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SHORT COMMUNICATIONS

CONTRIBUTION TO THE PROBLEM OF THE SO-CALLED NONPATHOGENIC AMOEBAE IN THE INTESTINE OF MAN

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Abstract. Among 10,418 patients of a Prague hospital, a plain infection with intestinal parasitic protozoans was identified in 1,319 persons (12.7 %). Of these, 3.5 % were infested with *Giardia intestinalis*, 0.3 % with *Entamoeba histolytica* forma *minuta*, 5.7 % with *Endolimax nana*. We evaluated the frequency of findings of protozoans in various clinical diagnoses. A statistically significant increase in frequency was recorded for *E. nana* in diagnoses of eosinophilia, giardiasis, amoebiasis and helminthiasis. A slight increase above the average was found for *Entamoeba coli* in diagnoses of giardiasis and helminthiasis. Most cases of infection with *Entamoeba histolytica* were associated with a stay abroad. No increase in the frequency of these protozoans was recorded for patients with diarrhea. An analysis of the results indicated that a nonpathogenic amoeba might participate in the origin of intestinal disorders in man.

In Central Bohemia, an infection with intestinal protozoans is among the most frequent parasitological findings in man (Červa 1962). Autochthonous dysenteric tissue forms of an infection with *Entamoeba histolytica* have not been reported from this area for tens of years. Therefore, in accord with the pertinent literature, clinical importance has been ascribed to Giardia intestinalis only, while *Entamoeba coli* and *Endolimax* have been regarded as typical commensals and nonpathogenic protozoans (Jírovec 1960). In order to test the correctness of these traditional concepts, a detailed analysis has been made of the results of examinations for a number of years. The results were obtained from the laboratory of a Prague hospital.

MATERIAL AND METHODS

The patients examined were mainly males aged from 20–50 years. The basic laboratory methods employed were Faust's flotation-concentration method and wet smears stained with ferric haematoxylin after Heidenhain. In all cases, the attending physician suspected an intestinal parasitosis on the basis of either clinical symptoms or anamnestic data. The case history of most patients contained a note on the basic clinical symptom. Our study set did not contain foreigners, patients with infections combined with helminthiases, and those with protozoic infections of a sporadic incidence (*Jodamoeba*, *Trichomonas*, *Chilomastix*).

The results of the protozoological examination referring to the stated diagnoses or groups of related symptoms were subsequently subjected to a number of tests. The randomness of the study set was confirmed with the analysis of dispersion, the significance of dividing the findings of protozoans into the set of diagnoses with Student's paired t-test, remote values with Dixon's test. In order to assess which of the data differed at a 5 % level of significance from the distribution of protozoans in the table, values X^2 were established by means of a 2×2 contingency classification (Roth et al. 1962). Statistically significant values are framed in the table.

Table 1. Summary of protozoological finding in different diagnoses

Diagnosis	No. of exam.	*Giardia intestinalis* No.	%	*Entamoeba coli* No.	%	*Entamoeba histolytica* No.	%	*Endolimax nana* No.	%	Total No.	%
without diagnosis	1 008	20	2.0	27	2.7	2	0.2	51	5.1	100	10
return from abroad	1 538	60	3.9	67	4.4	16	1.0	90	5.9	233	14.7
diarrhea	796	24	3.1	10	1.3	0	0	21	2,7	55	7.1
other intestinal disorders	4 021	123	3.0	124	3.0	5	0.1	237	5.9	489	12.6
cholecysto- and hepatopathy	592	34	5.7	14	2.4	0	0	26	4.4	74	12.5
eosinophilia	343	10	2.9	7	2.0	2	0.6	28	8.1	47	13.7
skin diseases	613	4	0.7	8	1.3	0	0	21	3.4	33	5.4
febrile diseases	270	7	2.6	8	2.9	0	0	12	4.4	27	10.0
other diagnoses	240	7	2.9	4	1.6	0	0	6	2,5	17	7.0
giardiasis	270	51	19.0	15	5.5	4	1.5	34	12.6	104	38.5
amoebiasis	83	1	1.2	5	6.0	5	6.0	14	16.9	25	30.1
helminthiasis	644	22	3.4	38	5.9	2	0.3	53	8.0	115	17.5
Total	10 418	363	3.5	327	3.1	36	0.3	593	5.7	1 319	12.7

RESULTS

Giardia intestinalis. The flagellate is generally considered to be pathogenic. We recorded findings of this protozoans, because they served as a criterion of methods used for evaluating the participation of protozoans in clinical symptoms. We ascribed importance to the fact that the incidence of giardiasis was neither increased in the group with diarrhea nor in that with not closer identified gastrointestinal disorders. Its frequency was significantly higher in persons examined for disorders of the biliary routes. Its incidence was highest in material submitted for examination because of suspected giardiasis. This might be regarded as evidence for a certain symptomatological specificity of the disease, and the advanced diagnostic experience of the attending physician. A stay abroad did not increase significantly findings of giardiasis.

Entamoeba coli. In the population sample examined, the total frequency in the incidence of *E. coli* was 3.1 %, similar to values obtained for giardiasis. A significant increase in the incidence of findings of this amoeba was recorded for persons returning from abroad, and in those suspected of giardiasis or helminthiasis. Similarly high was the percentile frequency of findings of *E. coli* in a diagnosis of amoebiasis, but the statistical test did not provide conclusive evidence due to the small number of diagnoses available.

Entamoeba histolytica forma ***minuta.*** Under conditions of the study area, infection with this protozoan has mostly been acquired abroad, as evidenced by a cumulation of findings in persons returning from abroad and in those with a diagnosis of amoebiasis,

also made, mainly because a stay abroad is indicated in the case history. In spite of the limited number of cases, it seems worth while to mention findings of *E. histolytica* in the diagnosis of giardiasis, because these are in support of the presupposed symptomatology of a nondysenteric form of infection with this amoeba.

Endolimax nana. With a total frequency of 5.7 %, findings of this amoeba were the most frequent ones in the entire set. Differences in its incidence in the individual groups of diagnoses were remarkable. Statistical tests disclosed a significant increase in infections with this amoeba in diagnoses of giardiasis, amoebiasis, helminthiasis and eosinophilia. It was the only protozoan of our set to display a marked relationship with eosinophilia as a possible evidence of interactions between the parasite and its host.

DISCUSSION

In the present study, routine laboratory material was examined ex post. We are fully aware of the fact that various errors cannot be avoided in a population set divided into groups in accord with the given diagnoses. However, the main clinical symptom for which the patient was examined for intestinal parasites, is reflected on all diagnoses. Having regard to the large number of cases evaluated, it might be expected that minor errors in the classification of patients derived from incorrect specifications of the attending physician will appear as insignificant in the statistical evaluation.

In our opinion, the motives upon which the attending physician decided on a diagnosis of giardiasis, amoebiasis and helminthiasis, should be subjected to a detailed analysis because, apart from giardiasis, none of these infections display a specific, characteristic symptom. It is evidently necessary to consider a certain complex of symptoms in combination with several anamnestic data. The number of findings of intestinal protozoans was always highest in these three diagnoses. Although, a high percentage of findings of giardiae in the diagnosis of giardiasis, and a relatively high percentage of *E. histolytica* in the diagnosis of amoebiasis was not surprizing, the high percentage of findings of *E. nana* in both diagnoses was most surprizing. It was three times higher than the average finding, and could not be explained by a possible concomitant infection of *Endolimax* and *E. histolytica* or *G. intestinalis*. In spite of a relatively high frequency in the incidence of these combined infections, their participation in the evaluated material was negligible (*E.n.* + *G.i.* = 6.5 %, *E.n.* + *E.h.* = 2 % of the total number of findings of *E. nana*). This might be explained only by an etiological participation of *E. nana* in the origin of symptoms resembling an infection with these better known parasites.

The anamnestic note "return from abroad" is a frequent suggestion for a parasitological examination. Findings surpassing notably the average were demonstrated for *E. histolytica;* they were less marked for *E. coli*. This observation is in direct support of an expected increased risk of acquiring intestinal infections in areas with worse hygienic conditions.

In patients with diarrhea or other gastrointestinal disorders, none of the protozoans pursued in this study were present in an increased percentage. This is another surprizing observation particularly with regard to the symptoms generally given for, e.g., giardiasis. An accelerated passage of the intestinal contents caused by diarrhea reduces apparently the number of parasites and also decreases the possibility of finding them.

Eosinophilia, confirmed by a haematological examination, is frequently the sole reason for requesting a parasitological examination. The necessity of paying increased attention to *Endolimax nana* is indicated by a significantly increased finding of these allegedly nonpathogenic amoebae in a diagnosis of eosinophilia. Any other direct evidence for the pathogenicity of this protozoan (e.g. from histological material) is still

lacking. We have little reason to doubt that the mechanism of pathogenicity of *E. nana* might be similar to that of *Dientamoeba fragilis* causing an irritation of the crypts of the intestinal mucosa leading to a fibrosis and the origin of chronic intestinal disorders (Swerdlow and Burrows 1955).

In febrile diseases and infections of the skin, a parasitological examination is requested mainly for the purpose of excluding a possible allergic reaction of the patient particularly in the case of a helminthiasis. In the sphere of protozoan infections, there has been no evidence for similar phenomena in our material.

The findings of protozoans did not surpass the total average in groups of patients examined for other diagnoses (tumors, circulatory disorders, etc.) or those for which no diagnosis was made.

Our results indicate that increased attention should be given to *Endolimax nana*. Its biology is practically unknown and experimental work with this amoeba in vivo is sofar out of question. The only possibility of obtaining a better understanding of the actual etiological participation of protozoans in disorders of the function of the digestive system is a targeted, clinicolaboratory investigation focused on the symptomatology of intestinal protozoic infections of man in the temperate zone.

К ПРОБЛЕМАТИКЕ ТАК НАЗЫВАЕМЫХ НЕПАТОГЕННЫХ АМЕБ В КИШЕЧНИКЕ ЧЕЛОВЕКА

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Резюме. Из числа 10418 обследованных пациентов в одной пражской больнице у 1 319 (12,7 %) обнаружено чистое заражение паразитическими простейшими. Заражение *Giardia intestinalis* обнаружено у 3,1 %, *Entamoeba histolytica* forma *minuta* у 0,3 % и *Endolimax nana* у 5,7 % пациентов. Сделана оценка частоты находок простейших при разных клинических диагнозах. Повышение частоты, имеющее статистическое значение, наблюдали в случае *E. nana* при следующих диагнозах: эозинофилия, гиардиоз, амебиаз и гельминтоз. Небольшое повышение, в сравнению со средними находками, обнаружено у *Entamoeba coli* при гиардиозе и гельминтозе. Заражение *E. histolytica* в большинстве случаев встречалось у лиц, вернувшихся из зарубежных стран. При поносных заболеваниях повышение частоты заражения не появилось ни у одного из изучаемых видов простейших. Анализ результатов указывает на возможность участия так называемых непатогенных амеб при возникновении заболеваний кишечника человека.

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