

CLINICAL STUDIES IN NON-DYSENTERIC INTESTINAL AMEBIASIS

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Diverse opinions are held regarding the pathogenic rôle of *Endamoeba histolytica* in cases of intestinal amebiasis which present neither a present nor past history of dysentery. Certain clinicians tend to attach clinical significance only to the dysenteric manifestations of the organism; others attribute to *E. histolytica* a wide range of protean symptomatology. Although the viewpoints of the majority are at neither of these two extremes, there is a considerable lack of agreement as regards both the nature and the frequency of symptoms in amebic infections and their clinical importance when dysentery is absent.

Dobell (1) in his monograph states that probably less than 10 per cent of persons who become infected with *E. histolytica* ever suffer to any appreciable extent from their parasitism. Faust (2) believes that 90 to 95 per cent of persons harboring the organism are apparently symptomless carriers. More recently, Wenrich, Stabler, and Arneth (3) noted little evidence of pathogenicity in carriers found in an examination of college students, and observed that a control group seemed to have as many or more signs of ill health than those in their series who were carriers of *E. histolytica*.

Findings contrary to these have been reported by other workers. Craig (4), who has had wide experience in clinical amebiasis, states that in his experience about 65 per cent of carriers have had symptoms referable to their infection, and that these symptoms disappeared after the eradication of the parasite.

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Philipstchenko (5) reports that one-half of 400 apparently healthy carriers found in a survey of Leningrad food handlers had various intestinal disorders. Johnstone and his co-workers (6) found that 52 out of 92 infections among a prison group were associated with notable gastro-intestinal upsets.

In addition to the discrepancies in the frequency with which symptomatology is associated with *E. histolytica* infections, it is to be noted that agreement is also lacking regarding the nature of the symptoms. Certain observers have incriminated the organism as the causative agent of symptoms far remote from the gastro-intestinal tract. Boyers (7), in an analysis of 1961 complaints presented by persons found to be infected, believes his results show symptomatology referable to many other systems of the body. Craig (4), although mainly emphasizing the gastro-intestinal manifestations, notes that frequently nervous and circulatory disorders are attributed to *E. histolytica*. Arthritis, iritis, Hodgkin's disease and other conditions have been suspected of being caused by the organism, but no convincing etiological relationship has been demonstrated in such cases and those claims have not at present gained any acceptance.

Many features lend particular importance to the problem of non-dysenteric amebic infections. Primarily to be considered is the concept that *E. histolytica* is an obligate tissue parasite and that in every individual harboring the organism there is a process of invasion and repair accompanied by more or less injury, the amount of disease, in all probability, being dependent on host resistance. As reliable estimates place the incidence of the organism to be about 10 per cent in the United States, it becomes important to reach some agreement on what proportion of the cases of amebiasis show evidence of injury.

METHODS

It is obvious that no single set of observations can clear up the many difficult aspects of the so-called carrier state in amebiasis. In the present investigation it was planned to handle a small number of cases of amebic infection with some thoroughness. Only cases which presented neither a past nor a present history

of dysentery were included as studies embracing both the dysenteric and the non-dysenteric phases do not clearly picture the more latent phases of amebiasis. Whenever possible, parallel control studies have been included in the investigation. Efforts were made to ascribe signs and symptoms to the organism only after a clinical study had ruled out other etiological factors.

In all, 216 cases of amebiasis came under observation. One group of 106 individuals harboring *E. histolytica* was composed of apparently healthy Navy men carrying on their regular activities; the other included 110 infections found in patients admitted on the Army wards of the Gorgas Hospital in the Canal Zone. The former group was examined to ascertain the frequency and severity of any symptomatology that might be referable to their parasitic infections. In the hospital group it was possible to make a thorough clinical study of all cases thereby ruling out symptoms of other etiology which might be present and otherwise be ascribed erroneously to the parasite. It is to be noted that the ambulatory Navy group was a particularly valuable group to study as there was little likelihood of other disabilities complicating the picture.

The routine of stool examinations was similar in both groups. Almost without exception three examinations were made on each individual. A mild cathartic of cascara sagrada was employed, a procedure which appeared especially efficacious in detecting protozoal infections and, with the multiple examinations, probably revealed a large majority of the infections. Normal saline preparations were examined first and subsequently all diagnoses were confirmed by smears fixed in Schaudinn's solution and stained with iron-hematoxylin.

Controlled study of the frequency of symptoms encountered in apparently healthy carriers of Entamoeba histolytica

To determine the frequency of symptoms in *E. histolytica*-positive cases, stool examinations were done on a group of 450 Navy men. Following the fecal examinations, a clinical history was taken and a physical examination done on each individual. This work was carried on by a single observer without knowledge

at the time of what parasites were harbored by any given person. In the history taking, stress was placed not only on gastro-intestinal symptoms but also on those referable to other systems. The complaints presented were usually those which had occurred a year or two prior to examination as symptoms at more remote times were apt not to be reliable.

The results are shown in table 1. 106 of the cases harbored *E. histolytica* and of this number 46 presented complaints, a percentage incidence of 43.4. Two other groups were selected, one of 108 men in which the fecal examinations had not revealed protozoa, and another of 236 men harboring protozoal species other than *E. histolytica*. These two latter groups were used as controls and showed 7.4 and 16.1 per cent, respectively, to have

TABLE 1

Controlled study of the occurrence of symptoms in apparently healthy carriers of Entamoeba histolytica and in individuals harboring other species of intestinal protozoa

	NUMBER	SYMPTOMATIC	PERCENTAGE WITH SYMPTOMS
Cases positive for <i>E. histolytica</i>	106	46	43.4
Control: Cases showing no intestinal protozoa....	108	8	7.4
Cases with one or more protozoal species but not <i>E. histolytica</i>	236	38	16.1

complaints similar to the *E. histolytica* group. Thus, allowing for the symptomatology encountered in the protozoal-negative group, approximately one-third of the amebiasis cases in a particularly healthy and physically-fit group presented complaints referable to their infections.

Occurrence of symptoms in persons harboring non-pathogenic species

It was noted that a rather high percentage of hosts of presumably non-pathogenic species had symptoms. A further classification was made to determine the occurrence of these symptoms with various species of amebae and flagellates. The numbers in each group were somewhat small for accurate comparison but *E. coli*, *E. nana*, and *I. bütschlii* showed no higher percentage of

symptoms than those not harboring protozoa. Of 44 cases of *Dientamoeba fragilis*, 27.3 per cent presented complaints, a finding which again suggests a pathogenic rôle for this organism as has been suggested by Hakansson (8) and Wenrich *et al* (3). Similarly, all the flagellates seemed capable of producing symptoms, the percentage for each being higher than the expected figure obtained from the negative control.

The occurrence of a greater number of symptoms in these latter cases cannot be interpreted, however, as evidence that these organisms are pathogenic. No convincing anatomical study has shown any of these species to invade tissue, whereas the invasive character of *E. histolytica* has been well established.

TABLE 2

Severity of symptoms presented by apparently healthy carriers of Entamoeba histolytica

	NUMBER OF CASES	PERCENTAGE OF SYMPTOMATIC CASES (46)	PERCENTAGE OF ALL CASES (106)
Moderately severe.....	14	30.4	13.2
Mild.....	13	28.3	12.3
Very mild.....	19	41.3	17.9
No symptoms.....	60		56.6
Total.....	106	100	100

A reasonable hypothesis seems to be that in certain gastro-intestinal disorders conditions become favorable for increased activity on the part of ordinarily harmless species, in which cases such activity may quite possibly materially aggravate a disease process primarily of other origin.

Severity of symptoms

A classification of the severity of the symptoms (table 2) sheds important light on one of the main controversies which is that concerning the frequency with which symptoms occur in amebic infections. Of the total number of cases harboring *E. histolytica* only 14, or 13.2 per cent of the 106, presented com-

plaints of any severity. Much of the symptomatology presented by the other cases appeared trivial, being of such a mild nature as to have caused little concern to the parasitized individual. Although medical advice was easily accessible to these Navy men, but few of those with complaints had sought advice or relief. Actually, therefore, it appears that but few individuals "suffer appreciably" from the presence of the parasite, yet including mild symptomatology, a large proportion have symptoms referable to their infections. It is apparent that the lack of agreement in the percentages of carriers which have complaints is a matter of the significance with which the individual observers have regarded the milder symptoms. Despite their trivial nature in some cases, it is nevertheless remarkable that in the Navy group, where resistance is probably of a high order, definite clinical manifestations were presented by so many of the cases.

Nature of symptoms and signs

As shown in table 3, none of the cases, although carefully questioned, gave a history of dysentery. It is of interest that 5 had recently been operated upon for appendicitis, a finding which appeared of increasing significance as other facts were obtained. Subjective complaints primarily referable to the upper gastrointestinal tract occurred with rather surprising frequency. Abdominal pain was by far the most common complaint, 39 out of the 46 presenting this symptom. In many cases it was cramp-like and poorly localized; in others it was dull and aching in nature and maximal in the lower quadrants. Only rarely was the pain severe. In many of the cases the pain simulated the early picture of appendicitis and a considerable number of cases had been placed under observation for this disease.

One-third of those questioned had bowel habits normal in every respect. Constipation as the sole complaint was about as frequent as diarrhea. In regard to this latter symptom most of the men complained of periods where the number of stools was only slightly increased, the stool, however, being of an unusually mushy or watery consistency. The frequently mentioned symp-

tom of alternating diarrhea and constipation occurred in only 8 cases. None of the cases had noted blood and mucus in their stools.

TABLE 3

Subjective complaints and objective signs in 48 apparently healthy carriers of Entamoeba histolytica

Past history:	
Dysentery.....	0
Appendicitis.....	5
Subjective complaints:	
Nausea.....	10
Vomiting.....	4
Distention and flatulence.....	14
Heartburn.....	11
Abdominal pain.....	39
Epigastric.....	5
Umbilical.....	5
Lower quadrants.....	15
Generalized.....	14
Bowel movements normal.....	15
Bowel movements abnormal.....	31
Diarrhea.....	13
Constipation.....	10
Diarrhea and constipation.....	8
Bloody diarrhea.....	0
Headaches.....	8
Nervousness.....	8
Fatigability.....	7
Loss of weight.....	5
Physical signs:	
Tenderness, abdominal.....	29
Epigastric.....	5
Cecum.....	12
Ascending colon.....	6
Transverse.....	8
Descending and sigmoid.....	7
Generalized, colonic.....	6

There seemed to be no unusual predominance of such complaints as fatigability, nervousness or loss of weight in this series.

Physical signs

One of the most striking findings was the presence of abdominal tenderness. No less than 29 gave this sign. The most prominent localization was at McBurney's point. In several instances this sign was so marked that had the individual complained concurrently of the symptoms encountered in appendicitis, operation would have appeared advisable. Circulatory abnormalities were not observed.

Blood examinations

In table 4 are summarized the results of blood examinations in 61 cases harboring *E. histolytica*, comparisons being made with a control group not parasitized with the organism.

The red cell counts showed little variation in the two groups, there being a slight tendency to lower counts in the control group. Hemoglobin estimations, done by the Dare method, showed somewhat lower readings for the parasitized individuals as noted both in the dispersion and averages of the cases. An examination of the data for cases presenting symptoms referable to their amebiasis did not reveal lower red counts or hemoglobin values than those obtained in the cases of symptomless carriers. Total white counts were not done but the differential counts in the amebiasis and control groups were similar. There was neither eosinophilia or preponderance of mononuclear leucocytes as has been reported by others.

Clinical significance of the findings of E. histolytica as noted in various hospitalized groups

Clinical studies were continued on hospitalized patients. In these cases the object was to ascertain the nature of the more severe symptom complexes of non-dysenteric amebiasis. Of importance was the fact that the mild symptomatology encountered in the Navy group suggested the possibility that there would be but few cases severe enough to require hospitalization for complaints due to *E. histolytica* infections. In this regard it was of interest to ascertain the incidence of *E. histolytica* infections in patients admitted to the hospital primarily for gastro-

intestinal disorders, and to compare this incidence with that of cases admitted for all other conditions, this latter group serving as a control.

In a group of 361 cases comprising medical and surgical cases under treatment for such conditions as fracture, hernia, heart

TABLE 4

Blood findings in 61 apparently healthy carriers of Entamoeba histolytica

ERYTHROCYTE COUNT	POSITIVE FOR <i>E. HISTOLYTICA</i>	NEGATIVE FOR <i>E. HISTOLYTICA</i>
<i>million</i>		
Over 5.0	11	10
4.5-5.0	32	26
4.0-4.4	16	18
3.5-3.9	2	7
Total number of cases.....	61	61
HEMOGLOBIN		
<i>per cent</i>		
Over 90	27	37
80-89	28	24
70-79	5	0
60-69	1	0
Total number of cases.....	61	61

Means obtained in red and differential white cell counts (61 cases in each group)

	POSITIVE FOR <i>E. HISTOLYTICA</i>	NEGATIVE FOR <i>E. HISTOLYTICA</i>
Erythrocytes.....	4,640,000	4,606,700
Hemoglobin.....	86.9%	92.7%
Polymorphonuclears.....	53.0	54.4
Lymphocytes.....	38.8	39.0
Eosinophiles.....	3.5	3.5
Monocytes.....	3.5	3.1

disease or other disorders bearing no relation to amebic infection, 54, or 14.9 per cent harbored *E. histolytica*. In contrast, a group of 244 patients admitted for gastro-intestinal disease revealed 56, or 23.0 per cent harboring the organism, a significantly higher infection index than that shown by the control group. The data in this series therefore indicates that cases of non-dysenteric

amebiasis made up an important proportion of the total number of cases admitted to the hospital for treatment.

By segregating the 244 gastro-intestinal admissions into those with complaints primarily referable to the lower gastro-intestinal tract and into those mainly referable to the upper gastro-intestinal tract, *E. histolytica* indices of 29.7 and 12.5 per cent, respectively, were obtained, this suggesting that the organism tends to produce symptoms only referable to the lower tract. However, further analysis of the 244 cases showed that this was not true for after clinical study, cases were excluded which were found to be suffering from definite entities which could not have been caused by *E. histolytica* and, by including only those in which no other etiological factor than *E. histolytica* was present to explain the syndrome, the incidence of upper and lower gastro-intestinal complaints proved to be 28.6 and 34.5 per cent, respectively. Thus, in cases which even after careful clinical study remained of an indeterminate nature, the evidence suggests that many were of amebic etiology, and further, that upper and lower gastro-intestinal tract symptomatology occurs in amebic infections with about equal frequency.

An interesting finding was that 9 *E. histolytica* infections were found in 102 cases of the gastro-intestinal group despite the fact that the syndromes in these cases proved not to be amebic. Carcinoma, duodenal ulcer and like conditions accounted for the symptoms in these cases, a finding which shows the care necessary before ascribing any symptom-complex to the organism without ruling out all other possible diseases. Similarly, it is to be remembered that the control group showed a 14.9 per cent *E. histolytica* incidence and in these cases there was no causal relationship of the parasitic infection to the cause of admission. It is the obscure gastro-intestinal cases which are often left with such unsatisfactory diagnoses as gastritis or enteritis, cause undetermined, which form the important group in which the finding of the parasite becomes of etiological significance.

Nature of symptoms

An analysis was made of 47 cases in which there was no etiological factor other than the parasitic infection which would

adequately explain the syndrome. To these were added 7 cases in the control group who, although admitted for treatment for some unrelated condition, were found to be suffering concurrently with symptoms referable to their *E. histolytica* infections.

TABLE 5

Subjective complaints and objective signs in 54 hospital cases harboring E. histolytica in which no other etiological factor would adequately explain the syndrome

Past history:	
Dysentery.....	0
Appendicitis.....	24
Present history:	
Nausea.....	20
Vomiting.....	6
Distention or flatulence.....	18
Heartburn.....	12
Abdominal pain.....	50
Epigastric.....	13
Umbilical.....	9
Right lower quadrant.....	14
Left lower quadrant.....	5
Generalized.....	9
Bowel movements normal.....	28
Bowel movements abnormal.....	26
Diarrhea.....	9
Constipation.....	12
Diarrhea and constipation.....	5
Headaches.....	16
Fatigability.....	14
Nervousness.....	10
Loss of weight.....	7
Physical signs:	
Tenderness, abdominal.....	37
Epigastric.....	7
Cecum.....	18
Ascending colon.....	7
Transverse colon.....	8
Descending colon or sigmoid.....	10

As noted in table 5, similar symptoms and signs to those found in the Naval group were presented, although in these cases the complaints were more varied and of a more severe nature. Al-

most one-half had at some recent time come under observation for appendicitis. Occasionally, upper gastro-intestinal complaints occurred to the exclusion of all other complaints. Pain was the most frequent symptom. The bowel movements were normal in over one-half of the cases. Constipation was a more frequent complaint than diarrhea, this latter symptom occurring in but a small proportion of the cases. Nervous and circulatory disorders occurred but almost always in association with and subordinate to the gastro-intestinal complaints. Tenderness in various regions of the colon was elicited in 37 of the 54 cases and again the sign was commonly localized over the cecum.

TABLE 6

Tentative admission diagnoses on 47 cases in which later clinical study revealed no adequate cause to explain the syndrome other than the presence of Entamoeba histolytica

	NUMBER OF CASES
Appendicitis, subacute or chronic.....	18
Peptic ulcer or chronic gastritis.....	10
Enteritis, chronic.....	7
Gall bladder disease.....	4
Gastro-enteritis, acute.....	3
Appendicitis, acute.....	3
Renal colic.....	2
Total.....	47

The tentative admission diagnoses made in 47 cases are listed in table 6. They demonstrate the wide variation of conditions simulated by amebic infections. The large number of cases thought to be appendicitis is consistent with other observations recorded in this series. Of those cases which came to operation, only those were included in which the pathological report of the appendix revealed no evidence of disease. It is to be noted that the larger number of cases were considered subacute or chronic manifestations of appendicitis, most of which were discharged without operation.

In table 7 the chief complaints are summarized. The most frequent was pain, being presented by 34 out of the 47 cases. In

3 of the cases the complaint was mainly of weakness and in 1 the chief symptom noted by the patient was headache.

Duration of symptoms

In Table 8 the duration of symptoms according to the patient's statement, as presented by both the ambulatory and the hos-

TABLE 7

Chief complaint in 47 cases harboring Entamoeba histolytica in which there was no adequate cause to explain the syndrome other than the presence of the organism

Pain.....	34
Epigastric.....	11
Umbilical.....	5
Right lower quadrant.....	8
Generalized.....	8
Lumbar.....	2
Nausea.....	1
Constipation.....	4
Diarrhea.....	3
Alternating constipation and diarrhea.....	1
Headache.....	1
Weakness.....	3

TABLE 8

Duration of symptoms in 100 cases with complaints referable to Entamoeba histolytica infections

	AMBULATORY GROUP	HOSPITAL GROUP	TOTALS
Less than 1 week.....		7	7
1 week to 1 month.....	3	6	9
1 to 6 months.....	11	14	25
6 to 12 months.....	7	5	12
1 to 2 years.....	10	6	16
2 to 3 years.....	5	6	11
3 to 5 years.....	6	6	12
Over 5 years.....	4	4	8
Totals.....	46	54	100

pitalized groups, is recorded. The marked chronicity of the majority of the infections is indicated by the fact that the symptoms in almost half had persisted for over a year. Recurrence was a characteristic presented by almost all of the cases.

Results of treatment

Table 9 combines the results of treated and untreated cases in both groups and comprises only those cases which prior to treatment had symptoms referable to their infections. Carbarsonone in 0.25 gram capsules administered twice daily for a period of 10 days was given as a routine. The follow-up examinations were made between six and twelve months after treatment. Approximately three-fourths obtained relief following carbarsonone

TABLE 9

Results of treatment of Entamoeba histolytica cases presenting complaints referable to the infection

	AMBULA- TORY	HOSPITAL- IZED	TOTAL	PERCENT- AGE
Number of cases given specific therapy..	17	27	44	
Complete relief.....	9	14	23	52.3
Partial relief.....	4	5	9	20.4
Improved.....	13	19	32	72.7
No change in condition.....	4	7	11	25.0
Condition worse.....		1	1	2.3
Unimproved.....	4	8	12	27.3
Number of cases not given specific ther- apy (control).....			14	
Improved.....			3	21.4
Condition unchanged.....			8	57.2
Condition worse.....			3	21.4

administration. Although but few cases are included in which no treatment was given, it is of interest that the results were exactly opposite, the majority stating either that their symptoms had persisted or had become aggravated.

COMMENT

Judging from the rarity with which diagnoses of non-dysenteric phases of amebiasis are made in medical practice, and considering the prevalence of *E. histolytica*, one would come to the conclusion

that clinical manifestations of the organism without dysentery are rarely of such severity as to require medical assistance. In the present investigation, however, quite the contrary proved to be so. Even in what may be presumed to be a highly resistant group, some of the infected individuals presented complaints which could not be regarded as unimportant. In the hospital study an impressive number of cases proved to be of amebic origin and had not the presence of the parasite been demonstrated, the final diagnoses in these cases would have fallen in that large and unsatisfactory group in which neither the true cause nor the nature of the disorder is known.

The most striking feature of the cases studied in the investigation was the dissimilarity of their clinical manifestations as compared to the symptomatology encountered in amebic dysentery. Whereas the presence of dysentery, or blood and mucus in the stools, immediately brings to mind the possibility of an amebic process, the same organism is capable of producing disorders which give but scant clues to the nature of the disease. This observation becomes of greater importance in view of the fact that the largest proportion of amebic infections are of this latter type. This was demonstrated in a recent Naval survey (9) in which only 4.6 cases of dysentery were found for each 1000 individuals harboring *E. histolytica*. Thus despite the less serious nature of the non-dysenteric cases of intestinal amebiasis as compared with those presenting dysentery, the difficulties in their diagnosis and their prevalence constitute a problem of some importance in clinical medicine.

It appears that a large number of apparently obscure gastrointestinal cases which seek relief in hospitals and clinics are actually cases of amebiasis and that frequently these cases are not being diagnosed. The lack of recognition of the non-dysenteric syndromes is due to the fact that a positive diagnosis is dependent on the demonstration of the organism in the stool examination. It is known that rarely should the organism be reported in any less than 5 per cent of routine stool examinations, yet too often hospital laboratory reports fail to reveal any such incidence of infection. Where this is so, the infections cannot be

diagnosed and this situation has led to a false impression regarding the clinical importance of non-dysenteric manifestations of *E. histolytica*.

Certain clinical aspects of these cases are characteristic enough to bring to mind the possibility of an amebic infection and lead to an intensive search for the parasite by stool examination. From the clinician's standpoint, a clear understanding that blood and mucus need not be associated with amebic infections is of fundamental importance. Usually the non-dysenteric case is first suspected of being some well-defined and common gastrointestinal entity, but a study shows so much to be atypical that the anticipated diagnosis cannot be reached. It is this very atypicalness which should suggest amebiasis, and with abdominal pain as a prominent complaint, and when the symptoms are characterized by chronicity and recurrency, these features all become especially suggestive of amebiasis.

Of special interest in the present investigation was the common occurrence of a syndrome simulating subacute or chronic appendicitis. Appendicitis was particularly apt to come under consideration in the disorders encountered in these groups, but the frequency with which the various attending physicians were led to consider the possibility of disease of the appendix was a striking feature of the investigation and one which indicated the organism to have an important rôle in such syndromes. The possibility of a large proportion of the non-dysenteric cases suffering from an amoebic typhlitis suggests itself. Many of the cases harboring the organism were subjected to operation. In none of the infections were ill effects noted as a result of operation, and in a few, serious results undoubtedly would have followed had operation been withheld. The significant fact was that in many cases the signs were too mild to indicate surgery, while in others there was a return of like symptoms after operation, these facts suggesting the advisability of anti-amebic therapy in connection with other indicated treatment in these cases.

SUMMARY

In the present clinical investigation only cases of intestinal amebiasis in which there was neither a present nor a past history

of dysentery were studied. The cases comprised both symptomless carriers of *E. histolytica* and infected individuals with complaints of varying severity. Control observations were made whenever feasible. Only those symptoms and signs were ascribed to *E. histolytica* after other possible causes had been ruled out. In all, 216 cases of non-dysenteric amebiasis were studied, of which 100 were found to have symptoms.

1. A study of the occurrence of symptomatology in a selected group of 106 apparently healthy men harboring *E. histolytica* showed 46 or 43.4 per cent to have symptoms. A control group of 108 cases negative for intestinal protozoa revealed but 8 or 7.4 per cent to have complaints. Of the 106 cases of amebiasis only 13.2 per cent of the complaints were of any appreciable severity.

2. Of 236 individuals harboring various intestinal protozoal species, but not *E. histolytica*, the percentage with symptoms was similar to that found in the non-parasitized group, with the exception of *Dientamoeba fragilis* in which 27.3 per cent of 44 cases presented symptoms. Similarly, some of the flagellates presented higher percentages than the control. An explanation of this apparent pathogenicity was offered.

3. A study of the blood findings in 61 cases of apparently healthy carriers of *E. histolytica* showed no significant differences from the results obtained in a control group of an equal number of individuals not harboring the parasite.

4. Despite the apparent trivial nature of the complaints presented by most of the cases in an ambulatory group, it was found by a study of various hospitalized groups that a considerable number of non-dysenteric amebic infections are severe enough to require hospitalization. In 47 such cases the disease picture was so obscure that only the finding of the parasite in the stool led to the proper diagnosis, and in these, specific anti-amebic treatment gave good results where other methods had failed.

5. A study of the nature of complaints revealed these to be primarily referable to the gastro-intestinal tract, yet without blood and mucus in the stools and usually without bowel abnormalities which might suggest an amebic process. Complaints referable to both upper and lower gastro-intestinal tracts ap-

peared with equal frequency. Complaints referable to other systems were seldom encountered. Chronicity, recurrency and mildness of the symptoms were characteristic features.

6. A symptom-complex simulating subacute or chronic appendicitis was the most commonly observed syndrome in this series of non-dysenteric cases of amebiasis.

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