A CASE OF URINARY AMOEBIASIS.

BY

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URINARY amoebiasis appears to be a very rare condition; Braun¹ refers to 9 cases, and Dofflein,² under the heading of *Entamoeba urogenitalis*, gives references to 4 of the same cases as those mentioned by Braun. Baelz's case occurred in a woman in Japan; entamoebae were found both in the bladder and the vagina, and Baelz was of opinion that the parasites were introduced into the vulva with the water used for washing the parts, and that they penetrated thence into the bladder and vagina. The amoebae are said to have been very motile, with a diameter of about 50 μ . Apparently it was not stated whether they contained ingested red blood corpuscles, though the urine is described as sanguineous. Baelz's paper was published in 1883, twenty years before Schaudinn pointed out the distinctive characteristics of the pathogenic and non-pathogenic entamoebae. The author's suggestion as to the mode of infection of his patient seems very probable, if it is understood to mean that the amoebae were transferred from the intestine to the bladder and vagina by means of water used for ablution.

On May 12th, 1914, a male agriculturist, aged 18, Brahmin by caste, was admitted under my care to the King George's Hospital, Lucknow. He had been suffering from haematuria for six months, and from anasarca of the legs, penis, and scrotum for about three weeks. There was paraphimosis and a small superficial ulcer—scarcely more than an abrasion—on the glans penis near the meatus; from this ulcer there was a slight sero-sanguineous discharge. The sore was not indurated, and although there were numerous large spirochaetes, there were no treponemata in the discharge. The inguinal glands were not enlarged. No abnormality was found in the heart, lungs, spleen, or liver. There was no tenderness or irritability of the bladder and no fever. The appearance of the stools was healthy, and no entamoebae could be found in them; the patient stated that he had never suffered from dysentery. The urine was rather scanty and deeply blood-stained. Its reaction was acid; specific gravity, 1013; there were much albumin, numerous pus cells, red blood corpuscles, and a considerable number of hyaline and granular tube casts. The urine contained very numerous actively motile entamoebae.

Half-grain doses of emetine hydrochloride were given hypodermically twice a day. The next day the amoebae were still numerous and very motile. In forty-eight hours, by which time the patient had received 2½ grains of emetine, the amoebae were much diminished in numbers, and decidedly more sluggish. On the following morning the urine was much clearer, and no longer tinged with blood; the reaction was now alkaline, the specific gravity 1010, there was little albumin, and a copious deposit of triple-phosphate crystals. No active entamoebae could be seen, but there were still a few non-motile rounded forms. These possessed no cyst-wall, and contained a large vesicular nucleus; they were probably dead. On May 17th no amoebae could be found in the urine, and the emetine was discontinued. The patient looked and felt much better. There was still some anasarca of the ankles and feet, and of the scrotum and penis. The urine was still alkaline, and contained only a trace of albumin.

On May 21st the swelling of the legs had quite disappeared, though that of the penis continued; the sore had healed. Within the next few days the reaction of the urine gradually became acid; a small quantity of albumin persisted, and an occasional granular or hyaline tube-cast could be found. The stools were examined microscopically almost every day; no entamoebae were found in them until June 5th, when there were a few sluggishly motile entamoebae, which seemed to be *E. tetragena*. At this time there were no amoebae in the urine, nor did any reappear during the rest of the time that the patient was under observation. The administration of emetine was resumed, and the entamoebae disappeared from the stools within two days.

The patient is still under treatment. He is evidently a case of chronic Bright's disease, and continues to pass a variable but always small quantity of albumin, and an occasional tube-cast. The urine is quite free from blood, and, although it has been examined repeatedly, no amoebae have been found in it since they disappeared on May 17th, nor have entamoebae been found again in the stools.

The entamoebae which occurred in the urine in this case were especially characterized by their active motility and by the unusual persistence of motion in one direction. As a rule, a single hyaline lobose pseudopodium was protruded in the direction in which the amoeba was travelling; as soon as the granular endoplasm had flowed into it a fresh ectoplasmic pseudopodium appeared at the same place. In this respect the entamoebae differed from the

ordinary forms of *E. tetragena* and *E. coli*, which frequently produce pseudopodia simultaneously at different parts of their surface, and often alter the direction of their motion. As the result of its great motility, an amoeba soon travelled right across the field of the microscope. In addition to actively motile amoebae, spherical or oval resting forms were seen; these varied in diameter from 25 to 35 μ . The cytoplasm in both the active and resting stages was coarsely granular, with numerous vacuoles; the vacuoles ranged in size from those that were just visible to others of a diameter of about 3 μ .

Nearly all the amoebae contained red blood corpuscles (which abounded in the urine); some amoebae were literally crammed with these. Many of the red blood corpuscles appeared to have been ingested recently and preserved their normal colour; others, from which the haemoglobin had disappeared, could scarcely be distinguished from very large vacuoles in the cytoplasm. The number of ingested blood corpuscles varied; as a rule, from one to sixteen, with an average of about ten; in one actively motile amoeba I estimated that there were at least thirty. On the other hand, a few full-grown entamoebae contained no red blood corpuscles or other food particles. No included bacteria were seen in any of the amoebae, either in fresh or stained preparations, and no free bacteria could be found in the urine. The surface of the amoebae seemed to be sticky, as foreign particles were often seen adherent to the posterior end of the cell, and these were dragged about by the parasites.

No distinction could be made in active amoebae between ectoplasm and endoplasm except in the pseudopodia. In the motile forms a broad process of hyaline ectoplasm was protruded suddenly, and might attain a depth of 4 to 5 μ , and persist for several seconds before the granular endoplasm flowed into it.

A few of the amoebae that were motionless and appeared to be dead were circular in shape with one large persistent hyaline pseudopodium projecting on one side. Owing to the great activity and persistence of motion in one direction displayed by most of the entamoebae, they generally assumed a narrow elongated form, attaining a length of 50 to 60 μ , with a breadth of 10 to 20 μ . On May 15th, when the patient had received 1½ grains of emetine, there were numerous very large and very active amoebae; some of these measured as much as 100 μ by 30 μ . In most of the living active amoebae no nucleus could be made out; in a few, however, a spherical nucleus, about 4 μ in diameter, could be seen. The nucleus usually showed a peripheral aggregation of granules. The difficulty of distinguishing the nucleus in living amoebae was enhanced by the numerous included red blood corpuscles and by the numerous vacuoles, which tended to conceal it. *Intra vitam* staining with dilute methylene-blue did not help much, as the nucleus stained very faintly or not at all; by the use of this method, however, two amoebae were seen which contained two nuclei each. None of the amoebae possessed contractile vacuoles, and no encysted forms were seen at any time.

In preparations of the amoebae, fixed in Schaudinn's solution and stained by Heidenhain's iron-alum haematoxylin process, the cytoplasm is very vacuolated. The nucleus shows no definite nuclear membrane; in some cases, there is much chromatin collected round the periphery of the nucleus and connected by strands with a central mass; in other amoebae the chromatin is distributed more evenly throughout the nucleus, and is not especially collected at the periphery. In fixed specimens the entamoebae vary in size from 18 to 35 μ .

Attempts were made to infect animals with the entamoebae from this case, in order that the specific characters and life-history of the parasite might be studied more thoroughly. On May 15th about four ounces of urine, containing numerous but rather sluggish amoebae, were injected per-anum as far up the colon as possible into a young kitten, and some of the urine was planted out on Musgrave and Clegg's medium. The kitten did not become infected, and no growth of amoebae occurred on the culture medium. On June 5th, when entamoebae were present in the stools, an emulsion was made and injected into a second kitten; this animal also did not become infected.

As already mentioned, encysted forms of the entamoebae were never found, either in the urine or in the stools.

It is therefore impossible to be quite sure of the species of *Entamoeba* concerned; but, considering the morphological characters noted, there seems to be no valid reason to doubt that it was other than the commonly occurring *Entamoeba tetragena*. Certainly the motility of the amoebae found in the urine was much greater than that of any *Entamoeba* that I have ever seen in the stools, but possibly the fluid nature of the medium may account for this.

To what extent the urinary tract was affected is also doubtful. In a case recorded by Posner,³ that author came to the conclusion that the *Entamoeba* spread from the bladder to the pelvis of the kidney.

The present case appears to be one of chronic tubal nephritis, and it seems to me to be more probable that the infection of the urinary tract with *Entamoeba* merely aggravated a pre-existing condition than that it was itself the actual cause of the disease. The disappearance of the *Entamoeba* from the urine, as the result of hypodermic injections of emetine, was immediately followed by the disappearance of blood from the urine, and a marked diminution (but not total disappearance) of anasarca, with, of course, a considerable diminution of the albumin in the urine. The tube-casts also diminished considerably in numbers. If the *Entamoeba* were confined to the bladder, it is difficult to understand the marked amelioration of the condition of the urine as regards tube-casts, and the diminution in severity of the general symptoms. Now, however, although more than a month has elapsed since any *Entamoeba* have been found, there is still some anasarca, and some albumin and a few tube-casts still persist in the urine. In Posner's case several relapses occurred in the course of more than a year; it will be interesting to note whether the present case also relapses.

The mode of access of the *Entamoeba* to the urinary tract appears to be fairly obvious in this case. Although the patient states that he has never suffered from dysentery, *Entamoeba* were found in his stools (otherwise normal) on two consecutive days, and their characters agreed with those of *Entamoeba tetragena*. It is the custom among Indians to wash the parts about the anus and perineum with water, after defaecation. It is easy to understand that *Entamoeba* could readily be transferred by the ablution water from the neighbourhood of the anus to the orifice of the urethra, whence they could make their way to the bladder and the rest of the urinary tract. Probably an abnormal condition of the urine is necessary for the parasites to establish themselves. Chronic nephritis is a common enough disease in India, and so also is intestinal amoebiasis; hence opportunities for the infection of the urinary tract must frequently be present, and the case recorded above suggests that possibly urinary amoebiasis is a commoner condition among Indians and other Asiatic races than is generally supposed.

The rapid disappearance of the *Entamoeba* from the urine of this case, as the result of hypodermic injections of emetine, is an interesting confirmation of the efficacy of this treatment in other forms of amoebiasis.

REFERENCES.

¹ Braun, *Animal Parasites of Man*, 1906, pp. 37-8. ² Doflein, *Lehrbuch der Protozoen-Kunde*, 1909, pp. 505-6. ³ Braun, loc. cit.

CHRONIC INTESTINAL STASIS ASSOCIATED WITH LANE'S ILEAL KINK AND HYPOTHYROIDISM.

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IN face of the continued expression¹ of conflicting opinions on the real importance of peritoneal bands, whatever their mode of origin, in the production of chronic intestinal stasis, it may be of sufficient interest to place on record an instance illustrating beyond doubt the leading part that may be played by Lane's ileal band in simulating chronic appendicitis and in the causation of obstruction by kinking.

Mrs. B., European, aged 23, multipara (2), was admitted into the Countess of Dufferin Hospital, Baroda, on December 6th, 1914, for chronic intestinal stasis.

She had always been subject to constipation; for the last three years it had been getting worse, her bowels

opening regularly only once every seven or eight days. She first had pain in the right iliac fossa about five and a half years ago, so much so that about three and a half years ago her appendix was removed in London by a well-known surgeon, but the attacks of pain did not disappear; if anything they had been getting worse, especially at the premenstrual time. Evidence of peristalsis in the right iliac fossa had been observed during an attack of pain by Major Mackechnie, I.M.S., under whose treatment she had been. He desired to operate on her, and for that purpose facilities were given him at the hospital.

Mrs. B. had pigmentation of the skin and presented many symptoms associated with chronic intestinal stasis, and, on careful scrutiny, also with hypothyroidism; in which order these two conditions should be correlated is a matter for speculation beyond the scope of this report.² It is to be noted that there was no relaxation of the abdominal walls or external evidence of enteroptosis.

I assisted Major Mackechnie at the operation, which was performed on December 7th, 1914. It had been proposed to perform an ileo-sigmoidostomy. The parts on opening the abdomen presented a disappointingly normal appearance. The caecum showed no trace of its removed appendix. There was no distension, no matting or any trace of old inflammation, no hypertrophy, no obvious sign of constriction or narrowing of lumen of any part of the gut. It was only on closer examination that Lane's ileal kink was identified. The peritoneal band was clamped, divided, and ligated, completely freeing the gut from its downward pull. The proposed ileo-sigmoidostomy was abandoned, and the rest of the operation consisted in "slinging" the retroverted uterus.

Major Mackechnie left for the front the day after the operation, and the case has remained under my observation. It is now more than three months since the operation, which yielded immediate striking results in the correction of the stasis. The latest report from the patient is that her bowels still continue to move daily, copiously, and without the help of any laxative.

It is regrettable that we had not the means of observing the behaviour of the gut under radiographic examination. I do not know, however, what more conclusive evidence than in this case can be adduced in favour of Lane's ileal kink having been the sole cause of the chronic obstruction. There was no disturbing factor otherwise to account for the stasis or to which the ultimate success of the operation might have been attributed. The fact that the appendix had been previously removed without relief does away with the suggestion of an inflamed appendix causing spasm of the ileo-caecal valve.

For those who admit only of the possibility of Lane's band playing a secondary part consequent on inflammatory thickening or contraction, or on "marked" visceral ptosis, or on defective tone of the intestinal wall, it may be said with absolute certainty that none of these conditions existed.

Rightly or wrongly, as time will show, none of the more ambitious operative measures had been undertaken such as ileo-sigmoidostomy, with or without colectomy, partial or complete, to which the success of the operation might have been attributed without in any way establishing a case for Lane's ileal kink.

Correction of the position of the uterus has no doubt helped in the disappearance of the premenstrual pelvic pain, but considering that the appendages were perfectly normal I do not know that it is possible to ascribe the pain in the right iliac fossa to a "reflex tonic spasm of the psoas muscle," though the attacks of pain were said to have been worse premenstrually. At any rate it would be too far-fetched to connect the dramatic relief of such pronounced stasis with the correction of the retroversion of an otherwise perfectly normal and movable uterus.

It may be further recorded that while the patient has been feeling ever so much better than she had ever felt before, and that her complexion soon became clear and pink, and all pelvic and right iliac pains have disappeared, yet the premenstrual headaches and neuralgias, though far less severe, still persisted, and there had been no appreciable diminution in the menstrual flow, which had always been far too abundant. The uterus is freely movable and in perfect position; the eyes, nose, and mouth, etc., have