently), and in this statement I am confirmed by the observations of several other Manchester physicians. The "alcoholic" heart has also practically disappeared. Now I think I may take it for granted that the people in Manchester and district are still taking alcohol in large quantities. If these cases are really due to alcohol, why have they disappeared? This is the negative evidence.

Now take the positive evidence. During the last two months I have seen six cases of the old so-called "alcoholic" paralysis type, five of whom are at present under my care.

CASE I.

Edward R., aged 40; has taken ten glasses of beer nightly, more at week ends. Has pressure pains well marked, loss of knee-jerks, some atrophy, paralysis of the legs, slight paralysis of the arms, no loss of memory, burning pains of the soles of the feet, slight general pigmentation.