THE PUERTO RICO JOURNAL OF PUBLIC HEALTH
AND TROPICAL MEDICINE

VOL. 12 MARCH, 1937 NO. 3

THE CONCOMITANCE OF ENDAMOEBA HISTOLYTICA AND HYMENOLEPIS NANA *

RAFAEL RODRÍGUEZ-MOLINA and WILLIAM A. HOFFMAN
From the Department of Medical Zoology of the School of Tropical Medicine, San Juan, P. R.

J. R. (U. H. 1250), a 22-year-old male mulatto, a barber, was admitted to the University Hospital, March 24, 1933. He complained of colicky pains in the umbilical and lumbar regions which were accompanied by diarrhea, tenesmus and bloody stools with mucus. This symptomatology appeared quite suddenly about nine months ago, but became more intense about two months before admittance. Diarrhea, pain accompanying defecation, tenesmus and straining at stool have lately been more marked and have taxed his vitality and energy. Fever and prostration have not been present. The patient claims he has lost twenty pounds during this present illness. Three months before, while attending the Out-patient Department, fecal examination disclosed the presence of *Hymenolepis nana, Necator americanus, Trichuris trichiura,* vegetative forms of an ameba tentatively identified as *Endamoeba histolytica,* and cysts of *Giardia lamblia.* The state of the amebae at the time did not permit a definite determination.

Male fern, combined with magnesium sulphate and acacia, as recommended by Gunn [1] for taenia infections, was administered by duodenal tube. After a dysenteric-free period of one month symptoms reappeared, and the patient was admitted to the hospital.

Physical examination revealed a well-nourished and developed individual not appearing ill. The liver was not enlarged or tender. No ulcerations of mucous membrane were evident on rectal examination. Mucous discharge obtained about ten cm. above the internal sphincter was not bloody, and contained no amebae. The blood count, urine, and Kahn tests were negative. A second fecal examination disclosed beyond all doubt the presence of numerous vegetative and precystic forms of *Endamoeba histolytica,* as well as the other parasites previously mentioned. A coprozoic organism closely resembling *Bodo caudatus* was also noted. It was decided to again administer the vermifuge, and observe its effect on the symptomatology before instituting anti-amebic therapy. The feces remained free of dwarf tapeworm ova eleven days. Before male fern administration, the daily number of stools fluctuated from three to ten; after, they seldom attained five in number. However, the gastro-intestinal symptomatology persisted. Two ten-day series of carbarsone *per os,* consisting of 0.5 gm. daily with an interim of one week, had but little effect. Emetine hydrochloride given intramuscularly in 0.60 gm. daily doses during two ten-day periods with a four-day interval afforded definite relief. However, diarrhea, though without blood and with vegetative amebae, persisted. A seven-day treatment with chiniofon (yatren) caused the disappearance of amebae, and practically all symptoms. The daily

* Received for publication January 16, 1937.

dose was increased from 0.75 gm. to 2.25 gms. Retention enemas (1–3 gms. chiniofon to 200–300 cc. water) were also employed. The patient was discharged June 23, 1933, three months after admission.

He was advised to partake of well-cooked foods, and to be careful to prevent contamination of food with rat feces. No other member of the patient's family harbored *E. histolytica* or *H. nana.* Within a short time he gained several pounds in weight. Owing to his cooperation it was possible to obtain for an extended period three fecal samples a week. On August 10, 1933, Hymenolepis eggs were again abundant. Previously, they had been present more or less sporadically.

Intermittent attacks of lower abdominal pain of three to five days' duration, accompanied by diarrhea without blood or mucus, usually followed by spontaneous relief, have occurred during the past three years. *E. histolytica* has never been demonstrated after successful chiniofon therapy. These periods of pain and diarrhea appear suddenly and are more frequent after some dietary indiscretion. The patient has observed that fatty foods and a high carbohydrate diet seem to intensify these attacks.

In an effort to eliminate tapeworms as a possible etiological factor connected with these disturbances, male fern has been employed on seven occasions with considerable relief which has lasted for several months after each treatment. The number of worms recovered varied from 1,574 to 13,000 per treatment for the first six, with a total of 22,493. A chain of segments without a scolex had to be matched with one, therefore quite obviously the counts were conservative. The number of tapeworms recovered after the seventh treatment was so great, that enumeration of individuals, a tremendously time-consuming procedure, had to be eliminated in favor of a method of estimation. This consisted of a determination of the volume occupied by the tapeworms and counting of samples of volume units. The total thus obtained, more than 44,000, a figure greater, apparently, than any recorded in the literature, represents what is considered a very conservative estimate. In view of the abundance of adult tapeworms present, their average size seemed near the minimum length of 15 mm.

On the occasion of the sixth treatment two doses of male fern, a week apart, were administered, the basis for this

rationale being that within this period all cestodes would have completed their development within the intestinal villi and would have passed into the lumen where they would be affected by the second dose of the anthelmintic. According to Hunninen [2], four to five days are required for the completion of this phase of the life cycle of the identical or closely related form, *Hymenolepis fraterna,* in the rat. Nevertheless, this means of attack failed, for ova were found in the excreta within a relatively short time.

Since Faust [3] found that gentian violet, a highly efficaceous drug in Strongyloides infections, deeply stained the intestinal epithelium, and therefore might affect the cysticercoids, a course consisting of 0.2 gm. daily for ten days, and repeated after an interval of one week, was instituted three days after the seventh treatment with male fern (April 16, 1936). This likewise proved fruitless, for eggs were present in the stool May 10, 1936.

The patient was last seen December 21, 1936. The frequency and intensity of the symptomatology have diminished. Though these attacks of diarrhea which appear when ova of *H. nana* become abundant are annoying, they do not interfere with his work. A high protein, low fat and carbohydrate dietary regime seems to aid in providing relief. Possibly, an acquired resistance built up in part through a more suitable diet may be a factor in the clinical improvement observed, in spite of the failure of drug therapy to eliminate the parasites.

DISCUSSION

The case presents several interesting features. It is difficult to decide whether the symptomatology occurring before hospitalization was entirely due to *E. histolytica* or to the combined action of this species and *H. nana.* It is clear that though the bloody diarrhea disappeared with the amebae, some gastro-intestinal disturbances, though less pronounced than formerly, have persisted.

The relative mildness and course of the illness during hospitalization, presumably due in great part to amebic infection, is also of interest. There was no fever, leucocytosis, anemia or anorexia, and the patient was at no time confined to his bed. This mildness might be considered to represent the course of amebiasis in Puerto Rico, when

symptoms are discernible. During the past nine years, 214 (2.35 per cent) of the 9,095 fecal samples examined in the parasitological laboratory of the School harbored cysts of *E. histolytica.* Only in 23 (0.25 per cent) were trophic forms demonstrated and only in this latter group was clinical amebiasis noted. Costa Mandry and Marín [4] attributed the low incidence of clinical amebiasis to the avirulence of the strain prevalent in Puerto Rico.

Repeated studies of peripheral blood morphology have shown no other abnormality than a moderate eosinophilia which never exceeded 13 per cent, though both tapeworms and hookworms were present.

The persistence of *H. nana* (first recorded from Puerto Rico by Hill and Sánchez [5] in 1924) despite the elimination of large numbers of the tapeworms after repeated anthelmintic treatment is noteworthy. While the possibility exists that the development of immature forms in the intestinal villi may extend over a period greater than one week, and therefore some were unaffected by male fern, we consider the existence of internal autoinfection a more plausible explanation. The possibility that external autoinfection may have occurred seems slight, because the patient possesses habits of cleanliness above the average, and for a time served as a hospital orderly. On several occasions examination of material beneath his finger nails were negative for ova of the dwarf tapeworm. The continued increase of tapeworms leads us to believe that in the presence of a concomitant amebic infection his resistance to Hymenolepis was lowered to such a degree that internal autoinfection occurred and that adults were present below that part of the small intestine to which they are usually restricted. Hunninen [6] records a similar occurrence among rats presumably suffering from mouse typhoid. He has also informed one of us about an individual in whose stools ova of *Hymenolepis nana* persisted in spite of repeated treatments.

Various writers consider oil of chenopodium more effective than male fern for the elimination of *H. nana.* It is our belief that the amebiasis constituted a contra-indication to the use of the former drug. One known fatality resulting from the use of chenopodium on the Island, though under somewhat different conditions, largely influenced our action.

From the data presented, it would seem that the intermittent, though low grade, gastro-intestinal disturbances present after the eradication of the amebic infection can be explained in terms of increasing numbers of adult cestodes in the intestine of the host.

The authors desire to express their appreciation to José L. Janer and José Oliver González for technical aid during the course of the investigation.

BIBLIOGRAPHY

1. GUNN, H.: The treatment of tapeworm through duodenal tube. Am. Jour. Trop. Med. 11: 273–277. 1931.
2. HUNNINEN, A. V.: Studies on the life history and host-parasite relations of *Hymenolepis fraterna* in white mice. Amer. Jour. Hyg. 22:414–443. 1935.
3. FAUST, E. C.: The symptomatology, diagnosis and treatment of Strongyloides infection. Jour. Am. Med. Assoc. 98: 2276–2277. 1932.
4. COSTA-MANDRY, O. and MARÍN, R. A.: Algunas consideraciones sobre la amibiasis en Puerto Rico. Bol. Asoc. Méd. P. R. Número 166: 5–9. 1928.
5. HILL, R. B. and SÁNCHEZ, A.: The presence of *Hymenolepis nana* in Porto Rico. Jour. Am. Med. Assoc. 83: 766. 1924.
6. HUNNINEN, A. V.: An experimental study of internal autoinfection with *Hymenolepis fraterna* in white mice. Jour. Parasit. 22: 84–87. 1936.