

FLUSHING THE INTESTINAL CANAL THROUGH MULTIPLE ENTEROTOMY OPENINGS.

WITH THE REPORT OF ONE CASE.

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STARTING with the assumption that patients with acute peritonitis frequently die from the absorption of septic products from the intestinal canal, as well as from the peritoneal cavity, I carried out at the Harvard Medical School, during the winter of 1906-1907, a series of experiments on cadavers and on animals for the purpose of determining whether the intestinal canal could be cleansed by flushing through multiple enterotomy openings, and whether, if so, it could probably be done without any great degree of danger to the patient.¹

As a result of these experiments (which will be published later) I came to the conclusion that to flush the intestinal canal of a patient suffering with acute intestinal toxemia, whether or not peritonitis was also present, was a perfectly practicable procedure, and that, in certain cases after the simpler methods of treatment had been used without result, that it was thoroughly justifiable. It also seemed obvious to me that the removal of the intestinal contents by flushing with warm salt solution would be of great advantage to such a patient, especially for the following reasons: first, because it would remove an active source of septic infection; secondly, because it would place within the intestinal canal a large quantity of salt solution where it could be readily absorbed into the circulatory system; thirdly, because the warm solution would re-enforce the bodily heat, the whole intestinal canal being thus converted into a long tortuous hot-water heater within the abdomen. For these reasons I felt willing to carry out this procedure on a patient, provided the conditions which the patient presented seemed to me to justify it.

Finally, a case, in which the treatment outlined above seemed particularly applicable, entered my service at the Boston City Hospital.

HISTORY OF THE CASE.

The patient was a little girl, eight years old, with acute general peritonitis which, by culture, was later found to be a pure streptococcus infection. The condition of this little patient when I first saw her was deplorable. The face was pale, and the features drawn and sunken. The skin was cold and "clammy," and was here and there covered with perspiration. The pupils were dilated. The respirations were shallow, and the pulse "thready" and scarcely perceptible. It registered 180 beats to the minute. In short, the patient presented the appearance of one about to die. The tongue was covered with a thick, dry, brown coat, the lips were parched, and the patient articulated only with great difficulty. There was general tympanites and general tenderness, and there was a board-like spasm of all the abdominal muscles. A high turpen-

tine enema, that had been given without result, had been expelled.

The child was evidently dying of sepsis. I determined, therefore, to open the abdomen, clean the peritoneal cavity, and, if I then thought it best, to flush the intestine also, for it seemed to me probable that the retained intestinal contents were furnishing a large proportion of the general sepsis that was killing the patient.

The essential details of the operation and of the subsequent history of the case are as follows:

Ether. Median incision below umbilicus. Abdomen opened. Intestines slightly reddened and free, pus everywhere. Culture taken. Many thick, yellowish flakes of fibrin adherent to intestinal coils. Abdomen rapidly explored. No obvious cause of peritonitis found. Appendix slightly swollen and vessels injected. Removed. Peritoneal cavity thoroughly irrigated through long glass tube.

Numerous coils of much distended small intestine were brought into the wound.

An incision was then made into the gut at the point estimated to be high up, *i. e.*, near the duodenum. The incision was in the free border of the intestine, and parallel with its axis. Much gas escaped. A glass tube was then introduced into this opening with its tip directed downward, a gauze pad pressed about the intestine at this point held the tube in place and prevented leakage. The coils outside of the abdomen were gradually distended with hot salt solution, then a second incision was made in the lowest intestinal loop presenting in the wound. It was roughly estimated that the length of the intestine between these two wounds was 2 to 3 feet. Much gas and foul-smelling intestinal contents escaped from the lower wound, and finally the wash water came out clear. The upper wound was now sewed up with Pagenstecher thread (Cushing right-angled suture) and from the lower wound the rest of the intestinal canal was flushed, a large amount of fluid being introduced. The lower intestinal wound was then sewed up, the peritoneal cavity again irrigated, and the abdominal wound closed except at its lowest extremity where a small cigarette drain had previously been inserted into the pelvis. It is hardly necessary to add that during the flushing the greatest care was taken to avoid contamination of the peritoneum by the intestinal contents. The enterotomy openings were drawn well away from the wound, and carefully packed about with gauze. After the dressing had been placed on the abdominal wound a rectal tube was introduced, and a large quantity (nearly one quart and a half) of intestinal contents with salt solution came away. Finally, the fluid escaping from the tube became quite clear.

During the intestinal flushing the etherizer who could not see what was being done called the attention of the operator to the fact that the pulse of the patient had become conspicuously stronger and its rate dropped to 140. This condition of the pulse persisted throughout the operation. While the dressing was being applied $\frac{1}{2}$ gr. of morphine and $\frac{1}{20}$ gr. of atropin was administered subcutaneously. No "shock enema" was given.

Good ether recovery. Toward evening the patient became somewhat restless, and another $\frac{1}{2}$ gr. of morphine was given. About midnight the rectal tube was introduced without result. The patient was given saline solution by rectum, one pint every four hours; and it was well retained. Water and cracked ice were given by the mouth, but as they were vomited, no further attempt was made to give anything in this way. At six o'clock on the morning after operation a nutrient enema was given and retained. Temperature at this

¹ I wish to express my thanks to Dr. W. E. Faulkner for his valuable assistance during these experiments, and to Profs. W. T. Porter and W. B. Cannon, who, for the animal experiments, kindly placed the laboratory facilities at my disposal.

time was subnormal, and the pulse was 140 and of fair quality. There was considerable vomiting. Nutrient enemata were given from time to time, and for the most part they were retained. From this time on, for the next three or four days, the patient was given nothing by mouth, and was nourished entirely by rectum. Occasionally a cleansing enema was given, with fair result. On the fourth day albumin water and brandy in water were given in small quantities by the mouth.

The general condition gradually improved. The abdomen was not distended, and the abdominal spasm lessened. From this time on the condition of the patient showed progressive improvement from day to day. The vomiting ceased entirely. The patient was able to take more food by the mouth, and her general appearance became greatly improved. The tongue still remained dry and parched. There was a moderate purulent discharge from the drainage wound, which was flushed daily.

The remaining history of the case is uneventful, for the patient's condition became better each day until she was out of danger. The record made on the twentieth day after the operation showed the temperature normal, the pulse 112, and of good quality. The patient was taking a liberal diet of soft solids and eggs, and the bowels moved occasionally without enemata. She was gaining rapidly in strength. On the thirty-first day after the operation she was up and about the ward, and on the thirty-sixth day she was discharged from the hospital in excellent condition, there being only a small granulating surface at the lower end of the abdominal scar.

REMARKS.

It is obviously impossible to state with any degree of certainty that the recovery of this patient was due to the flushing of the intestine, but, judging from my experience in "forlorn hope" cases of general peritonitis, I find it hard to escape the conviction that the flushing did accomplish that happy result. The removal of a large amount of liquid feces and gas from the lower part of the small intestine and the colon must have greatly diminished the absorption of septic products, while the introduction of a large quantity of warm salt solution must have rapidly increased the amount of fluid in the vascular system, and favorably influenced the body temperature.

The change in the character of the pulse, while the intestinal canal was being flushed, was one of the most striking features in the case. While, during the first part of the operation it was weak and "thready" and registered about 180 beats to the minute, it suddenly improved during the flushing to a pulse which might, by comparison at least, be called "strong," and which was only 140 beats in the minute. This improvement in the pulse persisted throughout the rest of the operation. In fact, after the flushing of the intestine was done until the patient left the hospital for her home, the pulse was at no time less good in quality than what might be called "fairly strong."

If what I have just written in reference to the effect of injections of hot saline solution into the intestine under such conditions is true, it would seem to indicate that these flushings may be useful in other conditions, in which there is acute

intestinal toxemia associated with ileus, for example, in selected cases, typhoid fever in some of the acute infectious diseases of the intestine, and in cases following as of abdominal operation where the patient is suffering from a high degree of sepsis or of shock, where it is desirable to introduce, as soon as possible, into the body a large amount of heated fluid at a place where it can be most readily absorbed into the circulation, to improve the pulse and to combat shock. Even if, in a case, one is not successful in flushing (that is, in washing the intestinal contents through the colon and out of the anus), presumably no harm has been done, and the intestinal contents will have been at least washed nearer the anus, while the presence of a large amount of hot saline solution in the colon should improve the condition of the pulse and assist in combating shock.

In concluding this paper I wish to say that I have tried to refrain from making extravagant claims as to the usefulness of this new procedure, but I cannot help feeling that its employment in this individual case, where the patient was evidently dying from a streptococcus peritonitis, was as severe a test as could have been selected for it. I hope that the facts here recorded will interest the profession sufficiently to induce surgeons to give the method a more thorough trial than at present I have been able to give it, and, if the method proves to be efficient in their hands, to determine its degree of efficiency, and the proper limits of its usefulness.

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CLINICAL MEETING OF THE STAFF,
MAY 17, 1907.

A CASE OF MULTIPLE PAPILLOMATA OF THE BLADDER.

BY LINCOLN DAVIS, M.D.

J. H. R., forty-seven, married, worker in woollen mill, was first seen by me in the Genito-Urinary Department of the Out-Patient on Sept. 1, 1906.

He gave the following history: Family history unimportant. Never had any venereal disease. About one year ago first noticed dull pain over the pubes. Six months later the urine became bloody. The bleeding was intermittent in character; the urine would be continuously bloody for two or three days, and then clear for a week or two. One week ago had an attack of severe pain in the testicles, shooting up into the bladder. At no time was there pain on micturition or frequency.

Examination showed a rather poorly developed and nourished man. There was a left-sided varicocele. The right epididymis was markedly thickened, and contained a distinct nodule. By rectum, the prostate was found soft and full, without nodules; the vesicles were not felt. The kidneys were not palpable. The urine was slightly cloudy, but not bloody. The sediment was not examined microscopically.

A provisional diagnosis of tuberculous epididymitis and cystitis was made. A note appears in the record to the effect that a specimen of urine should be saved for guinea-pig inoculation. This, however, was not done.

At the next visit of the patient, on Sept. 8, the urine was perfectly clear. A Kollman cystoscope was intro-