

# Incidence of intestinal amoebiasis

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**EDITORIAL SYNOPSIS** This is an interesting study showing that the incidence of detecting infection is highest when stool is taken for examination at sigmoidoscopy. The use of a saline purge is not recommended.

The incidence of intestinal amoebiasis varies markedly in different countries and in the different parts of the same country. The incidence also varies with different gastrointestinal symptoms (Shrivastav, 1953; Antia, Chaphekar, Chhabra, Swami, and Borkar, 1961). Although there are a number of reports on the incidence of *Entamoeba histolytica*

alone (Table I), only a few have dealt with the incidence of all types of amoebae (Table II). These reports, except that of Shrivastav, do not mention the incidence in dysentery, non-dysenteric diarrhoea, and asymptomatic patients. Also the patients studied were not drawn from different social strata. Consequently it is the object of this study to analyse

TABLE I

INCIDENCE OF ENTAMOEBIA HISTOLYTICA

Reference	Locality	Symptoms	No. of Patients	Incidence (%)
Cunningham and King (1916-17) Hardy and Spector (1935)	East Bengal (India)	Dysentery	157	8.9
	Chicago (U.S.A.)	Asymptomatic	161	15.5
		Vague abdominal symptoms	33	42.0
Johnstone, David, and Reed (1933)	California (U.S.A.)	Asymptomatic	997	8.9
Leitman and Vitlinskaya (1946)	Tashkent (U.S.S.R.)	Asymptomatic	1,002	12.7
MacAdam (1919)	India	Asymptomatic	351	13.0
Mayer (1940)	Bikaner (India)	Patients admitted to a hospital	1,083	23.2
Misra and Samant (1950)	Lucknow (India)	Diarrhoea	125	17.7
Patel (1945a)	Bombay (India)	Asymptomatic	125	43.3
		Vague abdominal symptoms	101	58.0
Patel (1945b)	Bombay (India)	Vague abdominal symptoms	136	63.9
Shah <i>et al.</i> (1960)	Bombay (India)	Asymptomatic	700	29.8
Sofia and Ciaravino (1944)	Asmara (Eritrea)	Dysentery	1,370	10.2
Tribedi and De (1938)	Calcutta (India)	Dysentery	129	35.0
Vaidya (1942)	Bombay (India)	Dysentery	129	35.0

TABLE II

INCIDENCE OF DIFFERENT TYPES OF AMOEBAE

Reference	Locality	No. of Patients	Incidence (%)				
			<i>E. histolytica</i>	<i>E. coli</i>	<i>E. nana</i>	<i>I. butschlii</i>	
Antia <i>et al.</i> (1961)	Bombay	Dysentery	561	28.0	15.5	1.4	0.8
		Non-dysenteric diarrhoea	239	1.2	1.3	4.4	0.5
Blumenthal, Dutra, Paschal, and Kuhn (1947)	Calcutta	Diarrhoea	219	31.5	8.2	5.5	2.3
		Non-diarrhoea	810	20.5	9.8	16.4	3.8
Chaudhuri and Rai Chaudhuri (1946)	Calcutta	9,015	8.8	5.1	5.9	0.9	
	Bombay	856	13.0	25.5	9.0	0.3	
Shrivastav (1953)	Bombay	Chronic abdominal symptoms	1,010	35.6	41.6	8.7	1.1
		Asymptomatic	384	20.2	49.2	9.37	1.3
		Acute dysentery	104	49.0	2.9	—	—

TABLE III  
INCIDENCE OF DIFFERENT TYPES OF AMOEBAE IN 4,160 PATIENTS  
B. Y. L. Nair Charitable Hospital

	B. Y. L. Nair Charitable Hospital			Gastrointestinal Symptoms Other Than Dysentery or Diarrhoea	Without Gastrointestinal Symptoms	Private Practice	Total
	Dysentery	Non-dysenteric Diarrhoea				Gastrointestinal Symptoms	
No. of patients	560 <sup>1</sup>	360	240 <sup>1</sup>	1,500	500	1,000	4,160
<i>Entamoeba histolytica</i>							
Trophozoites	65	30	2	11	5	14	
Trophozoites and cysts	19	7	—	5	2	1	
Cysts alone	74	14	1	78	20	8	
% incidence	28.2	14.1	1.3	6.2	5.4	2.3	
<i>Entamoeba coli</i>							
Trophozoites	11	13	2	7	2	—	
Trophozoites and cysts	19	13	—	14	5	—	
Cysts alone	57	29	1	192	60	33	
% incidence	15.5	15.3	1.3	14.2	13.4	3.3	
<i>Endolimax nana</i>							
Cysts	8	3	10	43	19	11	
% incidence	1.4	0.3	4.4	2.9	3.8	1.1	
<i>Iodamoeba butschlii</i>							
Cysts	4	14	1	90	17	9	
% incidence	0.7	3.9	0.4	6.0	3.4	0.9	
Patients with one or more than one type of amoebae							
Total no.	219	88	16	275	91	64	753
% incidence	39.0	24.4	6.6	18.3	18.2	6.4	18.1

<sup>1</sup>Sample of stool was collected on sigmoidoscopy and examined immediately.

the incidence of amoebae in faeces using different methods of stool collection, in patients with or without gastrointestinal symptoms, and in patients from different social strata of an urban population.

#### MATERIALS AND METHODS

The incidence of amoebae was studied during the last 10 years in 4,160 patients (Table III) of both sexes, mostly between 15 and 50 years of age. Of these, 1,000 patients had symptoms related to the gastrointestinal tract and were studied in private consultant practice. They were of the higher income group and lived in better sanitary conditions. The rest (3,160) of the patients, studied at the B. Y. L. Nair Charitable Hospital, Bombay, were of a lower income group and lived in relatively insanitary surroundings. They were further divided into 920 patients with dysentery (frequent unformed stool with macroscopic and/or microscopic blood); 240 patients with non-dysenteric diarrhoea (frequent unformed stools without blood); 1,500 patients with gastrointestinal symptoms other than dysentery or diarrhoea; and 500 patients without gastrointestinal symptoms who were admitted for complaints such as hydrocoele, abscess, or pyrexia.

**COLLECTION OF FAECES** In 560 patients with dysentery and 240 patients with non-dysenteric diarrhoea the specimen of stool obtained through a sigmoidoscope was examined immediately. In other patients, the sample

of stool evacuated in the morning was examined. Of the 500 patients without gastrointestinal symptoms seen in

TABLE IV  
INCIDENCE OF DIFFERENT TYPES OF  
AMOEBAE IN FAECES OF 300 PATIENTS WITHOUT  
GASTROINTESTINAL SYMPTOMS ON NATURAL  
EVACUATION AND AFTER A SALINE PURGE

	Natural Evacuation	After a Saline Purge
<i>Entamoeba histolytica</i>		
Trophozoites	1	1
Trophozoites and cysts	—	—
Cysts alone	8	7
% incidence	3.0	2.6
<i>Entamoeba coli</i>		
Trophozoites	2	6
Trophozoites and cysts	2	1
Cysts alone	25	24
% incidence	9.6	10.3
<i>Iodamoeba butschlii</i>		
Cysts	6	5
% incidence	2.0	1.6
<i>Endolimax nana</i>		
Cysts	6	7
% incidence	2.0	2.3
Patients with one or more than one type of amoebae		
Total no.	39	36
% incidence	13.0	12.0

hospital, 300 were given a saline purge and the liquid sample was also examined (Table IV).

**ROUTINE EXAMINATION OF FAECES** Thin films were prepared by putting a drop of warm normal saline at one end of a glass slide and a drop of Lugol's iodine at the other end, and in both a small amount of faeces was mixed. Coverslips were put on these preparations and examined under the microscope. Two such glass slides were prepared. Thus four specimens, two of warm saline and two of iodine, were examined in each patient.

**FORMALINE-SALINE-ETHER CONCENTRATION METHOD** In each patient the stool was also examined with this concentration method. About 2 g. of faeces was suspended in 7 ml. of formaline-saline (5 ml. formaldehyde mixed with 95 ml. saline). This suspension was allowed to stand for one minute, then filtered through a double layer of gauze into a centrifuge tube. About 2 to 4 ml. of the filtrate was mixed with an equal amount of ether and centrifuged for three minutes at 2,500 r.p.m. The supernatant fluid was discarded and the sediment was examined under the microscope.

#### RESULTS

**INCIDENCE OF ALL TYPES OF AMOEBAE** In the different groups of patients the incidence showed marked variation (Table III). In patients with dysentery, stool collected during sigmoidoscopy and examined immediately showed an incidence of 39%, but when the stool collected during the morning evacuation was examined the incidence was 24.4%; in patients with non-dysenteric diarrhoea the incidence was 6.6%; in patients with gastrointestinal symptoms other than dysentery or diarrhoea, the incidence was 18.3%; in patients without gastrointestinal symptoms the incidence was 18.2%; and in patients with gastrointestinal symptoms seen in private practice the incidence was 6.4%. The overall incidence of all types of amoebae in 4,160 patients was 18.1%.

**INCIDENCE OF ENTAMOEBIA HISTOLYTICA** The highest incidence of *E. histolytica* was 28.2% in patients with dysentery whose sample of stool was collected on sigmoidoscopic examination but the incidence was 14.1% in patients with dysentery whose natural morning evacuation was examined. In patients with gastrointestinal symptoms (other than dysentery or diarrhoea) and also in those without gastrointestinal symptoms the incidence was 6.2 and 5.4% respectively. The incidence was 10.5% in all hospital patients and 2.3% in patients studied in private practice.

**ENTAMOEBIA COLI** The incidence of *E. coli* in hospital patients in various groups was between 13.4 and 15.5%, except in patients with non-

dysenteric diarrhoea in whom it was only 1.3%. The incidence of *E. coli* in patients studied in private practice was 3.3%.

**ENDOLIMAX NANA** The incidence of *E. nana* was 2.6% in hospital patients and 1.1% in patients studied in private practice.

**IODAMOEBIA BUTSCHLII** The incidence of *I. butschlii* was 3.9% in hospital patients and 0.8% in patients seen in private practice.

**INCIDENCE AFTER A SALINE PURGE** The incidence of all types of amoebae in the natural evacuation of 300 patients without gastrointestinal symptoms was 13% (Table IV). In the same patients when the liquid sample after a saline purge was examined the incidence was 12%.

#### DISCUSSION

The incidence of intestinal amoebiasis varies with the method of stool collection, symptoms from the gastrointestinal tract, and sanitary conditions.

**METHOD OF STOOL COLLECTION** In dysentery, the incidence of *E. histolytica* is twice as great when the faecal sample is collected during sigmoidoscopy as when the morning evacuation is examined (Table III).

In Bombay the incidence of *E. histolytica* in asymptomatic cases was reported as 43.3% (Patel, 1945a) while in patients with vague abdominal symptoms the incidence reported was 58% (Patel, 1945b) and 63.9% (Shah, Mehta, Patel, and Phutane, 1960). This high incidence remains unexplained because in our study the maximum incidence of *E. histolytica* was 28.2% in patients with dysentery whose sample of stool collected on sigmoidoscopy was examined immediately. Both the above-mentioned authors reported the incidence of *E. histolytica* only and made no mention of other types of amoebae. It is possible that their reports included all types of amoebae.

**Warm stage** For the detection of trophozoites a warm stage is usually recommended. In a tropical climate a warm stage is unnecessary, as in the saline preparation at room temperature amoebae showed motility for six to eight hours and occasionally even after 24 hours.

**Stool collection after saline purge** For the detection of vegetative forms of amoebae many clinicians and pathologists advocate administration of a saline purge and examination of a liquid sample of stool. In our view, in patients with dysentery and diarrhoea administration of a saline purge is undesirable but in patients without gastrointestinal

symptoms the stool examinations before and after a saline purge does not show significant variation in the incidence (Table IV).

**SYMPTOMS OF THE PATIENTS** The highest incidence of amoebae (39%) is in patients with dysentery while in non-dysenteric diarrhoea the incidence is 6.6%. The incidence of amoebae in patients with gastrointestinal symptoms other than dysentery or diarrhoea and in those without any gastrointestinal symptoms is almost identical (about 18%). These findings suggest that amoebae may produce dysentery but are probably an incidental finding in other groups of patients.

**SANITARY CONDITIONS** The incidence of amoebae is 20.7% in 3,160 hospital patients and 6.4% in 1,000 patients seen in private practice (Table III). The results show a lower incidence of amoebae in patients living in improved sanitary conditions.

#### SUMMARY

The incidence of intestinal amoebiasis was studied in 4,160 patients, and of amoebae in faeces varied with the method of stool collection. In patients with dysentery, the incidence is higher when the stool is collected directly from the colon through a sigmoidoscope than that collected from a natural morning evacuation (Table III). A saline purge for the detection of amoebae in the stool is not desirable in patients with dysentery or diarrhoea and in those without gastrointestinal symptoms it does not increase the incidence of amoebae in the stool.

The incidence of amoebiasis also varied with different gastrointestinal symptoms. Patients with dysentery (frequent unformed stools with blood) have the highest incidence.

The incidence of amoebiasis is higher in patients seen in hospital practice who live in insanitary conditions as compared to those seen in private

practice who live in relatively better hygienic surroundings.

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