incisions, removal of the cause, withdrawal of the intestinal coils, constant irrigation, drainage free with gauze or rubber tubes and gauze. The regions of the pelvis, liver and spleen need special attention. This complete operation demands plenty of assistance and much care in preliminaries. Many operations for septic peritonitis are of little use; there is far too often haste in preparation and small thought for the essentials. Unless all the careful detail can be attended to by complete equipment and trained assistants the operation may do more harm than good.

In my experience this radical and thorough attempt at removal of the infection will be borne astonishingly well by the patient, provided the intestinal coils are kept warm and handled carefully and if every detail of operation and stimulation is provided. The use of subcutaneous salt solution during and after the operation, I have found of great value.

It will be impossible to state positively which cases will recover and which will die, as it is impossible to say what cases are positively beyond relief. There are limits of toxemia beyond which the surgeon cannot go. What those limits are, further collective experience must decide.

Surely more cases of general peritonitis are left to die unoperated upon, than there are cases operated upon whose chances of life are destroyed by the operation. I do not claim that operation in septic peritonitis is ever more than a forlorn hope, but I do maintain that the operative treatment of this distressing condition is not undertaken as often as it should be, and when undertaken is often done in a half-hearted, incomplete manner.

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Clinical Department.

A CASE OF ACUTE GENERAL STREPTOCOCCUS INFECTION OF THE PERITONEUM FOLLOWING A FACIAL ERYSIPELAS; LAPAROTOMY AND EXTENSIVE WASHING OF THE ABDOMINAL CAVITY; RECOVERY.

BY MAURICE H. RICHARDSON, M.D.,
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THE time seems to have come when peritonitis must be classified and treated in accordance with the increased knowledge of this formidable affection which bacteriology has given us. Not that a recognition of the exact nature of the bacterial growth has as yet enabled us, even by operating promptly, to treat with a much diminished mortality general peritoneal infections—though we cannot but hope for greater success than we have thus far had—but it does enable us, at least, to foresee the probable severity of a given case, the rapidity of its course, the chances of its favorable termination.

That a bacteriological classification, based upon clinical evidence, will be possible sooner or later, seems probable. It seems well established, for example, that of the general peritoneal infections dependent upon appendicitis, those in which the colon bacillus predominates are attended by a comparatively low temperature; those caused by the streptococcus pyogenes by a high one; that a mixed infection may show a high or a low temperature, according to the predominance of one or the other of these germs; that the progress of a streptococcus infection is rapidly fatal, of a staphylococcus comparatively slow, of a colon bacillus sometimes rapid and fatal and sometimes mild and favorable. Moreover, the virulence of the controlling germ varies in different cases between wide limits of activity and of potency.

Certain rare cases of general peritoneal infection undoubtedly recover under medical treatment; but in such recoveries the impossibility of absolute demonstration always renders the existence of a true germ infection doubtful. Such an infection taken for granted, it seems likely that, in cases in which medical treatment is successful, the infection is mild and of slow development, though—as is shown by extensive adhesions between contiguous surfaces, demonstrated at subsequent operations or at autopsies—it is often widespread. In successful surgical cases, it can occasionally be proved that the infection is caused by the most prolific and baneful germs. As a rule, however, the milder the germ, the milder and more favorable the case.

Recovery under any method of treatment is rather a matter of hope than of expectation; for, with all the advance that has been made in the bacteriology of acute general peritonitis, a delay of a few hours after such an accident as perforation of the vermiform appendix, places the patient beyond a reasonable hope of relief. It seems therefore reasonable to assert that any delay in applying surgical treatment to general peritoneal infections, whether for the purpose of giving opium to quiet peristalsis, or of giving salines to increase it, is unjustifiable; for when constitutional and abdominal signs point to a general and profound toxemia, the time for successful interference has passed. It is in the realization of the importance of time, indeed, that the chief progress in the treatment of acute general peritonitis has been made.

The general peritonitis of appendicitis is probably a

mixed infection in which the streptococcus pyogenes plays the most actively fatal part. The colon bacillus, because of its great reproductive activity, may often be obtained in pure cultures, and for this reason its influence is probably overrated. The fact that in colon bacillus infections there have been a certain number of recoveries — a small number, to be sure — after drainage and irrigation, has always encouraged me to operate, even in cases of advanced general sepsis. Streptococcus infections, on the other hand, I had been led to regard as always fatal. The following case seems therefore worthy of being recorded. Not that all cases of general infection should not be published, for it is of the greatest importance that every accurate observation in general peritonitis should be made known; but a general infection in which the abdominal cavity was invaded to remote corners, and in which a prompt interference was made, is especially encouraging.

On October 22, 1896, I saw Miss E. J. A., age forty-two, a patient of Dr. Cook, of Natick. She had always been well, though she had had for some years a small uterine fibroid. During the past year she had been flowing a good deal. She had had some trouble with the left ear, following an attack of the mumps in the spring. On Friday, October 16th, about a week before I examined her, she was seen by Dr. Crockett, who sent her home because of an erysipelas involving the left ear. At this time the temperature was 100°. She began to menstruate soon after this. Dr. Cook saw her on Saturday, Sunday and Monday. There was no fever. By Monday the redness and swelling had practically disappeared. On Wednesday, the 21st, Dr. Cook was summoned because of severe abdominal pain. The temperature was 103.4°; the pulse 100. There was marked tenderness over the lower portion of the abdomen. There were nausea and vomiting. Morphine was given hypodermically. On Thursday, the 22d, the morning temperature was 102.8°, pulse 94; noon temperature 104.8°, pulse 105; evening temperature 104.8°, pulse 115. There was occasional vomiting. The menstrual flow still continued.

Physical examination showed the face to be flushed, the pulse 115, the temperature 104.8°. The general condition was good. The abdomen was distended and rigid; there was no dulness or tumor. Vaginal examination was negative, the fibroid being masked by the distention.

The diagnosis made was that of an acute general infection from the streptococcus of erysipelas. Immediate laparotomy was advised as affording the best chance for life, small though that seemed to be.

A median incision below the umbilicus exposed distended intestines floating in cloudy serum. The peritoneum was brightly injected. Here and there flakes of fibrin were visible between adherent coils. The uterus contained several small fibroids. The Fallopian tubes were normal, though the peritoneum of the uterus and broad ligament shared in the general redness. The appendix was normal.

Immediately on opening the peritoneal cavity a culture was made from the escaping serum. A second culture was made from the surface of the presenting intestine. Through the median cut, which was about five inches in length, the abdominal cavity was washed in all directions for about fifteen minutes with a warm saline solution. A gauze drain was left at the lower angle of the wound, from which it led into the depths of the pelvis.

The operation was performed at 6 P. M. At 12 P. M. the temperature was 102.8°, the pulse 101. On Friday, October 23d, the temperature at 6 A. M. was 102°, pulse 104; at 12, temperature 104°, pulse 104; at 6 P. M., temperature 103°, pulse 104. There was no vomiting. The patient was very restless, and was still flowing. On Saturday, October 24th, the temperature at 6 A. M. was 102.4°; at 11, 102.2°; at 5 P. M., 103°, pulse 96–100. From this time the patient was steadily convalescent. On November 2d, 10th, and 16th the temperature suddenly rose to 105°, and was thought by Dr. Cook to be malarial.

The source of the infection in this case was with little doubt the erysipelas; and though the germ may have been introduced into the abdominal cavity through the blood, the channel was in all probability the menstrual flow and the Fallopian tube.

Peritoneal infections without a cause apparent either at operation or at autopsy are extremely rare. I can recall but one or two in which no channel of infection was found. One case in particular was pronounced rheumatic by the pathologist, who failed to find any source of infection. That general infections do take place without the possibility of demonstrating the channel of invasion I have no doubt. The presence in the case described of a local inflammation about the ear, just before the peritoneal infection, must, however, be regarded as something more than a coincidence, especially in view of its erysipelatous (streptococcus) nature. Moreover, it is not surprising that there should be a germ invasion of the peritoneum through the Fallopian tube; indeed, it is surprising that infections should be so rare through an open channel connecting the uterine and the abdominal cavity, particularly when we consider the well-known septic character of the uterine and vaginal canal. The Fallopian tube, to be sure, is abundantly provided with ciliated epithelium which sweeps back the invading bacteria; but so are the bronchi, which at times have little efficacy in warding off pneumococcus and other infections.

Be the source, channel, and nature of the infection what they may, the importance of early recognition of its presence must be emphasized, until every case is brought to operation at the earliest possible moment. A few cases like that here recorded will do much to remove the feelings of profound discouragement with which most surgeons have undertaken the surgical treatment of general peritoneal infection. If it shall appear that an early exploration with prolonged and thorough irrigation of the whole abdominal cavity removes enough of the micro-organisms and their products to enable nature to take care of the rest, we shall then be justified in exposing the peritoneal cavity at the first suspicion of the infection, at the very onset of pain and tenderness.

The recoveries upon which are based the demand and the justification for early and radical measures must be after true infections, as shown by competent bacteriological examination. Turbidity of serum means nothing; for such a serum is quite as likely to be sterile as not. A number of acute abdominal cases have been successfully operated upon at the Massachusetts General Hospital as cases of acute general peritonitis; and although the gross appearances at the time of operation apparently confirmed the diagnosis, yet cultures taken from the turbid fluid proved to be sterile — a fact which immediately robbed the cases of

their supposed importance. It is to be hoped, therefore, that no cases will be accepted as cases of acute general peritonitis without a competent bacteriological examination — not even cases in which the abdominal fluid possesses the usual appearances of pus. As a matter of fact, the only way in which the varying statistics of operations for general peritonitis can be even approximately reconciled is to assume that the majority of successful operations follow infections which are apparent rather than real.

Unfortunately, the evidence obtained from numerous observations made at operations and subsequently at the bedside seems to show that whatever the kind of infection of the peritoneum, however slight or severe its manifestation, and whatever its treatment, the result is still deplorable. Nevertheless, the outlook in view of the increasing number of recoveries in authentic cases after early recognition and operation is distinctly more hopeful.

The report of the pathologist is as follows :

Miss E. J. A.— *Culture from peritoneum*.— Cultures are made on blood serum and in 24° show a pale gray, slightly yellow growth along line of inoculation. Water of condensation slightly turbid, and shows considerable pale yellow deposit. Microscopic growth is found to be a small micrococcus arranged in chains averaging 15 elements in number.

Gelatine stab culture shows at end of 24°, at room temperature, abundant yellowish-gray growth along line of inoculation. Grows as well at bottom as at top of stab. Fine round yellowish colonies on either side of stab. Does not grow as readily on surface of gelatine. Non-liquefying.

Litmus milk shows in 48° considerable change in reaction, but no coagulation.

Potato in 48° in incubator shows no visible growth. In bouillon first culture showed after 48° in incubator a marked sediment with clear supernatant fluid. Sediment is in form of flocculi of considerable size. Later bouillon cultures, however, fail to give this flocculent appearance, but sediment is finely granular.

Agar plates show surface colonies to be pale gray with darker centres and irregular leaf-like contour.

On November 1st a suspension of the organism in bouillon was injected to the amount of 1½ c. c., into a guinea-pig. At end of two weeks animal apparently as healthy as ever. On sixteenth day, however, the pig was found dead in his cage. Autopsy showed microscopically nothing abnormal. Cultures made from spleen and heart's blood. In 48° culture from blood showed one pale lemon-yellow colony which, however, proved on investigation to be not a streptococcus, but the staphylococcus pyogenes citreus. This latter organism was undoubtedly a contamination. The pathogenesis of the organism, therefore, as far as guinea-pigs are concerned, is probably *nil*.

In conclusion :— We have to do here with a streptococcus differing from the ordinary variety in its character as a color producer. Similar organisms have been seen and described, but the exact status of the bacterium is yet to be made out— "*Streptococcus aureus*."

A PUBLIC DINNER FOR PROFESSOR VIRCHOW.— It is proposed, the *Lancet* states, to entertain Professor Virchow on the occasion of his forthcoming visit to England at a public dinner. Lord Lister, we understand, will take the chair and may count upon the support of the leaders of the profession.

A REPORT OF TEN OPERATIONS FOR GENERAL PERITONITIS WITH TWO RECOVERIES.¹

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IN dealing with general peritonitis except in the very early stages the surgeon has to do with patients whose general vitality has been lowered by the absorption of toxins from a serous surface of immense extent and complication and enormous absorbing power. This serous cavity abounds in folds and pockets which increase its absorbing surface, and its inflammation is attended by the paralysis of the musculature of the intestinal canal, by stagnation and putrefaction of its contents, generation of gas, distention, fecal vomiting. The patient's vitality is so quickly reduced by so active and virulent a process in such close relation with the great splanchnic nerve centres, and the attendant paralysis of the digestive and absorbent centres, that whatever measures are taken must be so thorough and effective as to change, and that at once, the condition of the peritoneal cavity from that of an absorbent of toxins to drainer of poison from the system. Operative interference must be thorough enough to accomplish its object at one session, for repeated operation, or continuous meddlesome interference, will prove a fatal tax on the strength of the patient. For this reason a thorough cleansing and disinfection followed by provision for drainage adequate to start a current out of the peritoneum and its lymphatics, instead of into them, must be accomplished at one operation and if possible immediate action of the bowels must be induced to prevent if possible intestinal paralysis, and enable nutriment to be administered to the exhausted system.

If the peritoneum can be disinfected and all its pockets successfully and thoroughly drained, within a very few hours adhesions are found around the drainage tubes or wicks, and prevent further infection of the peritoneal pockets. The patient's condition in cases where this is successfully accomplished changes from one of septic intoxication to one of comparative comfort, and the exhausted system has opportunity to recover.

These facts, the necessity for procuring a condition of rest for the patient, and the securing of adhesions preventing reinfection of peritoneal pockets, seem to me to militate against the exhausting procedures involved in the plans of continuous or repeated irrigation of the peritoneal cavity which have been proposed and tried.

During the past ten months I have been called to operate upon ten cases of acute general septic peritonitis at the Boston City Hospital. Eight of the cases resulted from perforating appendicitis, and two were of tubal origin. These occurred in the services of Dr. W. P. Bolles and Dr. George H. Monks, by whose courtesy I report them. All were operated upon as soon as seen, and in all the condition when first seen was extremely grave. Only one case, not included in the cases reported, was seen which was not operated upon owing to the moribund condition of the patient. This patient died six hours after he was admitted.

In the presence of fatal prognosis without operation it has seemed imperative to disinfect and drain

¹ Read before the Boston Society for Medical Improvement, April 18, 1898. The paper as read was a report of seven cases with two recoveries, but the writer has added three cases operated upon since the date of the writing, two of which recovered.