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Surgical Considerations of the abdominal Complications of typhoid fever

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SURGICAL CONSIDERATIONS OF THE ABDOMINAL COMPLICATIONS OF TYPHOID FEVER.

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DURING a recent surgical survey of Europe I took pains to interrogate those whom I met upon various subjects which have had more than ordinary interest for me. Perhaps most interesting has been the topic of which I now propose to speak, namely, the question of surgical interference in the abdominal complications of typhoid fever.

My inquiries met with but one affirmative response —that was in Birmingham. There Mr. T. H. Bartleet during the past winter had operated for perforating typhoid ulcer. Perforation was diagnosed by the resident physician, at whose urgent request the attending physician gave sanction for surgical interference, and Mr. Bartleet was called in. He made a median incision, and great fecal extravasation was discovered upon opening the peritoneal cavity. An unsuccessful hurried search was made for the bowel opening, the cavity irrigated, a drain put in, and the parietal incision closed. The patient died during the second day after operation.

Since my return a single contribution upon this subject has appeared in literature: the report of a case operated upon in 1885, by Prof. Kussmaul, of

Strasburg, and reported by Lücke in the *Deutsche Zeitschr. für Chirurg.*, 1886–87, xxv. 1–4. I give an abstract of the important points of this, to be, historic case:

A woman, aged twenty-eight years, was admitted to the Strasburg Obstetrical Clinic, on September 22, 1885, and very shortly afterward confined normally. The puerperium was tardy, and she gradually developed a typhoid condition. This became so marked on October 14th as to justify a positive diagnosis of typhoid fever. All went well until the night of the 22d of October, when she was suddenly taken with agonizing pain in the abdomen, and symptoms of collapse. In ten minutes she was seized with continuous chills, was cold, pale, and bathed with cold prespiration; pulse 180, and small; much vomiting, pain upon palpation of abdomen, and tenesmus present. The patient was a few hours later transferred to the surgical clinic with the accompanying diagnosis of perforated typhoid ulcer.

Prof. Kussmaul saw the case almost immediately, and determined upon abdominal section. Upon commencing operation the patient's condition showed: cold extremities, pulse small and weak, belly moderately distended and painful, great shock. Precautions were: warm room, legs carefully wrapped, rigid antisepsis. An incision was then carried from the umbilicus to the symphysis pubis. The incised tissues were found œdematous, and upon opening the peritoneum much dark, flaky, feculent fluid escaped. The intestines were pasted together and covered with fibrinous exudate. The coils of the small intestine were carefully drawn out, examined, and covered with hot moist towels: they were found quite adherent to one another. One small perforation was found about a foot and a half above the ileo-cæcal valve. From it flowed yellow feculent material. The cæcum and vermiform appendix were negative; mesenteric glands enlarged. That portion of the gut including the perforation was excised and stitched with Lembert sutures, the peritoneal cavity cleansed thoroughly by irrigation with salicylic solution

and sponging, a large drain placed in position, and the abdominal wound closed. The patient died in eleven hours without reacting from shock.

Necropsy proved the presence of broncho-pneumonia and hypostatic congestions, foul pus in Douglas's culde-sac, and fibrinous exudate everywhere in the peritoneum, while the drain tube was totally obstructed by a kink. The belly-wound was in excellent condition. The site of resection was found to be nineteen inches above the ileo-cæcal valve, while on either side of the intestinal incision circular necrosis and inflammation were well advanced.

As far as my knowledge and search go, these two cases represent the history of surgical interference with the peritoneal complications of typhoid fever. In the *Philadelphia Medical Times* of December 11, 1886, Dr. James C. Wilson, after recounting a case of recovery from peritonitis following supposed typhoid perforation, impressively asks whether operation in certain of these cases would not be justifiable, and pleads for its judgment by trial. This article called forth an approving editorial in THE MEDICAL NEWS, but since then the subject has remained dormant and received no further public attention. Whether the future will present more brilliant and encouraging results remains to be seen, certainly they can become no worse in record, and just as certainly there would seem to be chance of improvement.

The etiology of the conditions which might indicate operation appears well understood, and we have no additional modern knowledge which will, by making more clear the exact etiological factors, possibly also assist in diagnosis. For upon the latter depends *everything* concerning surgical interruption of the typhoid pathological process.

There are practically but two conditions which we could have any hope of benefiting by operation. They are, perforation of the intestine with intra-peri-

toneal extravasation; and rupture of a suppurating gland or other abscess into the abdominal cavity.

Now, granted that either of these conditions has been correctly diagnosed, and the patient not moribund, I should consider it imperative duty to interfere surgically. In the light of present medical science I think everyone will agree with me that the condition *diagnosis* being allowed, we should so proceed until it is proved either that operation can be of no avail, or that an occasional life, otherwise condemned, can be saved.

Diagnosis being our starting-point and foundation, what then may be our powers in that direction? First, however, a word as to the etiological factors which give rise to the conditions which we would improve. Typhoid perforations and mesenteric gland abscess occur more frequently in men than in women—almost never in children. About 1 per cent. of cases in adults perforate, and 10 per cent. of typhoid fever deaths occur from this complication. From the beginning of the third week until the end of the fifth week is the period when such complications are most apt to take place. Either of the chief complications of which we are speaking, but especially perforation, may arise at even a very long period after the subsidence of apparent symptoms, perhaps from a resultant chronic ulcer, but this latter would scarce come under the strict limits of our caption. Perforation may be the result of primary slough of a Peyer's patch early in the course of disease, but usually, and at a later stage, secondary ulceration is responsible. Completely formed ulcers have been observed as early as the seventh day. The mesenteric glands are always enlarged, frequently inflamed, and occasionally slough during the course of typhoid fever. This is the result of conveyance to them of absorbed septic matter by

the intestinal lymphatics. The exact nature of this irritating substance we do not understand, nor does its constitution concern the limited scope of this article.

Suppurative peritonitis may, in the typhoid state, develop from one or more of three causes: from irritation of the peritoneum by proximatous inflammation of gland, intestine, or other organ; from the perforation of an ulcer, or from rupture of a gland or other abscess into the peritoneal cavity. The earliest sloughing and ulceration, as a rule, will be found close to the ileo-cæcal valve, and in this same region are to be found the most violent septic changes and extensive ulcerations, although, on the other hand, it is not a fact that most perforations there occur; which may depend upon the peculiar bowel structure in that region.

Hoffmann states that the ulcerative process rarely extends more than nine and a half feet above the valve; it *can* occur, however, in any place where intestinal glands are to be found, from the upper duodenum to the lower colon, but ulceration at these extremes must be very infrequent. Perforation of the vermiform appendix from involvement of its follicles is to be remembered as a possibility, but I have no knowledge of an example.

The immediate causes of perforation are: imprudence in diet, muscular exertion, and, occasionally, the movements of entozoæ.

Liebermeister states that an apparent diphtheria of the mucous membranes—including the intestinal—occasionally follows upon recovery from typhoid fever, but regards the process more as a breaking down from malnutrition than as a true diphtheria. Perforation of intestine from violent inflammation has been known to follow this condition of its mucous membrane.

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Rupture of the spleen occurs rarely, as does peritonitis also, from proximity to, or rupture of, abscesses of the same, or other abdominal organs. Gangrene of more or less intestinal wall is also an infrequent complication. Peritonitis may arise at any time from the onset of an attack of typhoid fever until an indefinite period after the establishment of convalescence. Originating before the end of the first week it cannot be caused by perforation or abscess, unless the former be due to the breaking down of an old ulcer cicatrix, etc., caused by the general devitalization of tissues. In fact, before the end of the second week, any peritonitis starting up is probably of the irritative or sympathetic type, or due to the general constitutional depreciation incident to the disease. This form is liable to come on at any time during the course of the malady in question, and must be dealt with as we would with a similar state of affairs in a non-typhoid individual; with the difference that some of the special considerations hereafter to be mentioned must be kept in mind before operative interference is undertaken. Of course, surgical treatment would always at least be considered in any case of peritonitis in these times. Sudden onset of peritonitis of violent type or with concomitant or quickly succeeding great shock or collapse, during the time limits when perforation, etc., are likely to occur, would indicate with great probability that some such accident had taken place: gradual onset and increase might be caused by either the more grave complications, or by irritative or sympathetic lesion—most probably the latter. Cases are on record where perforation has taken place, a very small amount of bowel contents escaped, the pathological orifice had been almost at once closed by fibrinous exudate, and *gradually* increasing fatal purulent peritonitis set up.

Great shock or collapse without concurrent peritonitic symptoms may indicate hemorrhage, or even the most desperate septic peritonitis from perforation. One case under my care not long since became greatly shocked, complained of a little more pain in his ileo cæcal region than he had been having, had copious bloody stools, and died in about twelve hours. Post-mortem showed that perforation had taken place at a higher level of intestine, coincidently with hemorrhage from a separating slough lower down, and that purulent peritonitis had already started and made considerable headway. No symptoms of the latter complication were discernible during life, and I hope that the combination is, and will continue, unique; and that we shall soon possess some means by which accurately to differentiate the occasional shock of beginning peritonitis from hemorrhage. Investigations into the by no means trite subject of the symptoms of certain forms of peritonitis are most urgently needed. Within a year I saw a man die of universal purulent peritonitis from traumatic rupture of intestine, without presenting a single conventional symptom of that "inflammation."

May means be forthcoming to tell positively the presence or absence of peritonitis under all circumstances? Those who have had most experience will, I think, agree with me in being in a very anxious receptive condition for the advent of such pathognomonic signs. Upon the occurrence of perforation, patients usually become conscious, if they have not been so before; but, unfortunately, this sign holds good for hemorrhage also.

Sudden agonizing pain in the right lower abdomen, quickly increasing and extending, chill or coldness, particularly of the extremities, fall of temperature, small, rapid pulse, hurried, shallow breathing, hag-

gard appearance, and perhaps tympany and diminished liver dulness—these symptoms strongly indicate perforation; none is positive, but the combination, in absence of hemorrhage, is *almost* so. According to Hoffmann, violent general peritonitis without perforation took place in 16 instances out of 2000 cases of typhoid fever. Liebermeister has twice observed the same conditions arise, in similar cases, from rupture of the gall-bladder, and the discharge of calculi and bile into the peritoneum. The same author also mentions cases dying of perforative peritonitis which, during life, presented no symptoms of it. Infarctions of the liver, spleen, and ovary are said, likewise, to have originated these same conditions, with and without symptoms. Rupture of the spleen, and consequent death from hemorrhage or subsequent peritonitis, has been reported more than once. A very small perforation may cause gradual onset, or limited peritonitis. Reported cases of recovery from general peritonitis, due to typhoid perforation, are most probably ones of mistaken diagnosis. Flint says that peritonitis from perforation is almost certainly fatal.

Let me quote Dr. Wilson's impressive remarks. "Granted that the chances of a successful issue are greatly against you; that the patient is in the midst or at the end of a long sickness; that his tissues are in the worst state to stand the injuries of the surgeon's knife; that the lesions of the gut may be very extensive; that the vital forces are at the lowest ebb. No one yet has hesitated to perform tracheotomy in the laryngeal complications of enteric fever, which require it to save life for these reasons. The operative treatment of purulent peritonitis has been performed many times successfully by gynecologists in conditions scarcely less unpromising. In point of fact, the objections which may be urged against

laparotomy in intestinal perforation in enteric fever are no more forcible than those which would have been made use of at first against the same operation in gunshot-wounds of the abdomen. . . . The courage to perform it will come of the knowledge that the only alternative is the patient's death. Certainly *à priori* reasoning will not help us. We must not, however, overlook the fact that while a few cases of perforation occur in the second week of the disease, while the infective process has yet some time to run, a far larger proportion take place in the period of convalescence when the condition of the patient, except for deep ulceration, often single, is tending toward recovery."

If satisfied then that in certain of these cases operation is positively indicated and demanded, we should think over what course of procedure to adopt in carrying out the operation, that we may be prepared to deal with them when called upon to do so. All usual precautions taken in abdominal sections should be observed. The surroundings and atmosphere should be as cleanly as possible. The patient must be stimulated, if necessary, and extraordinary pains taken to keep him warm, such as surrounding him with hot bottles, wrapping the limbs with warm blankets, using hot solutions, and having the temperature and moisture of the apartment at just as high a point as the surgeon and his assistants can withstand—a collapsed patient can bear with benefit considerably more moist heat than can the operator.

If there is time and opportunity, a hot bath will not only cleanse the patient, but also improve his condition if he is shocked. Every unnecessary movement or manipulation of his body should be strenuously avoided before, during, and after the operation. The abdominal walls, and everything liable to come in contact with the wound, must be

surgically clean, and in convenient order before the operation is begun. Median incision will undoubtedly prove best in almost every case. It should be as long as is necessary for efficient work, and commence a little more above the pubes than is usual in such incisions. Extreme gentleness will be required throughout, as otherwise, perhaps in any case, other ulcers may be broken through. Let systematic search for lesions commence at once upon gaining admission to the peritoneal cavity, starting, in order, at the points most liable to involvement. We should examine the cæcum and its appendage, then carefully go over the entire length of the small intestine continuously from its termination in the cæcum to its origin at the pylorus, by passing it between the fingers. This finished, in like manner the colon should be examined; then the mesentery, ovaries, liver, etc.

What shall be done with lesions when found? This is a vital, and not an altogether answerable question.

Perforations, in the great majority of cases, will be found in the small intestine corresponding to the position of Peyer's patches. Occasionally a follicle ulcer will perforate near the mesenteric border, but probably never so close to it as to produce the trying injuries which are made by a bullet or knife. In the cæcum, or colon, perforation is equally liable to occur anywhere, except close to the meso-colon attachments. The usual position of these lesions is fortuitous, as the situation permits of most easy reparative treatment.

Shall we resect a perforated bowel, simply turn in the borders of the perforation, or attempt the production of an artificial anus?

In the lack of experience, nothing positive can yet be said upon this point. We do know that cir-

cular gangrene of intestine occurred in the single instance where exsection has been done, but this may possibly have been due to some defect of operation. A large perforation, or a small opening through the base of a very large, deeply excavated ulcer, would probably require excision of a portion of bowel. Such an ulcer occurring in the small intestine would be in its longitudinal diameter, hence, it can be turned into the bowel entire by Lembert sutures introduced beyond its lateral borders. This I should be inclined to think the best method of dealing with most perforations, or ulcers about to perforate. The possibility of narrowing the bowel immoderately must be kept in constant view, and where the above suggested mode of repair would undoubtedly give rise to it, resection or artificial anus must be substituted.

It is possible that the necrosis of bowel already alluded to resulted from the absence of resistance in tissues so profoundly poisoned and malnourished as, of necessity, are those of a typhoid individual. We do not even know what course the parietal incision itself would follow, but I deem it probable that, with thorough cleanliness, such wounds could be induced to heal kindly. At the worst, happen what may, the patient can be in no more deplorable condition than before operative interference was carried out. We know nothing of what possibilities there may be in this direction, and I would plead for an attempt to reduce a mortality of one hundred per cent. If resection cannot successfully be done, and the affected area is too large for efficient stitching, then artificial anus would be another resource.

Whether any one of these three methods of treatment is *the* one, or whether all will have occasional use, must be determined by trial and experience. The order in which I should suppose them valuable

would be: stitching by Lembert's method, resection, and, lastly, artificial anus.

In the examination of the intestine I should also be inclined to turn into the bowel lumen, by the same method of stitching, any seats of disease which appeared likely soon to perforate, or to approach dangerously that condition. Cæcum and colon lesions could, probably in every case, be treated by simple stitching. The principles of modern abdominal and general surgery must be our guide in treating the rare abscesses of mesentery, liver, spleen, and ovaries which complicate typhoid fever. The point which I wish to reiterate is that, these having ruptured into the peritoneum, and being so diagnosed, it is our imperative duty to open the abdomen and treat what we may find according to our knowledge, unless the future shall demonstrate that no good can ever be accomplished by surgical interference in these desperate and, at least heretofore, necessarily fatal cases.

Large irrigations with very hot distilled or medicated water are indispensable before closing the abdomen. Just as important will it be to drain these cases thoroughly, and for this purpose nothing answers so well as the leaving in of a Keith glass-drain. This tube can best be kept in working order, as suggested by Dr. Joseph Price, by carrying a rope of absorbent cotton (medicated, if preferred) to its bottom, and removing it as often as a wad of cotton placed over the outlet becomes saturated. The rope and superimposed cotton must be renewed as it becomes saturated, even as frequently perhaps as every couple of hours for the first day; afterward, at less frequent intervals, according to circumstances.

The oncoming of symptoms of a second perforation would call for a repetition of the whole process.