THE INCIDENCE AND SIGNIFICANCE OF INFESTATION WITH ENDAMOEBA HISTOLYTICA IN NEW ORLEANS AND THE AMERICAN TROPICS[1]

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Fifteen years after Loesch (1875) first identified the ameba parasitic in the tissues of the large bowel as the etiologic agent of one of the two commonest types of dysentery Osler (1890) apparently diagnosed the first case of amebic dysentery in the Western World, although the record of Toribio González (1883) in Caracas possibly needs priority consideration. Immediately afterwards there followed the clinical observations of Stengel (1890) and Musser (1892), while the classical study of Councilman and Lafleur (1891–1892) on the pathology of the dysentery ameba will always serve as a landmark in clinical protozoology. The earliest clinical records from the South are those of Parker (1884–1885) in Virginia, Patterson in South Carolina (1895), and Ashton (1895) in Texas. The earliest contribution from New Orleans on this subject was Simon's masterful study of fifty cases (1909). Six years later DeBuys (1914) emphasized the fact that amebic dysentery was relatively rare in children, although it followed the same course as it did in adults.

The earliest histories from Panama, Colombia and other Central and South American countries indicate the prevalence of amebic dysentery in those localities. The Indians knew the virtues of the root of ipecachuana and passed on their knowledge to the Spanish settlers. Even today in villages in Panama far removed from modern medical procedure the native prizes the crude drug for this purpose. One of the inheritances of the Health Department of the Panama Canal, when the project was taken over by the United States in 1903, was amebic dysentery. We have to thank Deeks, James and Clark for a series of contribu-

[1] Contribution from the Gorgas Memorial Laboratory and from the Parasitology Laboratory, Department of Tropical Medicine, Tulane University.

tions to this subject which was the most complete up to recent years.

The development within the past decade of more refined methods for differentiating the pathogenic ameba (*Endamoeba histolytica*) from the non-pathogenic forms (*Endamoeba coli*, *Endolimax nana*, *Iodamoeba buetschlii* and *Dientamoeba fragilis*) and for recognizing the encysted stages of these organisms, has resulted in the discovery in all parts of the world of the greater prevalence of all of these protozoan inhabitants of the large bowel than had been surmised. With all this came the knowledge that in only a relatively small percentage of cases at any one time is amebic colitis an acute condition, while a much higher percentage consists in chronic cases or those with obscure intestinal symptoms which are relieved by amebicidal drugs. Furthermore, an even larger series consists of individuals without demonstrable clinical symptoms but in whose stools cysts of the dysentery ameba can be more or less consistently found. This last group has been considered to be one in which minute lesions in the large bowel are being produced by the amebae with tissue-repair taking place equally rapidly,—in other words, where a state of equilibrium exists between parasite and host.

Recently published survey data from Virginia (Faust, 1930) and from Tennessee (Meleney, 1930), indicate the relatively high incidence of the pathogenic ameba in those commonwealths. Comparable data from New Orleans and from Panama, made within the past two years by myself, are sufficiently comprehensive to warrant analysis.

The New Orleans series of approximately one thousand white persons consist of the following types of cases which I have studied: children under twelve years of age from the Welfare Clinics and from the wards of Charity Hospital; boys between twelve and twenty years from a well kept "home"; men and women from medical wards in Charity Hospital, and an extensive series from the obstetric service of Charity Hospital. These groups are representative of the well and sick of the economically lower two-thirds of the population of New Orleans and environs. To this number I am privileged to add certain unpublished data

of Dr. Foster M. Johns, consisting of medical students (181), ambulatory clinic patients (234) and private pay patients (199). This latter group is more typical of the economically upper two-thirds of our population.

The data can best be presented in tabular form (table 1). It is evident that economic circumstances and age are the primary factors governing the incidence within the New Orleans area. Such a conclusion is more readily arrived at when the information

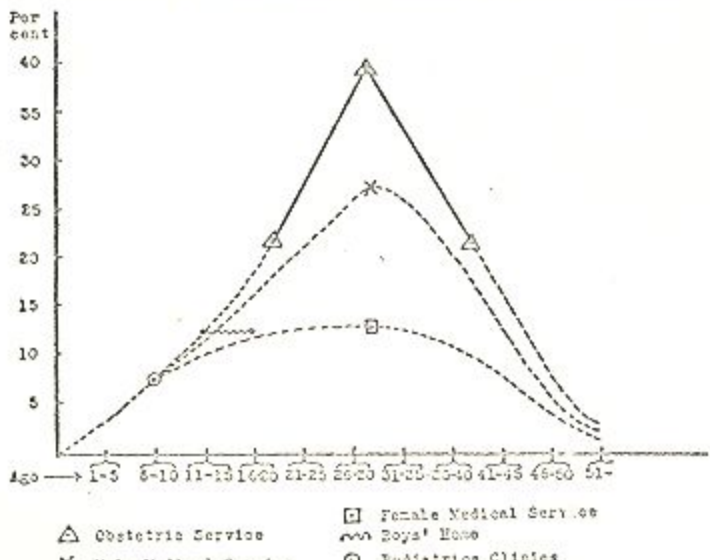

FIG. 1. THE AGE INCIDENCE OF ENDAMOEBA HISTOLYTICA IN NEW ORLEANS POPULATION GROUPS

is put in graphic form (fig. 1). Under six years of age amebic infection is light. It increases with age (e.g., exposure to infection) up to about thirty years, and then decreases in about the same percentage as it has risen. It is more common in Charity Hospital adult patients than in private patients or medical students. It is more common in men than in women on the medical services of Charity Hospital, but is highest in the obstetric cases.

While these records indicate a higher incidence of the organism in the New Orleans population than in that of Minnesota, New

TABLE 1

The incidence of Endamoeba histolytica in representative groups of the New Orleans population

GROUP	AGES						AVERAGE
	Unknown	1-5	6-15	16-25	26-35	36-45	
	per cent	per cent	per cent	per cent	per cent	per cent	per cent
Welfare Clinics and Pediatric Service..			7.7				7.7
Boy's Home			12.5	12.5			12.5
Male Medical Wards	27.2						27.2
Female Medical Wards	13.1						13.1
Obstetric Service				22.7	40.0	21.4	25.2
Medical Students (F. M. Johns)				8.27			8.27
Ambulatory Clinic Patients (F. M. Johns)	7.26						7.26
Private Pay Patients (F. M. Johns)	9.05						9.05

TABLE 2

The incidence of Endamoeba histolytica in representative groups in Panama

GROUP	AGES							AVERAGE
	Unknown	1-5	6-15	15-25	26-35	36-45	46+	
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent
Native River Villages: A		35.0	90.9	65.0		37.7		72.7
Native River Villages: B		32.8	30.0	33.0		30.6		33.0
Male Medical and Surgical Services, Santo Tomas Hospital			21.7	20.6	23.8	14.6	14.3	19.1
Female Medical and Maternity Services, Santo Tomas Hospital			14.8	14.9	14.4	14.5	9.4	14.3
White Patients and Staff, Gorgas Hospital	8.55							8.55
White Staff, Canal Zone Administration Building	2.81							2.81

York or Chicago, it is possible that differences in diagnostic technic may be partially responsible. Certain it is that the

infection of the population is much lower than in the Virginia and Tennessee populations surveyed.

The Panama series of more than 2000 individuals consist of the following: native villages in unsanitated areas away from urban conditions, natives in the Hospital Santo Tomas, male and female medical services, maternity wards and male surgical wards; Gorgas Hospital white patients and staff, and white clerical

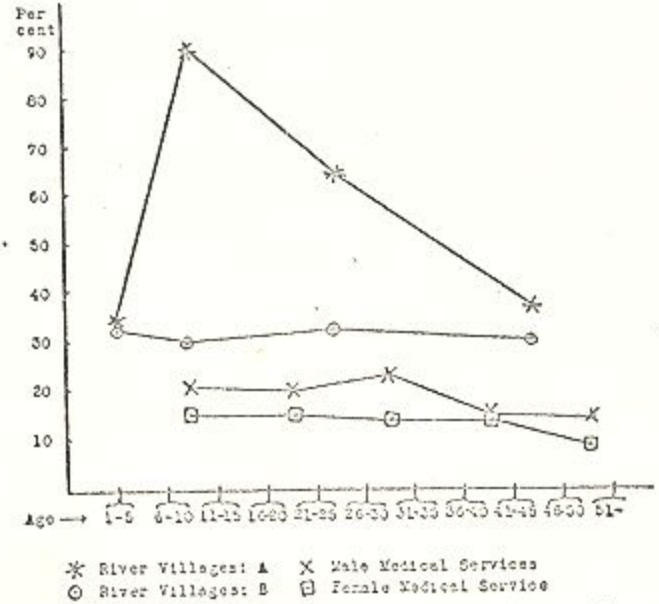

FIG. 2. THE AGE INCIDENCE OF ENDAMOEBA HISTOLYTICA IN PANAMA POPULATION GROUPS

employees in the administration building of the Canal Zone. These groups represent a complete cross section of life in Panama, from the lowest to the highest economic strata, and from complete unsanitation to sanitation *par excellence* in the tropics. These data are presented in charted form (table 2). Except for the first and last groups the incidence percentages are not unlike those for New Orleans. The former group (unsanitated river

villages) shows a high infestation under five years of age, an increase up to thirty to thirty-five years, and a decrease in later life. The group under best conditions of public sanitation and private care shows a low incidence of infection which might well be emulated in cool, as well as in warm climates. These data are graphically shown in figure 2. They are proof *ipso facto* that sanitation counts.

In both the New Orleans and the Panama series approximately two-thirds of the cases were examined three or more times. The importance of this procedure is evident on inspection of the data

TABLE 3

Sequence of positive findings and of cysts and trophozoites of Endamoeba histolytica in population groups of New Orleans and Panama

(Three or more examinations each)

POPULATION GROUPS	EVERY EXAMINATION POSITIVE	TWO OUT OF 3 EXAMINATIONS POSITIVE	ONLY FIRST OR SECOND EXAMINATION POSITIVE	ONLY THIRD EXAMINATION POSITIVE	POSITIVE ONLY AFTER 3 EXAMINATIONS	CYSTS ONLY	TROPHOZOITES ONLY	CYSTS AND TROPHOZOITES
	per cent	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*
Charity Hospital, New Orleans....	10.5	42.1	31.6	10.5	5.3	42.1	26.3	31.6
Hope Haven Boys' Home.....	55.5	11.1	33.3	0	0	100	0	0
Hospital, Santo Tomas.....	15.3	19.1	41.2	16.8	7.6	47.3	22.9	29.8
Chagres River Villages	14.8	29.0	31.4	24.8	0	90.9	2.4	6.6

as presented in table 3. This tabular summary also shows the significance of diagnosing those cases in which only cysts are passed as contrasted with those in which active trophozoites are seen. In the most heavily infested communities (including those in which acute dysentery in the native population is uncommon) cysts are much more common than trophozoites. This suggests a developing racial tolerance to the organism.

The amount of the infestation, as determined by the consistent daily discharge of the parasite (whether trophozoite or cyst) in the stool, has a definite bearing on the case. Routinely I utilize the following symbols to express the number of organisms in the

passed stool: +, light infection; ++, moderate infection; +++, heavy infection; ++++, very heavy infection. Populations with a high incidence usually have a heavy infestation and *vice versa*. Therefore a person with a heavy infestation from a lightly infected (non-immune?) group is more likely to develop an acute amebic colitis than one of a similarly high amount from a highly parasitized group.

Finally, in heavily infested individuals in a population with a high incidence the evidence seems to favor the view that *Endamoeba histolytica* is, in the great majority of these cases, essentially in complete equilibrium with the host tissue, and in some cases possibly not a tissue parasite at all, but, like this organism in certain species of monkeys, is a commensal, feeding only on starch, bacteria and mucus secretions of the large bowel.

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