CLINICAL LECTURE ON OPERATIVE INTERFERENCE IN TYPHOIDAL PERFORATION.

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THE FREQUENCY OF PERFORATION.

GENTLEMEN,—It is not often that you hear a lecture on typhoid fever in a surgical clinic, but the transference of a case requiring surgical aid from the medical wards has directed my attention to the subject, and I find on looking up the literature on typhoid fever that surgeons are directly interested in 1 per cent. of all cases of typhoid fever. About 1.2 per cent., according to statistics, of typhoid cases are complicated by perforation of the intestine. About 6 per cent. of the mortality of typhoid is due to perforation of the bowel. The majority of the cases occur between the ages of 10 and 40, as might be expected, and in the male rather than in the female sex. Osler states that perforation may occur in ulcers from which the sloughs have already separated, or it may be directly due to the extension of a necrosis through all the coats. A majority of the cases are in, or result from, small deep ulcers.

THE DATE OF PERFORATION: MULTIPLE PERFORATION.

In 193 cases collected by Fitz, the perforation occurred in the first week in 4 cases, in the second week in 32, in the third week in 48, in the fourth week in 42, in the fifth week in 27, in the sixth week in 21, in the seventh week in 5, in the eighth week in 3, in the ninth week in 2, in the tenth week in 4, in the eleventh week in 3, in the twelfth week in 1, and in the sixteenth week in 1 case. Perforation occurs, then, most frequently during the second, third, and fourth week. In the second and third week the fever is at its height, and in the fourth week the patient is probably convalescent, but in a very poor condition to undergo a surgical operation. Fortunately in the great majority of cases the perforation is single, but Fitz found 29 cases reported where more than one perforation occurred. In 19 cases there were two perforations, in 3 cases five, in 1 case four, in 4 cases there were several, in 1 case between twenty-five and thirty, and in 1 case thirty perforations.

THE SITE OF PERFORATION.

Now as to the location of the perforation. Hawkins of Edinburgh studied the *post-mortem* reports of 72 cases, and found that the perforation occurred in the ileum in 61 cases, at distances above the ileo-cæcal valve varying from one inch to six feet: in the majority of instances in the first twenty-four inches. Of the remaining 11 cases the cæcum was perforated in 3, the vermiform appendix in 3, the ascending colon in 1; the transverse colon in 1, the upper part of the descending colon in 2, and the sigmoid flexure in 1.

THE MORTALITY OF PERFORATION.

Is perforation of the bowel in typhoid fever always fatal? Until I began the study of this subject a few days ago, I was of the opinion that it was. The early investigators, Louis, Chomel, and Jenner, reported numerous cases of fatal perforation, but none of recovery. But I must confess that there are on record cases that seem to offer conclusive evidence that occasionally typhoid patients do recover after that dreaded complication.

Murchison states that occasionally cases are met with when recovery ensues after all the symptoms of peritonitis following perforation. That and other similar experiences raise the question, Does peritonitis occur in typhoid without perforation? We now know that the typhoid bacillus can cause bone and joint lesions, but so far as I am aware, it is not yet proved that it causes peritonitis. The peritonitis that is recovered from in the course of typhoid fever is localised.

May the coats of the bowel be so thinned and the peritoneal coat so injured that pathogenic organisms can set up a localised peritonitis and adhesion without perforation, and is this what happens in the rare cases of recovery ensuing after peritonitis, following symptoms of perforation?

Our daily experience in perforation of the appendix vermiformis is that when it occurs before limiting adhesions are formed, a fatal septic peritonitis ensues unless the escaped matters are removed, the peritoneum cleansed and drained, and the opening between the bowel and peritoneal cavity closed. The contents of the intestine in typhoid are not less septic than in health, and the patient's reparative and resisting powers are certainly not greater. The majority of perforations occur in the ileum, and the constant peristalsis prevents adhesions from forming. If the perforations occurred in the appendix or colon there would be greater chance of adhesions preventing the escape of septic matter, or at least the limitation of it. I think that the cases of recovery by resolution after symptoms of perforation, and without the formation of abscess, are really cases of localised peritonitis occurring without perforation.

Fitz reported 17 cases of spontaneous discharge of pus in typhoid ensuing after symptoms of peritonitis. Of these, 9 recovered and 7 died, and in 1 the result is not stated. The pus discharged into the intestine in 13 cases, into the vagina in 1 case, through the abdominal wall in 2 cases, and at the navel in 1. A case is recorded of a patient who at the end of typhoid fever had a severe deep-seated pain in the right buttock, extending up towards the right kidney. Three litres of pus were removed through an opening made in the right loin; the patient recovered. This abscess probably resulted from the perforation of the ascending colon, or an appendix turned up beneath the colon. Taylor reported a similar case. The abscess was opened by an incision between the sternum and navel. Three pints of turbid fluid were removed, and the patient recovered. The abscess probably resulted from perforation of the transverse colon. Escher reports a case where an abdominal section was performed for the relief of a suspected incarcerated right inguinal hernia. The condition found at the time of operation led him to think that it was a case of perforation in abdominal typhoid. The patient recovered. McCall reports the case of a woman suffering from typhoid, who on the sixteenth day of the fever presented all the symptoms of perforation of the bowel. Seventeen days later she passed an eggcupful of matter. Six days later he removed by aspiration from the region of the cæcum 18 ounces of foul-smelling pus and some gas, and six days later 6 ounces more were drawn off; she made an excellent recovery.

I call to mind the case of a young woman whom I attended during a course of typhoid fever some years ago. During convalescence after her temperature had been normal for several days, she developed a sharp pain in the left loin; the pain came on suddenly, and was so severe that a hypodermic injection of morphine was given; two weeks later I opened an abscess in her left loin, and removed a considerable quantity of pus having a foul odour. This quite possibly resulted from perforation of the colon.

THE DIAGNOSIS OF PERFORATION.

The symptoms of perforation are generally described as being very distinct and characteristic. These symptoms are sudden, severe abdominal pains associated with collapse; a marked fall in the temperature often to a point below normal, the pulse becomes rapid and shabby, the abdomen at some part is tender to the touch, and the abdominal muscles tense and rigid, and later distended and tympanitic. The patient is sometimes livid, the face covered with a cold perspiration, the extremities cold.

Too much reliance should not be placed upon the disappearance of liver dulness, although if you are familiar with the area of liver dulness in the patient under observation, the lessening of the dull area in a suspected perforation is certainly a valuable sign. Murchison mentions as other causes of intestinal perforation in typhoid softened infarctions of the spleen, softened mesenteric glands, and rupture of ovarian abscess.

The symptoms resemble very closely those of acute appendicitis, but in my experience with a number of cases in this

hospital, the occurrence of perforation in typhoid is not as a rule announced by such marked and distinctive symptoms as some medical authors describe. The patient complains of pain, but it is not, as a rule sufficiently severe to require opium for its relief. There is abdominal tenderness, but it is not as great as in appendicitis, and greater pressure is required to make the patient complain. The temperature is generally lowered 2° or 3° , but soon rises again; the face is anxious, and the pulse somewhat but not markedly accelerated. It is often altered more in quality than in rate. In fact it requires careful and critical observation to determine whether in a given case a perforation has occurred or not. In some cases the symptoms of perforation may be said to be almost absent. This is why house physicians so often overlook its occurrence, and leave it to be discovered by the attending physician at his next visit.

SURGICAL TREATMENT.

Having recognised a typhoid perforation, how should it be treated? When sure of your diagnosis, give a dose of opium: by so doing you relieve pain and arrest peristalsis, thus favouring the formation of limiting adhesions, and so far as you can, preventing the spreading of the escaped matters over the abdominal cavity. Supply artificial heat by means of hot water bottles and hot flannels, and if there are indications for it, administer a stimulant. Hot fomentations over the abdomen are generally grateful. If the patient's condition permits, ice may be applied over the tender area.

Leyden in 1884 suggested that typhoid perforations should be treated by laparotomy. In the same year, Mikulicz reported a successful case of laparotomy with intestinal suture in a patient with ichorous purulent peritonitis, attributed to a perforating typhoid ulcer of the small intestine. The diagnosis of typhoid was not clear; the patient had a small right inguinal hernia. He thought himself well when he jumped out of bed, and was suddenly seized with acute abdominal pain. Laparotomy was performed on the third day for supposed intestinal obstruction. A hole was found in the ileum 6 mm. long by 4 mm. wide. There were no signs of injury to the bowel, and the mesenteric glands were enlarged. The opening was clean cut, and the edges of the mucous membrane were not everted.

Lücke in 1887 performed the first laparotomy, undertaken with the defined object of finding and closing a typhoid perforation. The perforation occurred on the eighteenth day of the fever, and Lücke operated twelve hours later. The patient died.

Since then many operators in different countries have undertaken to close typhoid perforations, but the successes can be counted on the fingers of one hand. The first successful case that I can find recorded was operated upon by Wagner in 1888. The patient was a woman. The perforation occurred during convalescence. The diagnosis of typhoid perforation was made, the abdomen opened, irrigated, and the wound in the bowel sutured. The patient recovered.

In 1890 Taylor operated, but the operation was performed ten days after the onset of symptoms. There is no proof that the case was typhoid.

In 1891 Van Hook operated upon three cases of typhoid perforation, and one patient, a woman 31 years of age, recovered.

In 1894 Netschagan, of St. Petersburg, did a laparotomy for typhoid perforation, and resected a portion of the perforated bowel. The patient recovered.

In 1894 Abbe performed laparotomy on a woman, aged 31, who was convalescing from typhoid. The opening was sutured, the abdomen thoroughly irrigated and tamponaded with iodoform gauze; the abdominal incision was not closed. The patient recovered.

Laparotomy for the treatment of typhoid perforation has been performed six times in this hospital, three times by myself and three times by my colleagues. So far we have not been able to record a success. I am very hopeful, however, that this patient will recover. The perforation occurred on the thirteenth day of a more than usually severe form of typhoid fever. The pain and collapse at the time of perforation were not marked. There was some vomiting. I operated eighteen hours after the occurrence of sudden abdominal pain, tenderness, and vomiting. The perforation was readily

found, situated about 6 inches above the ileo-cæcal valve. A quantity of fetid brownish fluid, and pus and gas filled the pelvis and lower abdominal zone. The perforated ileum had formed no adhesion to neighbouring coils or to the parietes, but the opening was partially closed by a corner of omentum which was attached around the perforation. It separated very easily. Possibly if this man recovers it will be due to the fact of this omental adhesion limiting the escape of bowel contents. It is now twenty days since I operated. The patient's condition is good in every way. He passes formed stools, sleeps well, and takes plenty of nourishment. His abdomen is soft and flaccid, and absolutely free from pain or tenderness. His temperature is falling, and he has a good pulse of 88. I really am beginning to think that this man will recover; everything points that way at present certainly.

ITS RESULTS.

Now the statistics stand at present, not counting my own, whose recovery is not yet complete, but including doubtful cases, 30 operations and 6 recoveries; but if only those cases are included in which there was no doubt as to the diagnosis, counting only early laparotomies, we have 23 operations with 4 recoveries. I am satisfied that the proportion of recoveries to the number of operations done is not as good even as these figures indicate. It is probable that many unsuccessful operations have been performed that have not been reported, but I think most of the recoveries have been recorded.

Five cases have recovered after incision and evacuation of local collections of pus, and one case after aspiration of a collection of pus and gas in the cæcal region. Now in view of these results, What is our duty when brought to a case of typhoid perforation? The patient is in a very poor condition for operation, suffering from the typhoid poison, with very poor reparative and recuperative power. Perforation peritonitis adds more poison. Should we add the traumatism of an operation with a little loss of blood, and anæsthesia? Does any other treatment offer as good or better chances? Is there any alternative but to operate, or to hand the patient over to some one familiar with such work? The question must be answered according to the circumstances and condition of each case. If there is clinical evidence that the perforation is in the colon, or that it is likely to remain localised, then I should say—wait for abscess formation.

If, on the other hand, the clinical signs point to a perforation having occurred into the general peritoneal cavity previous to the formation of living adhesions, it would seem as though laparotomy, closure of the hole, thorough irrigation with normal saline solution at a temperature of 110° F., and very free drainage, offered the only hope of recovery. This should not be undertaken until the condition of collapse has passed off, nor in patients who are evidently moribund.

Perforations occurring during convalescence offer greater prospects of recovery. In this as in my previous cases I closed the opening in the bowel by two or three rows of Lembert sutures running in the long axis of the bowel. The opening closes readily. Dr. Johnston kindly tested the closure in the two cases that died: one twelve hours, and one twenty-four hours, after operation; in each case neither water nor air could be forced through the sutured part without a good deal of pressure.

It only remains for me to add that in this last case Dr. Johnston confirmed the clinical diagnosis of typhoid by finding that a drop of the patient's blood gave the characteristic reaction when brought into contact with a pure culture of the typhoid bacillus after his modification of the method of serum diagnosis.¹

¹ See the paper by Drs. Wyatt Johnston and McTaggart, pp. 1629 et seq.

MR. BANCROFT has promised to give his reading of the "Christmas Carol," in aid of the funds of Charing Cross Hospital, at St. Martin's Town Hall on Friday evening, January 22nd.

THE Lord Lieutenant of Ireland, on November 30th, at Meath Hospital, Dublin, opened a memorial bed to the memory of the late Sir George Porter, Surgeon in Ordinary to the Queen in Ireland. Earl Cadogan said he was sure Her Majesty would rejoice in the manner in which they were honouring his memory.