ing of a duodenostomy or jejunostomy with that of a temporary gall-bladder fistula, it will readily be seen how much easier of production, freer from infective complications, and surer of prompt closure the cholecystostomy is.

I have refrained, therefore, from any but the practical points gleaned by actual experience, leaving for another time the citation of specific cases, varied medications, and statistical results. It should not be inferred that I have ignored the other means at hand, such as hypodermoclysis, intravenous injection or continuous rectal irrigation. My aim is simply to call attention to an added means of accomplishing an end, when, for one reason or another, in a case of cholecystostomy or choledochotomy those already at hand can not be employed. I am absolutely convinced that nowhere in the alimentary tract is absorption so active or so normal. Nor do I wish to be understood as using this route for the instillation of fluids when there is no indication for it, or as claiming that it can be successfully utilized in every gall-bladder or common-duct drainage. Certainly there are cases in which the common-duct opening or cystic canal is so narrow that fluids thus instilled pass so slowly through as to be of little value as a source of water-supply to the general system. Even in these, however, I believe that the catarrhal swelling of their mucosæ can be lessened by isotonic alkaline normal salt solutions, thus hastening the restoration to that norm, for which these same tracts are being drained.

In conclusion, I desire to be understood not as recommending a cholecystostomy as a therapeutic measure for other ailments than those for which it was originally designed—though that may come in the future—but as urging the utilization of already existing fistulas for indications similar to those referred to in this communication.

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ABSTRACT OF DISCUSSION

DR. A. F. JONAS, Omaha: I am convinced that Dr. McArthur has given us a therapeutic measure which will be very far-reaching in its effect. If we stop to consider that in cholecystitis or gall-stone disease, we have to deal with an infection, we will find that the gall-stones are only a product of the disease. After their removal by operation in the majority of the cases, perhaps 95 per cent., a cure is affected by drainage to the surface. A certain percentage of the patients are not relieved in this way, in a small percentage not over five, the pain persists for a considerable period after the stones have been removed, and after the external drainage canal has healed. It is in such cases that the drainage proposed by Dr. McArthur would seem most effective. If we bear in mind that in gall-stone disease we have to deal with an infection which is transported to the gall passages, by way of the common duct, lymph channels or the circulation, we observe that the first change is a slowing of the biliary secretions, due to a catarrhal condition. As soon as there is a retarded flow of bile, gall-stone formation is possible. After an operation has been performed and drainage has been instituted, we desire to eliminate the infection and to restore the normal flow of bile and its normal fluidity. I have become convinced that after careful drainage we sometimes fail to give complete relief; in such cases we must institute some means by which bile may be caused to flow with greater rapidity. When the bile is not restored to its normal fluidity, it seems that by Dr. McArthur's method of irrigation of the bile passages with normal salt solution we have the means to accomplish this and to relieve patients in whom drainage has failed. Therefore, I wish to commend the method proposed, and I am sure that with an increasing experience we will find a wider field for its application.

DR. W. L. RODMAN, Philadelphia: I am convinced that a therapeutic measure with great possibilities has been given us by Dr. McArthur. As Dr. Jonas said, it is necessary in many cases of gall-bladder disease not only to make temporary drainage, but to keep up the drainage for some time afterward. In this way it seems to me that not only diseases of the gall-bladder itself, but chronic pancreatitis would be very much benefited by this treatment. Furthermore, we all appreciate Dr. McArthur's reference to appendicostomy, and that there are enormous possibilities in this direction. I have employed the operation in the past year in cases in which drainage of the large intestine was necessary, in chronic dysentery and in diarrhea. I have had the best results from free lavage through the appendix, and it seems to me that in similar conditions in the upper abdomen it might be equally useful.

DR. J. W. DRAPER MAURY, New York: Dr. McArthur's results correspond very closely with mine as I have observed them in animals. I have not yet hit on so ingenious a method of draining the duodenum, but I have done a duodenostomy and have been able to save the animal, which otherwise would have died, by washing out the duodenum by continuous irrigation. It is interesting to see how closely the experimental and clinical sides of this work have come together.

THE MANAGEMENT OF THE APPENDIX STUMP *

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During the past few years much time and some ingenuity have been expended in devising means for treating the stump of the appendix, and many articles have been published advocating methods which differ widely in degree, utility and ease of application. Many of these methods are so complicated and unwieldy as to merit no serious consideration, and more than one of them has been encumbered with some especially designed instrument to facilitate its performance.

The most extreme simplicity which is compatible with thoroughness has long been recognized as most desirable in operative technic, and it is the purpose of this paper to plead for the more general employment of simpler methods in the treatment of the stump of the appendix.

Two years ago Dr. John A. Wyeth, in a masterly address, presented this question before this Section. I can bring to bear on this subject neither the eloquence nor the weight of authority possessed by my distinguished friend, Dr. Wyeth, but, as in my attendance at various clinics in all parts of the country I notice the somewhat general use of procedures more or less complex, and in some instances unsafe, it would appear that the principles involved are sufficiently vital to permit further discussion. The method here advocated is, in brief, as follows:

The mesoappendix is ligated with No. 1 plain catgut. An incision is made between the ligatures and appendix until the latter has been freed to its base. Around the base of the appendix, practically flush with the cecum, a ligature of No. 2 silk is placed and tightly tied; an artery forceps is then clamped on the appendix half an inch distal to the silk ligature. After the tissues in the immediate vicinity have been protected with a gauze sponge or pack, the appendix is divided half way between ligature and forceps, the stump is thoroughly cauterized, inside and out, with pure carbolic acid and after being thoroughly dried, the cecum is permitted to

* Read in the Section on Surgery of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1908.

drop back within the abdomen, no effort of any sort being made to cover the stump.

I have employed ligation of the stump with silk in every instance in which it was possible, in all operations, and have seen no postoperative hemorrhage or other complication which could be charged to the stump treatment in over 2,000 appendicectomies.

It was my practice, until three and one-half years ago, to cover the stump, whenever feasible, by carrying over it from either side a fold of cecum, which folds were retained in position by Lembert sutures. This refinement was finally discarded as unnecessary after the repeated observation that in those instances in which, owing to the extreme infiltration of the stump or the cecal wall, such infolding was impossible, convalescence was as smooth and rapid as when this precaution was observed. About 800 patients have been thus treated with no complication of any sort which could be charged to the stump.

Many cases of postoperative hemorrhage have been reported in which, at operation, the stump had not been ligated with silk or linen, but had been treated by some of the more elaborate procedures, crushing, invagination, etc.

My information as to the occurrence of this accident after such ligation agrees with that of Wyeth, who states that he has been unable to find the record of a single case.

That efforts to bury the stump of the appendix by invagination, infolding, or by stitching over it the stump of the mesentery, prolong the operation and increase the general amount of manipulation necessary must be admitted. That such refinement of the technic is unnecessary has been proved by abundant evidence.

Frequently the attempt to place the sutures to accomplish this burying of the stump will be accompanied by hemorrhage due to the puncture of blood vessels by the needle and at times such hemorrhage may be somewhat difficult to control, much time being lost thereby.

It is a well-known fact that the vitality of living tissues is seriously impaired by prolonged manipulation, and the tendency to wound infection thereby increased. This fact of itself should cause us to "get in and get out" in every operation with as little trauma as possible.

We have all seen efforts made at covering the stump, possibly in unsuitable cases, in which the sutures were placed several times before they would hold, and which when finally secure were only made so at the expense of many tissue cells and much loss of time.

The argument is at times advanced that much danger of postoperative adhesions is engendered by dropping the uncovered stump. I believe this to be a bugaboo with no foundation in fact, particularly if such stump has been thoroughly cauterized with carbolic acid. I have many times had the opportunity to inspect the cecum when reopening the abdomen for other conditions, months or years after an appendicectomy made under the technic described above, and, in most instances, it was only with difficulty, if at all, that the former site of the appendix could be identified on the cecal wall.

That the danger of leakage is increased by failure to cover the stump is another bugaboo which, it seems, should be effectually routed by the experience of Lilienthal, who has in several instances tied off and dropped in similar manner the small intestine with no untoward result.

Believing that our duty to our patients and to surgical art demands that we should prolong neither anesthesia nor manipulation in any instance one moment beyond the actual requirements of the individual case, it is urged that time-destroying and tissue-bruising methods in the treatment of the appendix stump be abandoned for the more rational and safer procedure of ligation and dropping.

500 Security Building.

A CONSIDERATION OF THE FACTORS IN THE MORTALITY OF APPENDICITIS

BASED ON A CONSECUTIVE SERIES OF FIVE HUNDRED AND FORTY-FIVE OPERATIONS, WITH TWO DEATHS *

LE GRAND GUERRY, M.D.

COLUMBIA, S. C.

During the last four years I have had occasion to operate on a consecutive series of 545 appendix patients. Out of this number two were lost, making a mortality of about 0.3 per cent. The mortality rate is, I hope, sufficient justification for presenting the paper.

Appendicitis is by far the most important acute abdominal lesion that surgeons are called on to treat. It is about eighteen years since Fitz, of Boston, gave to the medical profession his classical treatise on appendicitis; it would not be far wide of the mark to say that the birth of the recognition of this disease was in Fitz's paper. He taught us pathology, he taught us what the disease really was, and its scientific and rational treatment followed not only logically but of necessity.

That 545 consecutive operations can be done by an ordinary man under ordinary conditions, with but two deaths, and these two occurring in the first 100 cases, leaving 445 cases without death, proves to my mind, at least, that there is a factor in the mortality that is not fully appreciated, or, if appreciated, is not practiced as it should be.

The 545 cases were divided as follows: Of chronic cases requiring so-called interval operation there were 240, with no death; of course, no one expects mortality in the ordinary cases of chronic appendicitis. Unless some unforeseen calamity occurs, the patients all recover, for the cases are practically aseptic.

Of acute cases there were 92 in which operation was performed within thirty-six hours. If I follow any rule in regard to this work, it is that I always operate as soon as the diagnosis is made, provided such diagnosis can be made within thirty-six hours. The reason for this is obvious: were it possible to operate in all cases within twenty-four hours, in nearly every instance one would operate before the infectious process had gone beyond the appendix; in other words, one would be able to do clean work in an uncontaminated field. The cases are few in which the infection spreads beyond the appendix within twenty-four hours. In cases seen on the third, fourth or fifth day, the clinical, as well as the pathologic, conditions are different.

I quote the following from Maurice Richardson:

After the first forty-eight hours the conditions found at the operation differ materially from those of earlier hours; necrosis has been fully established, localization has become successful or infection has become general; the appendix will be found imbedded in recent adhesions. Contiguous to it, surrounding it, or in some way connected with it, will be found

* Read in the Section on Surgery of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.