The Treatment of Acute General Septic Peritonitis

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THE TREATMENT OF ACUTE GENERAL SEPTIC PERITONITIS.

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THE treatment of acute general septic peritonitis must necessarily be medical and surgical; in truth, it should be stated that the treatment should be surgical and medical; surgical in its infancy—at its very commencement—and medical after the case has advanced beyond the reach of surgery, when surgical interference will tip the scale the wrong way. Surgical interference should be carried out as soon as the disease can be diagnosed and, in order that it may be diagnosed early, opiates should be withheld whenever this is possible. "Surgery early and opium late," is what I would advise. When the pulse is very rapid, the extremities cold and livid, the abdomen greatly distended, the knife should not be used; it will do no good and may do very much harm. Even the administration of an anesthetic will do harm to a patient in such a desperate condition. The treatment at this time should be medical, and no better treatment can be adopted than that outlined years ago by Alonzo Clark before the days of surgical interference. By means of large doses of opium we prevent absorption of the toxins and tide the patient over to a rapidly approaching period of immunity or phagocytosis. Many of them that appear to be in a hopeless condition will recover. When I have operated on such patients they have succumbed in a very short time, and I have long since given up the practice. It is unfortunate, however that the patients should reach such a condition without having received the benefit of modern surgical procedures. Operation should be performed early, it should be performed rapidly, it should be performed thoroughly, and the chances of any subsequent infection should be removed by the complete closure of the abdominal cavity. I look upon the most important symptom

indicating the presence of acute general septic peritonitis as rigidity of the abdominal muscles extending over the whole of the abdominal cavity. This is a very marked indication, and can be easily made out by the veriest tyro. A short time since I was asked if it did not require considerable courage to close an abdomen after opening it for the relief of acute general septic peritonitis, and I was forced to acknowledge that it did. In my practice my first closure was brought about as a consequence of a discussion that took place with my house surgeon. I had operated on a young girl who had acute general purulent peritonitis following perforation of a gangrenous appendix. I drained the pelvis and drained the loins and placed over the gauze packing and the tubes, moist dressing with rubber dam to facilitate drainage. For a few hours there was a fair amount of discharge from each of the three openings, and then all drainage ceased. The house surgeon asked why drainage was used under such circumstances when the object for which it was instituted was not attained. The bowel soon looked dry over the inflamed area. In the next similar case I closed the abdomen after evisceration or as much evisceration as occurred as a consequence of a very thorough flushing of the abdominal cavity, and the patient made an uninterrupted recovery. I have carried out this procedure in a number of cases since. The same procedure has been carried out by the assistant in my department in the Toronto General Hospital and by several professional friends, and with entirely satisfactory results. Neither drainage nor posture have been instituted. In some cases the wounds healed, in others they broke down either throughout their whole extent or in part, owing to the virulence of the infective material. The intestines should be handled as little as possible, no lymph should be removed, and evisceration should only be permitted as it is considered better to allow the intestines to slip out than to attempt to replace them during a thorough flushing and in order that all pockets may be disturbed and cleansed. If the patient appears shocked during this procedure, the insertion of two fingers on either side of the cut surface and the upward lift of the abdominal wall, as if lifting the patient off the table, by overcoming the rigidity of the muscles, will almost instantly return the extruded bowels. The flow of warm saline solution prevents erosion and damage of the endothelial cells and also prevents the abstraction of heat from the exposed surface. All hidden collections of infected seropus

must necessarily in this way be removed and the saline solution has a sterilizing effect. In the abdomen there are five pools; one behind the liver, one behind the spleen, one in each loin and one in the pelvis. When washing, it will be noticed that the saline solution becomes stained with the pus whenever the blunt trocar is passed into one of these pools. The water may appear to run quite clear and then become turgid as soon as the trocar is placed to the depth of the pelvis, and the same happens when it passes to the posthepatic or postsplenic or other pouches. The intestines should not be rubbed with sponges, towels or rubber-gloved fingers, and no attempt should be made to remove the excess of saline solution after a thorough lavage. The source of infection should always be hunted for and closed off either by means of accurately approximating sutures or, when this is not possible, by means of a protective Mikulicz gauze packing. It is only under the latter circumstance that any packing need be used in the abdominal cavity, and this packing is not intended to act as a drain, but to shut off a dangerous area—an area of repair of which the operator is doubtful.

At the time of making my report I had thirty-seven deaths and twenty-five recoveries in all, an apparently appalling record; but when this was further analyzed I found that in the first series there were twenty-six deaths and four recoveries; in the last series of thirty cases there were ten deaths and twenty recoveries. Of the last eleven cases there were nine recoveries; one of the deaths in this number was a foregone conclusion, being a case upon which operation should not have been performed, as the man had had hydrochloric acid poured out through a large perforation of the stomach, irritating his abdominal viscera for twenty-four hours. Since the date of that article I have treated the following cases:

No. 1535, Noble died.
No. 1574, Jones recovered.
No. 1614, Brady recovered.
No. 1624, Bliss recovered.

Dr. Marlowe, the assistant in my department at the Toronto General Hospital, has operated on eight cases with thorough lavage and closure with recovery in each case. Taking his experience with mine would show for the method advocated five deaths and twenty recoveries in the last twenty-five cases treated. From what I can hear from others, the results claimed

for pelvic drainage and Fowler's position have not been obtained by them.

The striking difference in the results in my former and more recent practice is due to several factors. First, non-interference in moribund cases; second, early interference; and, third, improved technic. Until vaccines have been developed with which the resisting power of the blood can be raised above the normal and a rapid condition of phagocytosis or immunity produced, we must continue along the old lines of treatment, and while this is so we should endeavor to improve them as much as possible. The treatment should be carried out as follows: The abdomen should be opened by a free incision, the site of infective invasion should be found and dealt with, the abdominal pools should be most thoroughly irrigated, taking no heed to the escaping intestines unless forced to do so by signs of shock, when irrigation should be suspended for a time and the escaping intestines should be returned as indicated above. In a few minutes the shock will cease and the irrigation can then go on as before. Normal saline solution should be used for purposes of irrigation. I have been in the habit of using subcutaneous saline injections and also irrigation by the rectum, but it is difficult to say whether this is beneficial or not as the cases recover and many cases recover without it. I administer morphin in large doses as soon as the patients are placed back in bed, and they are kept thoroughly under the influence of this drug. The abdomen is closed and no drainage is used. No special posture is adopted.

As a pupil of Lawson Tait, I was imbued with many of his ideas, but am now satisfied that his treatment of acute general septic peritonitis by the administration of purgatives and the adoption of strenuous measures to obtain the evacuation of the bowels was harmful and not to be recommended. The administration of purgatives at such a time prevents the very peristaltic rest prescribed by nature's efforts and increases the risk inherent upon the reopening of the original site of infection. Years ago I ordered the pumping into the rectum of large enemas, administered enormous doses of nauseating purgatives to the patient's discomfort and without attaining the desired end. Exhaustion was increased in an effort to remove stubborn nature's splints. A great deal of energy has been directed against the so-called intestinal paresis; when it has set in, it is impossible to move the bowels, and I have come to the con-

clusion that it is the better practice not to try. In a few days, the bowels will move without any assistance from the attendant physician or surgeon, and soon a colliquative diarrhea will take the place of what was previously an obstinate constipation, unless the patient succumbs in the meantime. It is much easier to interfere at an early stage than it was a few years ago. The public has become educated to the benefit of early operation.

When operation is not carried out with thoroughness, it is unfortunate to have the patient succumb from what may be called residual peritonitis from undiscovered pockets. Unless the surgeon has performed a very thorough operation, this is liable to occur. Two openings are not required for a thorough flushing of the abdominal cavity. The intestine should not be damaged by puncture or incision. The surgeon who can wash an abdomen *thoroughly* without permitting any escape from time to time of coils of intestine, is not living just now. It requires more handling of intestine during lavage to prevent the escape of the intestines than when a partial evisceration is allowed to take place. As the fluid is poured into the abdominal cavity the intestines float upward and slip out through the large incision that should be used, and if the solution is warm and poured out rapidly, but little attention need be paid to extruded bowels. It is the awkward attempt to slowly replace them that causes the damage, and I desire again to refer to an easy method by which this can be successfully and rapidly accomplished. The abdominal wall must be lifted upward, and if lifted upward with sufficient force, the intestines, owing to the length of the mesentery, must necessarily drop back. I have demonstrated this fact to house surgeons, anesthetists and others from time to time to their entire satisfaction.

Lymph cannot be removed by a stream of water. The separation of two inflamed intestines from one another will leave each with its own lymph attached and no attempt should be made to remove it. One must not consider the condition of the pulse during operation, as it will become elevated under the stimulas of the hot saline solution, and it is of very vital importance that the operation should be thoroughly completed. Washing with a jug or pitcher is to be deprecated. The tubes used from douche cans are frequently too small; nothing but a large tube, a large-sized blunt-pointed large-opened trocar will reach the peritoneal pools with sufficient rapidity and thoroughness. The intestines always look angry and red and may appear to be

almost gangrenous in spots, and yet such cases will do well after the intestines have been returned and the wound in the abdominal wall completely closed without drainage of any sort.

In Mr. Bond's paper, he says, "If evisceration and complete washing of the intestinal coils are ever justificable, it must perhaps be in those a most hopeless cases of streptococcus pyogenes infection in which the patient dies within a few hours of seizure from rapid poisoning without reaction or attempt at phagocytosis."

I cannot see the force of his argument. Such cases must necessarily be operated on at an early period—that is, before death; and as all cases of acute general septic peritonitis should be operated on early, I fail to see how the surgeon is to discriminate between the cases that Mr. Bond says may be eviscerated and washed and those in which he would strongly condemn such a procedure. I have used the method outlined above, my assistants have used the same method, many others here and there have also adopted this method of evisceration and lavage and closure with gratifying results. We are told that there are ascending mucus currents in the uterus and Fallopian tubes rushing onward to such an extent as to carry the dreaded pneumococcus from the vagina into the peritoneal cavity, and yet at the same time we are asked to believe that in all these cases of general inflammation a stab puncture of the cul-de-sac of Douglas with the insertion of a drainage-tube and an erect posture will soon overcome the intraabdominal streams. At another place Mr. Bond says, "There is little doubt that in the majority of cases of moderately virulent infection, such, for instance, as those arising in connection with a gangrenous or perforated appendix, the cost of interference is too great. Evisceration is fatal, while free and forcible irrigation is apt not only to wash away the defending phagocytes, but also to spread the virulent organisms from the primary focus over the whole area of membrane already taxed to the uttermost to repel the invasion." I agree with him, but such a case is not one of acute general septic peritonitis, because the virulent organisms are not spread over the entire peritoneal surface, and such an example must, therefore, be thrown out of court in any argument as to the efficiency and life-saving properties of evisceration and irrigation in acute general septic peritonitis. Such are cases of localized septic peritonitis, and I would not dream of carrying out a general irrigation, with or without evisceration in any of

them. The interference with the diaphragmatic zone is another theoretical bugbear. I always pass a large blunt ovariotomy trocar behind the liver and behind the spleen without the ill consequences that theoretically should ensue. It is a well-known fact that any handling in this area, even in a healthy patient, is accompanied by a certain amount of shock, not due, however, to any excessive absorption through the lymphatics of the diaphragm, but to the irritation produced n the neighborhood of an enormous nerve-plexus. And why should drainage be instituted? What more can be accomplished with it than without it? Do drains drain? When drainage-tubes are placed or gauze packings used, adhesions soon form and the main peritoneal cavity is shut off. Little else is accomplished except the possible contamination of a small quantity of fluid at the end of a very small pouch. There is a great difference between the pleural cavity and the peritoneal cavity. In the pleural cavity the movements of the box of the chest have a tendency to empty it with each full inspiration, and drainage is easily effected by the removal of a portion of a rib. In the abdominal cavity matters are different and, on account of the complex arrangement, it is impossible to institute thorough drainage. I am satisfied that neither the pelvic drainage, loin drainage nor posthepatic nor postsplenic drainage, with or without Fowler's position or any other position, will drain the peritoneal cavity. Fluid will collect among the intestinal coils, and all that we can do as surgeons is to wash it out, replace it by a somewhat antiseptic, nonirritating sterile solution in the hope that the poison will be so much diluted that the phagocytes will be able to deal with it. The phagocytes are the corporal guards posted at all the outlying stations, and in the omentum they seem to bunch up at the lymphatic stream-junctions until the clusters can be discerned with the naked eye. The omentum plays a most important rôle; it is the sluice-gate of the peritoneum, and that it performs a very important function can be judged from the great changes that take place at a very early period in the omentum in cases of acute general septic peritonitis. I am afraid that it would take more than hot saline rectal injections to divert the upward flow of the omental lymph stream. That an immunity or phagocytosis is established and that large quantities of septically infected fluid become sterile must have been impressed on all operators of experience in this branch of surgery. It frequently happens that large collections of fluid are met with in one or other of the

abdominal pools many years after the patient suffered from a severe attack of general septic peritonitis. The fluid shows that the illness was a desperate one and, in fact, operation may be undertaken as a consequence of the presence of some ill-defined thickening in the pelvis or loin, and it is not until after the abdomen has been opened that the riddle is read. These pools I have met with in cases that I attempted in my ignorance to drain at the time of the primary operation. When drainage is instituted, convalescence is impeded, much discomfort to the patient is produced, subsequent herniæ are liable to result, and there is an added danger of further infection from a multiplicity of wounds.

The sitting posture has taken such a hold on the profession that operations are performed with the patient in this posture, and the patients are then carried back to bed while still in this position, although before operation they have been allowed to lie, alas, for days with septic fluids flooding all areas. But the position is supposed to obviate all this and I am afraid that even poor Fowler died in the position in which he placed so much confidence. It is said that the enfeebled heart acts better when the patient is in the erect posture.

The elimination of toxins by the addition of large quantities of saline solution to the blood has been heralded abroad among the profession, but I have yet to learn that any research-worker has demonstrated it as an actual fact. I use the saline solutions, accepting blindly, like many others, suggestions that fall by the wayside, but am not convinced that this subcutaneous and rectal treatment does what is claimed for it. I do not believe that there is an increased risk in a case of acute general septic peritonitis of absorption from any one zone over any other zone. Zones are all equally bad, and were it not for certain compensating factors the infection of any of the zones would prove fatal.

The mere opening of the abdomen is not sufficient to relieve the intraabdominal pressure, the abdominal muscles will be as much on guard as before and the pressure will still continue unless the intestines are extruded from the cavity.

It became fashionable to condemn opium after operation because it did so much harm before the surgeon saw the case by masking the symptoms and instituting a false security. But in cases beyond any hope from operation, and in all cases of acute general septic peritonitis after operation, I use opium in very large quantities until the respirations are reduced to about

ten per minute, and until the patient appears to be well narcotized. Pain is relieved, the pulse-rate is reduced, and I believe that the most important feature is that absorption is retarded.

Gonorrheal peritonitis seems to differ from other forms. It is questionable whether interference is advisable or not. Interference is liable to produce a wide distribution of this virulent poison and to favor a greater amount of absorption. Adhesions appear to form more rapidly in cases of gonorrheal infection than in other forms of peritonitis and here a distended abdomen, high temperature and rapid pulse do not seem to indicate as frequently a fatal termination as in the other forms of peritonitis. Absorption appears to be retarded owing to the rapid formation of adhesions. In cases of acute general gonorrheal peritonitis in which the aid of surgery has been invoked, my experience has not been assuring, while the results in such cases when treated with rest and opium have been very gratifying.

The patients under my care are allowed to adopt any posture that suits them, but they are not allowed to sit up.

And now in closing, allow me to say, that I reached the conclusions embodied in this imperfect and necessarily short discussion of an important subject after years of practical experience, and can conscientiously advise a younger generation of surgeons in the treatment of acute general septic peritonitis above all *to operate early, to incise amply, to repair carefully, to wash thoroughly, to manipulate gently, to perform rapidly, to close completely* and then to narcotize deeply. In my opinion all else will be of secondary importance in the present state of our knowledge.

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