BALANTIDIAL DYSENTERY IN RODRIGUEZ AND ITS TREATMENT WITH MERCURY BINIODIDE

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Manson-Bahr (1936) states: "Balantidial dysentery is such a rare disease in man that it is more of a curiosity than anything else. Unfortunately the treatment of this infection has so far proved to be very unsatisfactory." The following cases successfully treated with mercury biniodide may therefore prove of interest.

Rodriguez is an island of 40 sq. miles lying about 350 miles from Mauritius, of which it is a dependency. It has a population of 12,000, and every household breeds at least one pig. The prevailing hygienic conditions are very unsatisfactory, so that dysentery due to *Balantidium coli* should not be unexpected.

During 1945 ten cases of balantidial dysentery were recorded; the first case was fatal, but the others were cured. When mepacrine proved to be ineffective in the first case it was decided to use some heavy metal, as Walker (quoted by Manson-Bahr, 1931) found that organic compounds of silver were very effective. Mercury biniodide was tried because it was the most easily obtainable metallic compound.

Case Histories

Case 1.—A man aged 30 was admitted into hospital on April 20, 1945, having complained of "dysentery" for several days. His stools were profuse and watery, and contained *Bal. coli* in fairly large numbers. He was given mepacrine 0.5 g. thrice daily and a mixture of bismuth and opium. The diarrhoea increased in severity and he died five days later.

Case 2.—A boy aged 4½ years was admitted into hospital on May 27, 1945, with the history of having had an attack of diarrhoea two months previously but without blood; it lasted for ten days and passed off with medical treatment. For some days before admission he had been having seven to nine motions daily; most of the stools contained blood, but sometimes only mucus. On admission the stool was found to contain *Bal. coli*. An injection of biniodide of mercury, 1/24 gr. (2.7 mg.), was given intramuscularly. The number of stools decreased progressively until only two motions containing some blood were passed on the 29th, when another injection was given. By June 6 all blood had disappeared from the faeces, which were found to contain no *Bal. coli*, but only trichuris and ascaris eggs. The boy was seen again at the beginning of April, 1946. He was then well and passing normal stools, but these were not brought for examination.

Case 3.—A girl aged 3 years attended the out-patients' department on May 31, 1945. The mother stated that the child had been ailing for three weeks and had been passing seven to eight stools daily, with blood. The stools were found to contain *Bal. coli* apart from ascaris eggs. Biniodide of mercury, 1/24 gr., was administered intramuscularly the same day. On the next three days the child passed only one stool each day. A second injection was given on the 5th, and a stool examination on the 8th revealed only the presence of ascaris eggs: there were no *Bal. coli*. The child had been feeling well for the last three days and had a good appetite. She was seen again in April, 1946, when she was in good health, but her stools were not brought for examination.

Case 4.—A boy aged 5 years was seen on June 18, 1945. For the last two days he had been passing two to four motions daily, with blood and mucus. *Bal. coli* was found in his stools, and 1/10 gr. (6.5 mg.) of biniodide of mercury was immediately given intramuscularly. After that the blood and mucus disappeared from the stools, which became watery. On the 20th, stool

examination revealed an absence of *Bal. coli* and the presence only of ascaris eggs and a few Charcot-Leyden crystals. A second injection was given. Two days later the patient was passing one solid motion daily without *Bal. coli* or Charcot-Leyden crystals. The boy remained well until March 4, 1946, when he attended the out-patients' department with the history that for the last two weeks he had been passing six to seven loose motions daily. The stools were found again to contain *Bal. coli* and ascaris eggs. Biniodide of mercury was prescribed for alternate days, and four injections were given. He was again seen on April 5, when no *Bal. coli* was detected. The mother volunteered the statement that the child was well after three injections.

Case 5.—A girl aged 7 years had for several months been passing blood and mucus occasionally, but only one or two motions daily. Though she had been feeling weak, her appetite had been good. When seen on Aug. 9, 1945, her stool was found to contain ascaris eggs and *Bal. coli*. On the 11th and 14th she was given 1/18 gr. (3.6 mg.) of biniodide of mercury intramuscularly. On Aug. 21 the stools were found to harbour only ascaris eggs. Seven months later the girl was still keeping well, and no *Bal. coli* was found in her motions.

Case 6.—Three months before coming to hospital a girl aged 10 had had diarrhoea, which lasted two days. She was given chenopodium oil, after which the diarrhoea ceased. For four days before her admission on Oct. 1, 1945, she was passing two or three motions daily, with blood and mucus, and was having colicky pains. On admission her stools were found to contain *Bal. coli*, ascaris eggs, and Charcot-Leyden crystals. She was at once given 1/12 gr. (5.4 mg.) of biniodide of mercury. Next day the *Bal. coli* had greatly increased in number and were very motile. On the 3rd another injection of biniodide was given, and by Oct. 5 all the *Bal. coli* had disappeared from the faeces. She remained well until six months later, when she again attended the out-patient department. She was then (April 2, 1946) passing two loose motions with blood daily and again *Bal. coli* was detected. Biniodide of mercury, 1/12 gr., was then given every other day. After five injections the patient was still passing two loose motions daily, but the blood had disappeared. The faeces, however, were found still to contain *Bal. coli* in very large numbers. The protozoa were so numerous and close together that some fields looked like mosaic work. As ascaris eggs were also numerous, chenopodium oil was given on April 13. The patient passed about one hundred roundworms. Next day, after a soft-soap enema, she was given an enema of mercury biniodide, 1/6 gr. (11 mg.), in one litre of water—equivalent to a concentration of 1 in 100,000. On April 16 both ascaris eggs and *Bal. coli* were absent from the stools.

Case 7.—A boy aged 4 years had been ill for three days and had been passing one motion almost every hour. The stools were very watery and he vomited occasionally. On March 9, 1946, the stools were found to contain ascaris eggs and *Bal. coli* in fairly large numbers. Mercury biniodide, 1/12 gr. (5.4 mg.), was prescribed. He was seen again on April 3 after he had received four injections. The stools were then loose, but numbered only three a day, and contained ascaris eggs but no *Bal. coli*. The child was feeling well otherwise.

Case 8.—A girl aged 13, sister of Case 6, had been ill for four days. She had been passing four to six stools daily with blood and mucus and tenesmus. When the stool was examined on March 14, 1946, *Bal. coli* was discovered. Mercury biniodide, 1/12 gr., was injected every other day. After two injections all the symptoms disappeared, but the stools were still loose. By April 12 she had had 11 injections; the stool was by this time normal and well formed, and there was only one daily. No *Bal. coli* was seen.

Case 9.—A man aged 40 had been ill for six days. For the first two days there were only two or three stools daily, watery but without blood. For the last four days blood and mucus had appeared in the stools, which numbered up to 12 daily. Motions were accompanied by severe tenesmus. When he attended the out-patients' department on March 27, 1946, *Bal. coli* was detected in his stools. Next day 1/6 gr. (11 mg.) of mercury biniodide was injected. On the 29th only eight stools were passed; they were less in volume and the tenesmus had

decreased in severity. On the 30th a second injection was given, three days after which only two stools were passed, and these were quite normal. No *Bal. coli* was detected in the stools when examined on April 13.

Case 10.—A man aged 63 had had dysenteric symptoms on and off for the past six months. For the last few days he had been passing thick liquid blood-tinged stools which were found to contain *Bal. coli*. A first injection of 1/2 gr. (32 mg.) of mercury biniodide was given on April 11, 1946. Two days later *Bal. coli* was still present and a second injection was given. On April 16 no *Bal. coli* was found in the stools and the patient was feeling very well.

In-vitro Tests.—A 1 in 100,000 solution of biniodide of mercury was found to kill the protozoa instantaneously. Motions ceased immediately, but ciliary movements continued for about ten minutes. The granules in the protoplasm were seen to move in a caudal direction as in a current. After ten minutes over 95% of the protozoa were found to be dead and to have burst. In 1 in 1,000,000 mercury biniodide solution, motion of the protozoa took 15 minutes to stop, and after one hour most of the protozoa were dead. With mercury perchloride a concentration of 1 in 100,000 was required to obtain the same effect as with 1 in 1,000,000 solution of mercury biniodide, while with tartar emetic a concentration of 1 in 2,000 was required. With a 1% solution of methylene blue the protozoa took over an hour to die.

Characteristics of Stools.—In early cases the stools were indistinguishable to the naked eye from those of amoebic dysentery. In more advanced cases the stools assumed a very characteristic watery form; in two cases it was possible to guess the presence of *Bal. coli*. In two cases Charcot-Leyden crystals were discovered, being very large and fairly numerous in one case. In spite of repeated and careful examinations no *Entamoeba histolytica* were found. The crystals disappeared at the same time as the *Bal. coli*.

Discussion

The only literature at our disposal consists of the *Lancet* and the *British Medical Journal* for the last ten years and a few pre-war numbers of *La Presse Médicale*. Mackenzie and Bean (1938) state that Dobell and O'Connor, after a survey of the literature, could find no record of a specific cure for the disease, but that Cort claimed success with enemata of 15 ml. of oil and chenopodium in 150 ml. of olive oil, and Banik reported a case successfully treated with yatren enemata, 8 oz. (227 ml.) of 2.5% solution. Mackenzie and Bean themselves used Loeffler's methylene blue. The lower bowel was thoroughly washed out and two pints (1.14 litres) of methylene blue was slowly run in. This was retained for 2½ hours and was followed by another wash-out, the whole procedure being repeated next day. A fortnight later a further wash-out was given, followed by an injection of the dye. Since that time neither ciliates nor cysts have been found. Remlinger, Cabanie, and Bailly (1938) attended a case of *Bilharzia haematobia* and *Bal. coli* infection in an Arab boy aged 14. The bilharzia infection was treated with subcutaneous injections of 0.5 ml. of "anthiomaline" (antimony thiomalate of lithium). After 16 days' treatment only bilharzia was present.

The pathology of balantidial dysentery resembles very much that of amoebic dysentery. In both types the protozoa are not only present on the surface of the bowel but congregate in the follicles and are embedded in the tissues forming the base of the ulcers. As is the case with the treatment of amoebic dysentery by parenteral administration of emetine, the drug used in the treatment of balantidial dysentery should be introduced parenterally so that it can reach the parasite via the blood stream. Mackenzie and Bean's case, and that of Banik, successfully treated with enemata alone, possibly were early cases, before the parasite had been able to burrow deeply into the

intestinal mucosa. In advanced cases it is doubtful if with an enema the drug will be able to reach the parasite.

In the nine cases successfully treated by us with intramuscular injections of biniodide of mercury improvement set in after the very first injection, and the second injection completely cleared the infection together with the symptoms in most of the cases. In Case 5 no *Bal. coli* was detectable seven months after treatment. I have no doubt that Cases 2 and 3 would, at the time of writing (after 11 months), have shown no parasite if the patients had sent their stools for examination. Case 4 had another attack of the infection after 10 months, and Case 6 after 6 months. These two children belong to very low classes of society, living under unsatisfactory sanitary conditions, and I believe theirs are cases of reinfection rather than of relapse, as they are still exposed to the infection.

Case 6 developed the illness a second time, and five injections of the drug did not clear the infection though the symptoms disappeared. I was inclined to think that in this case the infective organism was leading a saprophytic life in the lumen of the bowel, which explains why an enema was so successful where parenteral administration of the drug had failed.

In-vitro tests have shown that mercury biniodide is very lethal to the parasite: it is ten times more lethal than mercury perchloride, 500 times more than tartar emetic, and 100,000 times more than methylene blue.

Enemata with 1 in 100,000 solution of biniodide, one litre in quantity, should be quite harmless to the human body, because even if the whole of the mercury compound should be absorbed it would amount to only 1/6 gr., which is within the therapeutic dose.

Summary

Ten cases of balantidial dysentery are described. The first case treated with mepacrine ended fatally.

The nine other cases, treated by intramuscular injections of biniodide of mercury, were cured, but one of them required in addition an enema of the biniodide.

It is suggested that intramuscular injection be used except when the protozoa are living also in the lumen, when injections combined with enemata are probably best.

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Dr. Winifred De Kok's *First Baby* (Pp. 130, illustrated, 7s. 6d., London, John Westhouse, 1946) is intended for the young wife and mother; any doctor may confidently recommend it to his patients. It is clearly and simply written and provides sufficient detail for the uninformed reader to know exactly what to do. The author stresses the "normality" of pregnancy and labour and urges the expectant mother to cast out fear and not to listen to the gruesome stories of her relatives and "friends." She should preferably have her confinement at home if her antenatal examination shows her to be healthy and normal, and aim at breast-feeding her baby. She should prepare herself by taking the permitted extras in her diet. The author prescribes exercises for use before and after confinement, and advises on the economics of having a baby and the use of clothing coupons. She expounds in a simple manner the methods of prevention of minor ailments of mother and baby, the stages in bodily and mental development of the infant, feeding and weaning, and excretory training. This little book gives all the essential information without saying too much.