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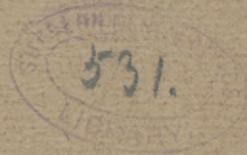
INTESTINAL PERFORATION IN TYPHOID FEVER:

ITS PROGNOSIS AND TREATMENT.

BY

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INTESTINAL PERFORATION IN TYPHOID FEVER: ITS PROGNOSIS AND TREATMENT.

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At the fifth annual meeting of the Association of American Physicians, Dr. Reeves,¹ in his paper on "Typhoid Fever," says:

"I have seen in five instances all the symptoms which announce and follow perforation of the bowels, yet the patients recovered."

During the subsequent discussion, Dr. Loomis² stated:

"I do not remember to have seen a single recovery after there were unmistakable evidences of intestinal perforation. Recovery from a local peritonitis complicating typhoid fever is not uncommon, but when the characteristic symptoms of intestinal perforation are present, in my experience, a fatal issue soon follows."

With such a divergence of opinion, so lately expressed, it seems desirable to reinvestigate the subject of intestinal perforation in typhoid fever, with the view of harmonizing conflicting opinions concerning its mortality, and, especially, with the hope of obtaining evidence which might aid in the treatment of this usually, if not invariably, fatal complication.

The frequency of its occurrence has been most recently considered by Schulz,³ who found that peritonitis from intestinal perforation took

¹ Transactions of Association of American Physicians, 1890, v. 17.

² *Loc. cit.*, v. 21.

³ *Centrabl. f. allg. Path. u. path. Anat.*, 1891, ii. 289. *Jahrb. d. Hamb. Staats Krankenanstalten*, 1889, i.



place in 1.2 per cent. of 3686 cases of typhoid fever treated in the Hamburg hospitals during the years 1886 and 1887. He thus essentially confirms the statement of Liebermeister,¹ who found intestinal perforation in 1.3 per cent. of rather more than 2000 typhoid patients in the hospital at Bâle between 1865 and 1872.

As a cause of death in fatal cases of typhoid fever it was found by Hölischer² to occur in 6 per cent. of 2000 cases. Murchison³ found a much greater frequency—11.38 per cent. in 1721 cases collected from various sources. But in 4680 cases of typhoid fever, as tabulated by various authors, I find a mortality of only 6.58 per cent. from this cause, thus practically agreeing with Hölischer.

It occurs much more often in man than in woman. In 444 cases, I find it among men in 71 per cent. and among women in 29 per cent. Its occurrence among children is very rare. Wolberg⁴ found no case of intestinal perforation among 277 cases of typhoid children in the Warsaw hospital. The following table, representing a collection of cases chiefly from periodical literature, shows the relative frequency of the occurrence of intestinal perforation in typhoid, at the different periods of life :

AGE AT WHICH PERFORATION OCCURS.

| Age. | Cases. | Per cent. |
|-------------------------|--------|-----------|
| 1 to 10 years | 7 | 3.6 |
| 10 to 20 " | 46 | 23.8 |
| 20 to 30 " | 77 | 39.8 |
| 30 to 40 " | 45 | 23.3 |
| 40 to 50 " | 14 | 7.2 |
| 50 to 60 " | 2 | 1.0 |
| 60 to 70 " | 1 | 0.5 |

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The perforation may take place from the end of the first week to the sixteenth week, as shown by the comparison of symptoms and lesions in 193 cases. The following table illustrates this point :

¹ Ziemssen's Hdb. d. sp. Path. u. Therap., 1874, ii. 1, 161.

² Münch. med. Woch., 1891, xxxviii. 64.

³ Treatise on Continued Fevers, 2d edition, 1873, 566.

⁴ Jahrb. f. Kinderheilkunde, 1888, xxvii. 28.

DATE OF OCCURRENCE OF PERFORATION.

| Week. | Cases. | Per cent. |
|-----------|--------|-----------|
| First | 4 | |
| Second | 32 | 16.5 |
| Third | 48 | 24.8 |
| Fourth | 42 | 21.7 |
| Fifth | 27 | 14.0 |
| Sixth | 21 | 13.4 |
| Seventh | 5 | |
| Eighth | 3 | |
| Ninth | 2 | |
| Tenth | 4 | |
| Eleventh | 3 | |
| Twelfth | 1 | |
| Sixteenth | 1 | |
| | 193 | |

The seat of the perforation in 167 cases was the ileum in 136 (81.4 per cent.), the large intestine in 20 (12.9 per cent.), the vermiform appendix in 5, Meckel's diverticulum in 4, and the jejunum in 2. In 19 cases there were two perforations, in 3 there were five, in 1 there were four, and in 4 there were several. In one case¹ there were twenty-five to thirty holes, and in another² there were thirty.

The duration of life after the symptoms of perforation arose was usually short. Of 134 cases, 37.3 per cent. died on the first day, 29.5 per cent. on the second day, and 83.4 per cent. during the first week following the onset of the symptoms. During the second week 9 died, 4 during the third week, while 1 lived thirty days and another thirty-eight days.

There is no definite relation between the severity of the individual attack and the occurrence of perforation. In about one-fourth of nearly 200 cases, the course of the disease was distinctly stated as mild. Cases of walking typhoid in which perforation took place were numerous—14 in all. Sévestre³ reports one under his observation as “of typhoid fever without marked signs till the outbreak of grave symptoms.” The case is reported by Bennett⁴ of a man who was admitted to St.

¹ Hoffmann: *Untersuch. u. d. path. anat. Veränd. d. Organe beim Abd. Typh.*, 1869.

² Lebert: *Ueber d. Typhus u. d. Typh. Epid. d. J. 1857.* Friedrich: *Die Paracntese d. Unterleibs b. Darmperf. im Abd. Typh.*, 1867.

³ *Bull. Soc. Anat.*, 1871, xlvi. 360.

⁴ *Trans. Path. Soc. London*, 1866, xvii. 121.

Thomas's Hospital for cardiac disease, with general dropsy. He was purged, and, in consequence of his voracious appetite, was allowed liberal diet, including meat. After a fortnight his bowels became loose for a couple of days. Complaint was then made of general distress. There was some abdominal tenderness, which was thought to be due to peritoneal inflammation from affection of the kidneys. Sudden death took place the next day from typhoid perforation of the ileum. Finucane¹ reports a case as apparently well till within two days of his death, when symptoms of perforation took place. Kleinwächter² records a similar case. The patient, a woman, was about her business till forty-eight hours before death, when the symptoms of perforation began.

As the cases of typhoid fever in which intestinal perforation occurs may be mild or severe, so may the symptoms of perforation be absent or latent, gradual or sudden. Of 80 cases in which a record is made of these characteristics, it was found that in 56 the onset of the symptoms was sudden, in 15 cases the symptoms were gradual or latent, while in 5 there were no symptoms whatever of perforation.

Laboulbène³ reports two cases of peritonitis in typhoid fever from perforation discovered after death :

“ Not having during life the ordinary and characteristic symptoms . . . there was neither severe pain, vomiting, nor tympany. The only signs which attracted my attention and which made me think of the possibility of intestinal hemorrhage, was a lowering of the axillary temperature with considerable chilliness of the skin.”

Barth⁴ had a somewhat similar experience. He says :

“ It was impossible, despite the closest watching, to determine with certainty the moment of perforation ; the patient had neither violent abdominal pain, vomiting, nor collapse, and only the somewhat sudden lowering of the temperature, on the morning of the 9th of February, led us to suppose, afterward, that the onset of the disturbance then took place.”

Jenner⁵ reports the case of a patient who, on the ninth day, left his bed unassisted, but with some difficulty, and died some hours later, there being no complaint of pain during the day.

¹ Lancet, 1889, ii. 793.

³ L'Union Médicale, 1877, xxiii. 389.

⁵ Medical Times, 1850, xxii. 298.

² Wiener med. Presse, 1880, xxi. 337.

⁴ Bull. Soc. Anat., 1884, lix. 142.

Differences of opinion concerning the fatality of intestinal perforation in typhoid fever have existed for many years. The earlier investigators, as Louis,¹ Chomel,² and Jenner,³ reported numerous cases of fatal perforation, but none of recovery. Tweedie⁴ stated that "intestinal perforation is always fatal, generally within thirty-six hours." The possibility of recovery seems to have been first suggested in the case reported by Buhl,⁵ who states that

"One of the cases of perforative peritonitis was interesting because death was not the immediate result of the perforation, since the hole was completely closed. Death occurred on the forty-fifth day of the disease and twenty-three days after the earliest symptom of perforation. It was the result of hemorrhage from a small artery opening into the intestine near the piece of mesentery which covered the hole."

Griesinger,⁶ after referring to the above case, and giving the history of one of his patients who died nine days after symptoms of perforation had taken place, admitted the possibility of the healing of a perforation and of recovery:

"never in cases of general peritonitis, only when the inflammation is wholly circumscribed. The rare exceptions are hardly worth considering in connection with the prognosis, which is to be regarded as almost fatal when the symptoms of perforation are distinct and as absolutely fatal when gas is present over the liver."

A somewhat more favorable opinion was held by Murchison,⁷ who asserted that "rare cases are met with where recovery ensues after all the symptoms of peritonitis from perforation." Since the publication of Murchison's classical work the writers of medical text-books have generally held the same opinion, and medical literature contains occasional reports of cases of recovery. It is our task, therefore, to consider the evidence which warrants the view that recovery ever takes place.

The evidence of recovery from intestinal perforation in typhoid fever consists, almost exclusively, in the reports of cases of recovery

¹ Recherches sur la Maladie connue sous les noms de Gastro-entérite, etc., 1829.

² Leçons de Clin. Méd., 1834.

³ Monthly Journal of Medical Science, 1849.

⁴ Cycl. of Pract. Med., art. "Fever," 1850, ii., 162.

⁵ Zeitschr. f. rat. Med., 1857, N. F., viii. 12.

⁶ Virchow's Handb. d. sp. Path. u. Therap., 1864, ii. 1, 199.

⁷ Op. cit., 569.

from peritonitis in typhoid fever following so-called symptoms of perforation of the intestine. These symptoms are, in brief, a sudden, severe abdominal pain, often associated with collapse, at times with a lowered temperature, which is subsequently elevated. The abdomen is rigid and tender, and becomes swollen, tense, and tympanitic. But little importance is to be attached to the disappearance of hepatic dulness and to the presence of a gurgling sound on respiration as evidence of gas in the peritoneal cavity in consequence of a perforated intestine. The former sign may be due to an abnormally small liver or to an overlying piece of intestine, and the dulness is usually found to persist when the intestine is actually shown to be perforated. Traube,¹ in calling attention to this sign, stated the importance of the previous determination of the normal outlines of the liver dulness. Tschudnowsky's² observation of an abdominal murmur, louder and longer on inspiration, shorter and feebler on expiration, attributed to the passage of gas in and out of the hole in the bowel, has been confirmed by Lewaschow.³ Botkin,⁴ however, states that this sign may exist without perforation of the intestine. The rarity of the recognition of either of these signs in the literature of intestinal perforation is sufficient evidence of their slight value, while the conditions of their occurrence, perforation with the considerable free discharge of intestinal gas, is comparatively infrequent.

The so-called symptoms of perforation merely indicate the beginning of a peritonitis, and may be present as the result of other local causes of peritonitis in typhoid fever than a perforative enteritis. Very rare, though possible, are the various causes of acute intestinal obstruction. Murchison⁵ mentions softened infarctions of the spleen, softened mesenteric glands, abscesses in the wall of the urinary bladder, ovarian abscesses, "the bursting inward of a pseudo-abscess in the sheath of the rectus muscle," and, finally, perforating ulcers of the gall-bladder. Rupture of the spleen may be added, as in the case reported by Kiemann,⁶ which gave rise to no symptoms suggesting rupture or peri-

¹ Berl. klin. Woch., 1866, iii. 68.

² Virchow u. Hirsch, Jahresb., 1869, ii. 133.

³ Vratoh, 1890, No. 3; Centralbl. f. klin. Med., 1891, xii. 270.

⁴ Louis. Prog. Med., 1890, xii. 512.

⁵ Op. cit., 564.

⁶ Ber. d. k. k. Krankenanstalt. Rud-stift in Wien v. J. 1888, 1889, 291.

tonitis. Sorel¹ reports a case of subacute peritonitis the result of an abscess of the liver. A like cause gave rise to a rapidly fatal peritonitis in the case reported by Daly.²

Still another source of acute peritonitis in typhoid fever is to be found in the Fallopian tube, as in the case reported by Wilson.³ His patient, a child of twelve years, died thirty-six hours after the sudden onset of abdominal pain, which was attributed to a salpingitis of the left Fallopian tube, found at the post-mortem examination. Beginning ulceration of Peyer's patches was present in the lower part of the ileum. Ranque⁴ credits Bourdon with a case which may have been of a like nature. The patient was nineteen years old. After several days of prolonged symptoms she was seized with abdominal pain, a violent chill, and suppression of the catamenia. Death took place six days later. There were beginning typhoid ulcers, but no perforation. The same author refers to Jaccoud as reporting a case of peritonitis in typhoid fever from rupture of the urinary bladder.

Still another cause of peritonitis in typhoid fever is illustrated in the case reported by Hoffmann.⁵ The patient gave birth to a child during the course of the fever, and died of diphtheritic endometritis and general peritonitis.

It is unnecessary to call attention to the numerous fatal cases of peritonitis in typhoid fever in which no local cause for the peritonitis was found. Jenner⁶ early published an article on the "Symptoms of Perforation of the Intestine without Existence of that Lesion." Of the case observed by him he says: "All the symptoms said to denote the occurrence of perforation of the intestine were also present, but in her case an examination of the body after death found those symptoms might be present without any traumatic lesion of the peritoneum." Wood,⁷ a few years later, thus remarks:

"I was compelled, therefore, to regard the case as one of peritonitis without perforation. No discoverable cause of the affection existed. . . . This case is calculated to throw great doubt upon the existence of intestinal perforation in those instances of peritonitis occurring in the advanced stage of

¹ L'Union Méd., 1882, xxxiv. 521.

² Philadelphia Med. and Surg. Rep., 1882, xlvi. 346.

³ Arch. of Pediat., 1887, iv. 391.

⁴ Thèse. Paris, 1881.

⁵ Op. cit.

⁶ Med. Times, 1850, xxii. 405.

⁷ Trans. Coll. Phys., Philadelphia, 1853-6, ii. 351.

typhoid fever in which cures have been effected, of which I have been so fortunate as to witness two in my own experience. They may have been, as in the case just related, nothing more than simple peritonitis without any opening whatever through the coats of the bowel."

Since perforation of the intestine in typhoid fever may take place without any suggestive symptoms, and since suggestive—even so-called characteristic—symptoms may occur without any perforation having taken place, it must be admitted that recovery from such symptoms is no satisfactory evidence of recovery from perforation.

There remains for consideration another set of cases, several in number, of recovery from peritonitis of sudden onset in typhoid fever following the discharge of pus, offensive or not, by the rectum, vagina, or abdominal wall. Food may be present in such pus. Such statements of fact do not necessarily show a primary perforation of the intestine, for the latter may have been caused by the peritonitis, which, in its turn, may have owed its origin to some cause apart from an intestinal lesion. One of the most marked cases of this sort is that reported by Low.¹ The patient, five years old, during the course of his fever, developed a hard, painful swelling at the right of the navel, which burst. Offensive pus was discharged, in which were several orange-colored masses as large as beans. The abscess healed ten days later. To accept this case as evidence of recovery from a typhoid perforation of the bowel, it is necessary to assume, first, that the case was one of typhoid fever, and then that there was a communication with the bowel. Of equal, if not of greater, importance in determining the possibility of recovery after typhoid perforation of the intestine, are the cases of prolonged life after the occurrence of symptoms suggesting a perforation with the discovery of the latter after death. Buhl's² case has already been referred to. Hoffmann³ records the case of a man in whom a bilateral pleurisy arose during the course of typhoid fever, at a time when the abdomen was tense, hard, and occasionally painful. Death took place after an illness of some seven months. Toward the end of this time an abscess pointed in the ileo-cæcal region, and was opened. Fecal pus eventually escaped. At the post-mortem examination it was found that the ileum was perfor-

¹ British Medical Journal, 1881, ii. 122.

² Zeitschr. f. rat. Med., 1857, N. F., viii. 12.

³ Virchow's Arch., 1868, xlii. 227.

ated and adherent to the abdominal wall. It opened into an extra-peritoneal fistula, which was continued downward into the groin, where it opened externally, and upward through the diaphragm beneath the pleura. Intestinal contents were thus present in the thorax, but not in the pleural cavity.

The similarity of the symptoms of typhoid perforation of the bowel and those of inflammation of the vermiform appendix is striking. Cases of perforating appendicitis have repeatedly been regarded as of typhoid fever, and, as a rule, the symptoms in typhoid fever which suggest a perforation of the bowel are those which, in the absence of typhoid fever, would be regarded as diagnostic of an appendicitis. These symptoms are not merely similar, they are actually identical, even to the usual localization of the consequent peritonitis in the right iliac fossa. However familiar this resemblance may now appear, the only conspicuous mention it has received in medical literature is by Gouronnet.¹ To be sure, he uses the terms typhlitis and perityphlitis without appreciating the prominent part played by the appendix in etiology, and the cases he reports make no mention of the condition of this structure. He² "speaks only of ordinary typhlitis occurring in the course of typhoid fever." The tumor is regarded as feces accumulated in the cæcum in consequence of inflammation of the cæcum. He³ states that "in many cases the progress of the inflammation of the pericæcal tissue is simultaneous with that of the cæcum, but a pericæcal abscess may sometimes be seen in the absence of an appreciable ulcer of the cæcum."

Despite this extraordinary resemblance between the symptoms of so-called typhoid perforation of the intestine and those of perforating appendicitis, in a research made several years ago I was enabled to find but three cases of this lesion attributable to typhoid fever. It is well known that the mucous membrane of the appendix contains numerous lymph-follicles, and that in typhoid fever these may become enlarged, necrotic, and ulcerated. It is, therefore, noteworthy that but few cases of perforation of the vermiform appendix are recorded in the literature of typhoid fever. Morin⁴ finds 12 cases in 64 = 18.75 per cent., which he collected from various sources, while

¹ De la Typhlite et Pérityphlite dans leurs Rapports avec la Fièvre Typhoïde. Thèse. Paris, 1881.

² Loc. cit., p. 9.

³ Loc. cit., p. 12.

⁴ Thèse. Paris, 1869.

Murchison¹ finds it but once in 39 cases. He suggests a doubt as to the nature of the disease in Morin's cases, in consequence of the large number of perforated appendices. Heschl,² among 56 cases, finds the appendix perforated in 8 = 14.3 per cent. But of 167 cases of perforated bowel in typhoid fever, collected for the purposes of this paper, I find but 5 cases, a fraction less than 3 per cent., in which the appendix was reported as the seat of the perforation. Such differences may be explained, as suggested by Murchison, on the ground of an incorrect diagnosis during life. But they are quite as likely to be due to overlooking the appendix at the time of the autopsy. Even in the cases of the fatal peritonitis in typhoid fever, in which it is stated that no perforation was found, there is no mention of the condition of the appendix.

Recent anatomical evidence is thus lacking of a relatively frequent perforation of the appendix in typhoid fever. Clinical evidence, on the contrary, though perhaps misunderstood, is abundant as to the probable frequency of perforative appendicitis in typhoid fever. The probability of its occurrence furnishes the best solution to the prognosis of intestinal perforation in the latter disease. Most cases of recovery from symptoms of perforation of the bowel in typhoid fever are those in which an attack of appendicitis is closest simulated. While the fatal cases of perforation of the bowel in typhoid fever are, in the great majority of instances, those in which other parts of the bowel than the appendix are the seat of perforation. Hence the prognosis of apparent perforation of the bowel in typhoid fever is to be regarded as the more favorable the more closely the symptoms and course resemble those of an appendicitis.

Such a consideration at once indicates the appropriate treatment for perforation of the intestine in typhoid fever. All indubitable cases of this nature were those in which a post-mortem examination was necessary to make the diagnosis certain. The suggestion of a laparotomy for the relief of a perforated bowel was first made by Leyden³ in 1884. In the same year Mikulicz⁴ reports a successful case of laparotomy and intestinal suture in a patient with ichorous,

¹ Op. cit., 623.

² Schmidt's Jahrb., 1853, lxxx. 42. Wiener Zeitschr., 1853, ix. 6.

³ Deutsche med. Woch., 1884, xvii.

⁴ Volkmann's Samml. klin. Vortr., No. 262.

purulent peritonitis, attributed to a typhoid, perforating ulcer of the small intestine. The patient had a small, right inguinal hernia, but thought himself well. He was suddenly seized with a violent pain in the abdomen on leaping out of bed. Symptoms of peritonitis ensued, and at the end of the third day laparotomy was performed for the relief of a supposed intestinal obstruction. A median incision was made, offensive pus, in which were pieces of potato, was evacuated, and a hole was found in that part of the ileum lying above the ilium. The hole was opposite the mesenteric attachment, and was six millimetres long and four millimetres wide. Its edges were sharp, the mucous membrane not everted, and there was nothing abnormal in its vicinity except an increased redness of the intestine. The mesenteric glands were soft and about the size of hazel-nuts. Mickulicz excluded the idea of a gangrenous incarcerated hernia, because the outline of the hole was regular and oval; there were no phenomena of a reactive inflammation in its vicinity, and there was no positive evidence in favor of such a view. He claimed that the seat, size, and absence of other characteristic symptoms excluded nearly all other than typhoid ulcers; while its position, edges, and the enlarged lymph-glands were evidence in favor of a typhoid ulcer. Although admitting the force of his argument, there remains a question as to the existence of typhoid fever in this case. Its chief value lies rather in its being a successful case of laparotomy, where a perforation of the ileum away from the mesenteric attachment existed, than as illustrating the value of laparotomy in the treatment of intestinal perforation in typhoid fever.

The first operation for the relief of the symptoms caused by a perforating, typhoid ulcer of the intestine where there is no question as to the nature and seat of the lesion, was performed in 1887, by Lücke.¹ The symptoms suggestive of perforation took place on the eighteenth day of the disease, and a laparotomy was performed twelve hours after their onset. The edges of the ulcer were cut out and the hole closed by sutures. The operation lasted some two hours, and the patient died a few hours later. The hole in the ileum was about a foot and a half above the valve.

In the same year Bontecou² operated upon a case of typhoid per-

¹ Deutsche Zeitschr. f. Chir., 1887, xxv. 1.

² Journal American Medical Association, 1890, xiv. 455.

foration thirty-six hours after the onset of its symptoms. The patient died. Morton¹ states that Mr. Bartleet, of Birmingham, had performed a laparotomy in the case of a perforating, typhoid ulcer. Death took place two days after the operation. Although feces were found in the peritoneal cavity the hole in the intestine was not discovered, nor is the evidence furnished that the case was one of typhoid fever.

At the meeting of the German Surgical Congress in 1888, Frank² stated that Hahn had operated on two cases of peritonitis from perforation in typhoid fever, but both patients died. Fürbringer³ also refers to the fact of Hahn's operations on some of his patients, all of whom quickly died after the operation. He alludes to the successful operation by Wagner. The fullest mention of this case I have been able to find is as follows:⁴ "Wagner (Königshutte) in recent years, has operated in three cases; first, on a woman convalescing from typhoid fever, for perforation of an intestinal ulcer; eventration of the intestines, irrigation, sutures of the wound without drainage. Recovery."

In 1889, Senn⁵ operated upon a patient who was thought to have a volvulus. He had been treated for chronic bronchitis for three weeks, during which time he had made three visits to Dr. Senn's office. The temperature was never above 101° F. At the end of the third week there was an acute attack of pain in the left iliac region, followed by vomiting which became stercoraceous. Laparotomy was performed at the end of three days. "A number of loops of the upper portion of the ileum were found enlarged twice the size of the remaining portion of distended intestine, rotated on the mesenteric axis one complete turn from left to right." While the over-distended intestine below this point was being withdrawn, about a pint of fluid feces gushed from the left iliac fossa. Perforation was discovered about six inches above the ileo-cæcal valve. The hole was closed by sutures. The operation lasted an hour, and death took place in the course of a few hours. Three elliptical ulcers of the ileum were found below the point of perforation.

¹ Philadelphia Medical News, 1887, li. 617.

² Beil. zum Centralbl. f. Chir., 1888, xxiv. 51.

³ Berl. klin. Woch., 1889, xxvi. 667.

⁴ Beil. zum Centralbl. f. Chir., 1889, xxix. 66.

⁵ Medical News, 1889, liv. 622.

Bontecou¹ operated upon a patient who was in the sixth week of typhoid fever. Seventeen hours after the onset of symptoms of perforation a circular hole about one-fifth of an inch in diameter was found in a patch some four or five inches from the ileo-cæcal valve. The hole was closed with sutures, but the patient died after a few hours.

In the *British Medical Journal*² is the following extract from a Japanese medical journal :

“Kimura, a surgeon in the Japanese navy, records a case in which he performed laparotomy for perforating typhoid ulcer. The patient was a man aged thirty-four. The operation was done twenty-eight hours after the occurrence of perforation, when the patient was collapsed and almost moribund. The perforation in the small intestine, about two inches above the cæcum, was of the size of a small pea. The perforated part of the intestine was turned inward, and ten interrupted Lembert sutures applied. The abdominal cavity was washed out with a warm solution of dilute boric acid and dried with a sponge; a large gum-elastic tube was introduced, and the wound stitched up and dressed antiseptically. The patient was ‘cheerful’ for a little time, but died about nine hours and a half after the operation.”

Early laparotomy in typhoid perforation of the intestine (with a reasonable doubt as to the existence of typhoid fever in three of the cases) is thus recorded to have been performed ten times. The result was fatal in every case but one, that of Wagner, a complete record of which does not appear to have been published. The inference is direct that this operation offers but slight hope in the early stages of typhoid perforation of the intestine. A like result occurs when the perforated spot is quickly found, as when a couple of hours are demanded for the operation. The lack of success is best attributed to the condition of the patient at the time enfeebled, as he usually is between the second and fourth weeks of the disease, when the perforation is most likely to take place.

Fatal as the results of this early operation have been in cases of peritonitis from typhoid perforation of the intestine, they have been more successful when a peritoneal abscess has been incised some time after symptoms of suspected perforation have taken place.

Barthélemy³ records the case of a young soldier, who, at the end of

¹ Loc. cit.

² *British Medical Journal*, 1890, ii. 777.

³ *Ann. d. Chir. franc. et étrang.*, 1841; Gouronnec, op. cit.

typhoid fever, had a severe, deep-seated pain in the right buttock, extending to the kidney. An abscess was recognized in the iliac and lumbar regions. An opening was made a little above the iliac crest and three litres of pus escaped. The patient recovered.

Escher¹ reports as a case of recovery from supposed intestinal perforation in walking typhoid, one where an abdominal incision was made for the relief of a suspected incarcerated right inguinal hernia after the third day of abdominal symptoms.

Taylor² states that a relapse took place in a patient thought to be convalescing from a severe attack of typhoid fever. The symptoms were more acute and dangerous than at first, and, at one time, there was so much collapse that a perforation was suspected. A tumor then formed between the sternum and navel, and was incised four months after the disease began. Three pints of brown, slightly turbid fluid were evacuated. The patient recovered.

Although the reported instances of the successful result of an operation for the cure of circumscribed peritonitis in typhoid fever are comparatively few, I have been able to collect a considerable number in which recovery resulted from resolution or from the spontaneous evacuation of the inflammatory product. In 17 cases of recovery by resolution, the peritonitic attack began in the second week in 1, in the third week in 8, in the fourth week in 1, in the fifth week in 1, and in the sixth week in 2. It began at the end of the fever in 1, and during the convalescence in 3. Recovery took place in a week in 1, in two weeks in 3, in three weeks in 2, in four weeks in 1, and in two or three months in 3. The length of time necessary for recovery in the remaining cases was not stated.

I find also 17 cases of the spontaneous discharge of the pus in peritonitis in typhoid fever. 9 patients recovered, 7 died, while in 1 case the result was not stated. The peritonitic symptoms began in the second week in 2 cases, in the third week in 3, in the fourth week in 2; in 1 walking case, in 6 convalescent cases, and in 3 during the course of the disease. Death is said to have taken place in six, fourteen, and fifteen days, in three weeks, and in two and one-half months after the symptoms began. The pus was discharged into the intestines

¹ Wiener med. Woch., 1887, xxxviii. 607.

² Lancet, 1890, i. 961.

in 13 cases; into the vagina in 1, through the abdominal wall in 2, and at the navel in 1.

It appears from this statement that of 27 cases of peritonitis in typhoid fever, whatever may have been the cause of the former, though often attributed to intestinal perforation, 3 recovered after operation, 17 after resolution, and 9 after the spontaneous discharge of the pus. The comparison of this series of cases with those showing the results of early laparotomy for symptoms suggesting typhoid perforation indicates that the appropriate treatment for this complication would be delay until a probably encapsulated exudation proved unduly slow in absorption. An immediate or early laparotomy for the relief of the peritonitis seems advisable only when the patient's condition is exceptionally good. Should the signs of the exudation persist a week or more, and the general condition of the patient permit an incision, surgical treatment would then be strongly advisable. That the patient may live for weeks after perforation has taken place is illustrated by the cases of Buhl and Hoffmann already mentioned.

In brief, immediate laparotomy for the relief of suspected intestinal perforation in typhoid fever is only to be advised in the milder cases of this disease. In all others, evidence of a circumscribed peritonitis is to be awaited, and may be expected in the course of a few days. Surgical relief to this condition should then be urged as soon as the strength of the patient will warrant.

