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Original Articles

THE TREATMENT OF AMEBIC DYSENTERY, ESPECIALLY BY APPENDICOSTOMY *

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The subject of the treatment of amebic dysentery, particularly in its bearings on surgical procedures, is one of lively interest and great practical significance to the medical profession. It assumes importance in view of the utter hopelessness of a certain proportion of cases which have been allowed to drag on until they no longer yield to medical treatment, and also because accessible statistics indicate clearly the widespread prevalence of the disease, principally in tropical, but also to a considerable extent in subtropical and temperate regions.

Passed Assistant Surgeon Heiser is doubtless correct in asserting that "amebic dysentery still easily retains first place, as that disease is the white man's worst enemy in the tropics." In the Philippine Islands, more than one-half of all deaths and disabilities among the whites are ascribable to this disease, while in Manila its death-rate has been averaging about 300 per annum.

The disease may also be acquired in the temperate zones. For example, J. P. Tuttle has shown that cases have occurred among persons who have never been outside of New York, and in 1903 T. B. Fletcher¹ reported, from the records of Johns Hopkins Hospital, 95 cases of amebic dysentery acquired in Maryland and 17 in eight other states. More recently, Boggs² has collected 63 additional cases from the same records, making a total of 182 cases. It is regrettable that in the large general hospitals throughout the southern section of the United States in which amebic dysentery is more or less prevalent, it is not recognized as a distinct disease. The pathologic and clinical records of these institutions down to a recent date classify amebic infection under the generic term of "chronic dysentery."

The simple truth regarding the geographic distribution in America is that patients in constantly increasing numbers are emigrating from the endemic localities to more temperate or northerly latitudes. The present dis-

cussion will not include a full consideration of prophylaxis, which embraces many points, but the fact that an unsterilized water-supply both directly and indirectly is the principal source of infection deserves especial mention. Musgrave has shown experimentally that sterilization or thorough filtration are essentials wherever the infection is endemic. The danger of eating green vegetables and fruits which have either been fertilized by the oriental method, i. e., with human excrement, or cleansed with unsterilized water, must be recollected.

The actual sources of infection, however, are numerous, so that prophylaxis is a complicated problem, and its scope beyond the prescribed limits of this article. Too much stress cannot be laid on the statement that both constipation and simple diarrhea constitute local predisposing conditions, and they should be, therefore, obviated to the fullest extent in localities in which amebic dysentery is endemic.

MEDICINAL AND OTHER TREATMENT

One of the most important indications to be fulfilled is rest; this applies with greater force to the acute than to the chronic form of the disease, and, to procure it, an opiate may rarely be required.

We shall describe in the next place the medicinal treatment of the attack. So long as scybalous masses are being passed, we prefer to employ magnesium sulphate in dram doses every third hour. If the general strength be good, a brief course of calomel should precede the use of the saline remedy. The magnesium sulphate lessens the pain and tenesmus by removing the hardened fecal masses and inhibiting rather than exciting undue peristalsis, and it also depletes the portal circulation, thus relieving the hyperemia.

In our view, purgatives, when employed in the advanced stages of amebic dysentery, commonly assume the rôle of aggravating causes. Neither have they a place in the treatment of cases manifesting highly acute invasion symptoms. Saline laxatives may, therefore, be required for longer or shorter periods, according to the character of the intestinal features and progress of the individual case, but should not be long continued after the dysenteric have been converted into diarrheal dejecta.

In the symptomatic treatment, the general condition of the patient brought about by disturbances of the circulatory and excretory organs (cutaneous, renal) must be accorded constant and most careful consideration. Measures intended to support the blood circulation should not be overlooked as occasion demands.

Chronic amebic dysentery is a specific disease in which the causal treatment is the essential and ultimate one on which professional efforts are to be focused. Experience and a critical examination of the expressions of authoritative opinion have shown that, in the majority of cases at least, the vital resistance of the body is incapable of destroying the invading organism after implantation of

* Read before the Section on Hygiene and Tropical Medicine of the Sixteenth International Medical Congress, Budapest, Aug. 29-Sept. 4, 1909.

1. Fletcher, Thomas B.: A Study of the Cases of Amebic Dysentery Occurring at the Johns Hopkins Hospital, *THE JOURNAL A. M. A.*, Aug. 22, 1903, xli, 480.

2. Boggs: Amebic Dysentery in the Southern States, *Virginia Med. Semi-Monthly*, April 10, 1908.

the *ameba coli* has occurred. Granting the correctness of this view, the question pertinently arises: Is there a specific remedy for this disease?

Following its discovery, ipecac at once gained popular favor, only to fall from its enviable position with the passing of time. It was reintroduced by Sir Patrick Manson, who has expressed the belief, founded on long experience, that in ipecacuanha we have a remedy possessing specific powers against the germ cause of at least certain of the more common forms of dysentery.

Says Manson:

I regard this drug as belonging to the same category of remedies as quinin or mercury or salicylic acid. I know that in America and in many other parts of the world, ipecacuanha has lost its reputation as an antidysenteric. . . . I would urge American physicians to give it one more trial, at all events in such cases of dysentery as have been acquired in the tropics.³

Recently certain American clinicians, among them George Dock, E. A. R. Newman and others, have warmly and enthusiastically advocated the use of this drug, claiming for it specific virtues. We have also been profoundly impressed with the therapeutic value of ipecac in the treatment of amebic dysentery during the earlier stages of the disease, but have met with failure in a few much-protracted or chronic relapsing cases. In one instance the drug caused the amebas to disappear from the dejecta, but they subsequently reappeared. In general, then, but not invariably, ipecac exerts a markedly beneficial effect, causing the amebas to disappear rapidly from the dejecta.

The success of the ipecac treatment depends largely on the method of and degree of care exercised in administration. The introduction of capsules of animal membrane, as suggested by Sandwith, and salol-coated pills, which carry the remedy into the intestines before it is absorbed, marked a decided advance in that the liability to nausea and vomiting was thereby minimized. In this manner massive doses which, according to its partisans, are essential to the utmost efficiency of the drug, can be easily administered.

Without stopping to give full details, it may be stated that not less than 30 grains at a single dose (after the method of Sir Patrick Manson in chronic amebic dysentery) are to be given on the first day. Subsequently the amount is to be diminished by five grains *per diem* so that by the sixth day only five grains of the drug are administered. During the next week or ten days a nightly dose of five grains must be allowed. The various precautions against vomiting, which have been properly emphasized by Manson and his adherents, need not be so rigidly enforced when the salol-coated pills of ipecac are employed. These, it will be recollected, are dissolved in and absorbed from the intestinal tract. It is, however, advisable to have the patient fast in all cases for about four hours before administering the remedy, and to enjoin absolute quiet for a similar period after.

This improved mode of administration has also had the effect of overcoming, to an extent at least, the prejudice formerly existing against ipecac as a therapeutic resource in this disease; not, however, before the introduction of colonic irrigation, which was founded on the results of laboratory investigations following the discovery of the specific element of the disease, and believed to offer an opportunity to combat the ameba at its seat of activity in the intestine. It may be questioned whether the irrigation treatment *per se*, i. e., without

surgical intervention, has in its last analysis given more encouraging results than the ipecac treatment properly carried out. On the other hand, Boggs² and others declare unhesitatingly that the local treatment is the only effective medication in the light of an extensive professional experience. For this purpose, solutions of quinin are most widely approved, commencing at 1:5000 of a blood-warm solution and progressively increasing in strength to 1:1000 in a few days.

Sandwith, in 1898, first suggested that amebic infections might be properly treated with large enemas before they had become chronic, and in this position he was ably supported by William Osler. More recently this treatment has been widely adopted in countries in which amebic infection is endemic. Most authorities believe it to be the part of wisdom to begin these irrigations after the early acute symptoms have, in a measure at least, subsided. Again, there are cases that have reached the stage of chronicity in which the local irritability is too great to permit of thorough lavage. The irrigation solutions which have found widest favor in intestinal amebiasis are those of quinin and silver nitrate, particularly the former. Among numerous other enemas may be mentioned those containing mercuric chlorid, argyrol, creosote and copper sulphate, but they are manifestly less efficacious than the two given above.

As with the ipecac treatment, so with irrigations, certain details in carrying out the method, not all of which can be described here, are necessary to insure the success of the treatment. Especial mention should be, however, made of the following points: marked elevation of the hips, the insertion of a soft rectal tube three to four feet into the colon and the retention of the irrigation fluid for fifteen to twenty minutes.

The object of this method is to wash thoroughly every portion of the colon; and the irrigations should be kept up until repeated examinations have failed to reveal amebas in the stools.

In protracted cases in which the ulcers first appear in the rectum and travel upward, colonic irrigation by the rectal route sometimes fails. The same is probably true of those cases in which the lesions begin in the caput coli and descend, not to speak of the cases in which the small intestine has been invaded for a short distance above the ileocecal valve. While the lesions of amebic dysentery are almost invariably confined to the colon, their distribution is by no means identical in every instance. For example, in 116 cases examined post-mortem, Fletcher⁴ rarely, if ever, found the lesion in the rectum and sigmoid.

On the other hand, Tuttle, in 74 cases of amebic dysentery among living subjects, observed typical ulcers of the rectum and sigmoid in 70 instances. Tuttle described numerous cases in which the ulcers appeared to decrease in size and number from the rectum upward, disappearing entirely in the upper part of the sigmoid flexure. Patients of this class obviously recover under local treatment. Wooley and Musgrave,⁵ in 200 cases of amebiasis, found the entire large intestine involved in 159; cecum and ascending colon in 23; transverse colon only in 2; descending colon, sigmoid flexure and rectum in 9 cases. The appendix was implicated in 14 cases, and the ileum in 7.

APPENDICOSTOMY

Whether it be on account of the peculiar distribution of the lesions or whether in consequence of the advanced

4. Fletcher, quoted by Tuttle: Amebic Dysentery, THE JOURNAL A. M. A., Oct. 8, 1904, xliii, 1022.

5. Wooley and Musgrave: Bull. Bureau of Gov. Lab., Manila, No. 32, June, 1905.

3. The Lane Lectures, delivered at the Cooper Medical College, August, 1905.

character of the local pathologic changes, the simple fact is that not all cases of chronic amebic dysentery yield to rectal lavage, even though carried out with great thoroughness. It is in these instances that appendicostomy offers a real sphere of usefulness by utilizing the caliber of the appendix, thus rendering possible the successful local medication of the large bowel. The following cases in point may be briefly cited:

CASE 1.—History.—The patient, F. J. B., aged 31, was a soldier in the Spanish-American War from 1898 until 1904, when he returned from the Philippines to Philadelphia. The disease developed during the first year he was in the service; it yielded to massive doses of ipecac with rest in the Philippine Hospital, but recovery was only apparent, and during the six years which he spent in the tropics he received similar treatment at irregular intervals for exacerbations, with marked temporary improvement, but the amebas were constantly present on examination of the feces. After his return to the United States, in 1904, he was treated first at the Army Hospital at Columbus, Ohio, rectal enemas being used without result; in November, 1905, acute symptoms manifested themselves and the patient sought admission to the Army and Navy Hospital in Hot Springs, Arkansas; rectal lavage with quinin and silver nitrate solutions was employed for about three months. On leaving, the patient found that he had gained eighteen pounds, and bowel movements were reduced to one or two daily. He felt himself well until November, 1906, when the intestinal features became active. In 1907 he developed a recurrent exacerbation, for which he was treated in three different Philadelphia hospitals, and in March, 1908, he was admitted to the Medico-Chirurgical Hospital, where he remained for three months. During his stay, the diarrhea, which was a prominent feature immediately after admission, markedly improved. The amebas, however, continued to be present in the dejecta and the general nutrition of the patient remained much impaired. On May 14 it was decided to perform an appendicostomy.

Operation.—This was done in two stages, the appendix not being opened until May 16, at which time a No. 10 rubber catheter was introduced into the cecum and the bowels well irrigated with a solution of quinin (1:4000). This was repeated daily with the most satisfactory results. At the time of the operation the patient was having from ten to twenty stools a day. After a week's treatment the number was reduced to less than a dozen in twenty-four hours, and at the end of four weeks he was having usually one, sometimes two, healthy actions a day.

Postoperative History.—The patient, being unusually intelligent, was able to carry out the lavage of the colon himself. Therefore he was allowed to leave the hospital and continue the treatment at his home. He gained flesh very rapidly, and when he reported to us the following September his appearance was strikingly changed for the better. He had gained about forty pounds in weight and reported himself as feeling perfectly well. We advised him, however, not to discontinue the irrigation, or to allow the fistula to close. There was never at any time leakage from the fistula. The catheter was allowed to remain only during the irrigation.

CASE 2.—One of us, in November, 1908, operated on a colored man from the island of Jamaica who had suffered with chronic diarrhea for several years. Having been treated without relief in the medical wards of the Presbyterian Hospital, he was transferred to the surgical ward, as appendicostomy had been advised by us. The result of the operation was as satisfactory as in the preceding case and the stools, which were upwards of thirty a day, were reduced within a fortnight to two or three in twenty-four hours. We have never seen a patient improve more satisfactorily in every way. He gained flesh very rapidly and within six weeks after the operation had put on thirty-seven pounds. Physiologic salt solution only was used. The patient was allowed to leave the hospital at the end of three weeks, but continued to practice daily irrigations until the time when he was last seen, in February, 1909, when he was exhibited at our clinic at the Medico-Chirurgical Hospital. He was then having one action a day and seemed to be entirely relieved of all gastric and intes-

tinal symptoms. He was, however, advised to keep open the fistula, which manifested quite a disposition to close, and to employ occasional irrigation. There was never at any time leakage from the fistula.

We have also resorted to appendicostomy in other cases of chronic dysentery and chronic diarrhea with entirely satisfactory results—so satisfactory, indeed, that we do not hesitate to advise the operation in cases proving rebellious to medical treatment. The mortality following such operations is practically negligible, and the relief, in our judgment, almost certain. It would not be germane to consider appendicostomy, valuable as it is, in other conditions, such as intestinal obstruction, syphilitic ulceration of the colon, chronic constipation, or for the purpose of introducing nourishment in typhoid or other debilitating diseases.

TECHNIC OF THE OPERATION

We think, however, that a few words as to the technic will not be amiss. We have always reached the appendix through the gridiron or McBurney incision. We favor, as a rule, doing the operation in two stages, believing that it is best not to open the appendix until firm adhesions have taken place between the cecum and parietal peritoneum. That it can safely be done, if necessary, in one sitting, is not to be questioned; but the mortality must be somewhat greater, and primary union of the wound to a certain extent jeopardized.

The technic as usually described in the text-books is faulty in one respect at least, and has caused more or less dissatisfaction with the operation. If the mesoappendix, as ordinarily advised, is ligated, the blood-supply to the appendix is cut off and gangrene of the organ is almost certain to follow. At least this has been our experience and that of other surgeons with whom we have discussed the subject. Our early operations were far from satisfactory on account of having employed the technic above mentioned.

It is much better to bring the base of the appendix well up against the abdominal wall, stitching the meso-appendix to the parietal peritoneum. Not only is the vitality of the appendix thereby insured, but intestinal obstruction, which is a possibility when the cecum is suspended by the appendix, as in the original technic, is eliminated. As the operation was formerly done, the dangers were much the same as in ventral suspension of the uterus, as it would be an easy matter for the small intestines to slip around and be interfered with by the appendix thus suspended. The best description of the operation is to be found in Moynihan's "Abdominal Surgery."

Since following the technic above referred to, we have always found the appendix of normal color at the end of forty-eight hours, whereas, as we have already said, it was invariably gangrenous if the mesoappendix was ligated.

The appendix is snipped off with a pair of scissors after brushing it over with a solution of cocain. Little or no pain is felt, and cocain even is unnecessary.

A No. 10 rubber catheter is at once introduced into the cecum and irrigation of the bowel practiced. While we have hitherto employed solutions at about the body temperature, Tuttle, of New York, strenuously insists on colder solutions, at a temperature of 65 degrees, believing that they are more efficient.

Some surgeons insist that the appendix should be opened at once and the operation completed in one stage. This position is largely taken to insure patency of the appendix. While this is undoubtedly a matter of impor-

tance, we believe an experienced surgeon will usually be able to satisfy himself that the appendix is patent by rolling it between his fingers.

Others have doubted the dilatibility of the appendix and have, therefore, wished to eliminate this uncertainty by opening the organ primarily. It is surprising to what extent even an abnormally small appendix can be dilated, if patience and prudence are exercised. Even in small appendices, the result of appendicitis obliterans, the caliber is sufficient to admit a fairly large catheter.

Another question of importance to decide will be the relative merits of appendicostomy and cecostomy. We unhesitatingly pronounce in favor of the former operation. Cecostomy has always been more or less unsatisfactory on account of the difficulty, almost impossibility, of preventing leakage, resulting in excoriation of the skin, which is most disagreeable and painful. If, however, it is to be given the preference, it should invariably be practiced by the method introduced by Gibson, which is practically the Stamm-Kader operation, which all of us prefer in gastroenterostomies and cholecystostomies.

We are frank to say that we have been surprised to find no leakage whatsoever from the appendix when the catheter is withdrawn.

Another point of considerable importance is whether or not the fistula should be closed when the disease seems to be at an end. Much, of course, will depend on the nature of the affection. If the operation is performed for the relief of amebic dysentery, it is our belief that the fistula should, as a rule, be maintained indefinitely. Certainly such is the case should the patient contemplate residence or travel in a tropical country. When desirable to close the fistula it is most easily accomplished by the use of a Paquelin cautery or nitric acid. Truth to say, we have had more trouble in keeping open the fistula than in closing it, and have been compelled from time to time to practice judicious dilatation in order to prevent too early closure.

CONCLUSIONS

In concluding this paper, a few points brought out in the foregoing discussion deserve to be reiterated:

1. Certain cases of old-standing amebic dysentery do not yield to either the ipecacuanha treatment or rectal lavage.

2. In these instances, fortunately rare, failure is most probably due to the advanced character and high position of the local lesions of the disease.

3. This small class of cases may be successfully treated by the combined method herein advocated, to wit: appendicostomy and systematic thorough irrigations through the appendix.

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ELECTRIC BURNS

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In this day and age, we recognize in electricity man's greatest ally. Guarded and under control, it has become the greatest factor in the progress of industries. On the other hand, it is capable of being most destructive to human life.

Electricity is seen in two great forms: static and dynamic. The static is that seen in common lightning, while the dynamic form or current electricity is the controlled and useful form.

FACTORS DETERMINING RESULTS OF INJURIES

Current electricity is injurious and destructive or harmless, depending on the following factors: (1) kind of current; (2) its intensity; (3) length of time of contact; (4) the part traversed; (5) the vital resistance of the body through which the current is passing.

1. It is generally admitted that the alternating or indirect current is more dangerous to life than the direct. Edison says: "Contrary to what one would expect, the higher the voltage the less the danger to life when the voltage gets up in the thousands." De Tarnowsky¹ makes the statement that injuries from the direct and indirect current of the same voltage are alike, though with the direct the liability to injury is greater because all the current passes on one wire instead of two.

2. The intensity depends on the resistance offered by the body through which the current is passing.

3. The result is in direct proportion to the length of time of contact.

4. Exposure about the heart, or current passing through or near the heart, is the most dangerous. In general the further from the heart, the less is the danger of cardiac paralysis.

5. Vital resistance, if not the greatest, is one of the greatest factors in determining the effect of a contact with a live wire. A person with a weak heart, or an alcoholic, is much more easily and surely killed than one in robust health. The same current may be harmless or harmful to the same individual at different times, depending on the condition of the body.

Horses and cows are more easily killed by electricity than man, perhaps because, in part, they have four points of contact with the earth. Dry, hard skin offers the best natural resistance; Lucas says it will take 100,000 ohms; delicate skin takes less. The mucous membrane takes about 1,000 ohms. Edison says that bone is a poor conductor, while blood is a good conductor.

De Tarnowsky, surgeon in chief of the Northwestern Elevated, has been able to draw the following conclusions from a series of experiments carried out on the structure of that railroad where pressure of 500 volts is used:

1. In dry weather it is safe to place one foot on the live rail with the other foot on the track. A lineman may even sit on the live rail with his feet on the track, provided his clothes are dry and whole.

2. A disagreeable though not painful shock is experienced while sitting on the live rail when the track is touched with bare, dry hands. Should the lineman be handling a tool, however, a flash burn would inevitably result.

3. The majority of accidents result from carelessness while handling tools.

4. Wet weather is especially conducive to accidents.

INTENTIONAL AND ACCIDENTAL ELECTRICAL INJURIES

Electrical injuries are brought about in two ways: intentionally and accidentally.

Intentional Electric Injuries.—In electrocution the state has found a quick and safe means of disposing of many of its criminals. The State of New York since 1890 has electrocuted over 100. Ohio adopted the same means in 1896, Massachusetts in 1898, New Jersey in 1897 and Virginia in 1908.

Spitzka² of Philadelphia says that he has made post-mortem examination of twenty-four of thirty-six electro-

1. De Tarnowsky, George: *Illinois Med. Jour.*, 1906, x, 502.

2. Spitzka, E. A.: *New Jersey Jour. Med. and Surg.*, April, 1909.