

INVESTIGATIONS OF YERSINIOSIS IN HUMANS AND SOME FARM ANIMALS IN THE VARNA DISTRICT

K. Boshkova, A. Kozarov, G. Kaprelyan

Key-words: Yersinia — enterocolitica — serology — humans — farm animals

The yersiniosis is a still inadequately studied illness of humans and farm animals in our country. Recently, some investigators (7, 8) perform systemic serologic studies of the distribution of human yersiniosis which allow them to determine the presence, concentration and dynamics of specific antibodies in sera of ill and healthy individuals. They report an increase of titer of antibodies in patients from the 6th to the 12th day from the onset of disease accepting as diagnostic criteria the titer values 1:80—1:100 and upwards.

V. Antonov (1) considers the rates 1:160 and upwards for a diagnostic titer by using reaction of agglutination with killed and alive cultures. Other authors (4, 5) apply this reaction in the diagnostics of yersiniosis, too. J. Szita et al. (13) have found out specific antibodies against Yersinia enterocolitica serovariants 0:3 and 0:9, respectively, in 4,56 per cent and 42,6 per cent out of 887 serologically studied blood samples of humans living in contact with animals and out of 2192 ones of patients with diarrhoeal syndrome. According to their data, antibodies with titer up to 1:100 occur quite often also in sera of healthy persons.

W. Knapp et al. (10) report the presence of specific antibodies against Y. enterocolitica serovariant 0:3 in 74 per cent and serovariant 0:9 in 24,3 per cent of sera of patients with rheumatoid syndrome. Other authors (3, 9, 11, 12) have investigated sera of animals (swine, horses, sheep, cattle and deer) and ascertained antibodies against Y. enterocolitica serovariants 0:3 and 0:9 in titers from 1:10 to 1:160.

The purpose of this work was to study the distribution of yersiniosis among humans and some farm animals' species in the Varna district by means of serologic methods.

Material and methods

Our study covers 516 human, 351 cattle and 122 swine sera. The human sera were taken from individuals which were studied on the occasion of rheumatoid syndrome and shewed negative results of the AST reaction. Their age distribution is as follows: up to 10 years — 155 sera; between 11 and 20 years — 92; between 21 and 40 years — 69; between 41 and 60 years — 122, and more than 61 years — 15 ones. 64 sera of healthy carriers were also investigated. The serologic results were obtained at two stages. First, the sera were studied after a rapid plate drop-let reaction of agglutination (RPDRA) with coloured antigen prepared from reference Y. enterocolitica strains serovariants 0:3 and 0:9 after Kozarov's and Nikolov's method. Second, the positive sera (according to the RPDRA) undergo a slow test-tube reaction of agglutination (STRA). The 0-antigen was obtained after Hadzhidimova's method. The sera were diluted by physiological solution

from 1:20 to 1:640. The antigen density of 1 mlrd/ml bacterial cells was prepared after Mc Farland's optical standard and added in amount of 0,5 ml. The reaction was performed in water-bath at 50 °C for one night and read after 2 hours at room temperature.

Results and discussion

The serologic investigation concerning specific antigens against *Y. enterocolitica* serovariants 0:3 and 0:9 shows that 26,1 per cent of human, 51,2 per cent of cattle, and 9,4 per cent of swine sera possess antibodies against serovariant 0:3, and 3,1 per cent of cattle sera against serovariant 0:9 (table 1). On table 2

Table 1

Results from the serologic investigation of sera of humans, cattle and swine according to RPDRA

Origin of sera	Number of sera	Antibodies established to			
		serol. var. 0:3		serol. var. 0:9	
		n	%	n	%
Humans	516	135	26,1	—	—
Cattle	351	180	51,2	11	3,1
Swine	122	33	9,4	—	—

Table 2

Results from the serologic investigation of human sera to serologic variant 0:3

Age in years	Number of sera	With antibodies		Without antibodies	
		n	%	n	%
up to 10	154	54	35,0	100	65,0
11—20	92	15	17,3	77	82,7
21—40	69	23	33,3	46	66,7
41—60	122	34	27,8	88	72,2
over 60	15	2	13,3	13	86,7
blood donors	64	7	10,9	57	89,1
Total	516	135	26,1	381	73,9

the results from the serologic study of human blood samples are presented. A relatively high percentage of specific antibodies against serovariant 0:3 are ascertained in children aged up to 10 years — 35 per cent and in patients aged between 21 and 60 years — totally 61,1 per cent. The presence of antibodies is found out also in 10,9 per cent of sera from healthy donors.

On table 3 one can see that the titer of specific antibodies after RPDRA varies in wide ranges — from 1:100 till 1:800. The titer 1:400 is the most frequent one — 124 sera. Similar data are received by using the STRA. The sera with antibody titers in dilutions from 1:40 to 1:80 predominate both in humans and animals.

Table 3

Results from serologic investigation of sera of humans, cattle and swine according to RPDRA and STRA

Origin of sera	RPDRA				STRA			
	dilution							
	100	200	400	800	20	40	80	160
Humans	9	20	64	42	9	12	10	8
Cattle	37	57	52	34	—	24	20	11
Swine	2	21	8	2	7	5	3	1
T o t a l	48	98	124	78	16	41	33	20

The performed serologic assays of the distribution of *Y. enterocolitica* sero-variants 0:3 and 0:9 among humans, cattle, and swine demonstrate that this disease is quite wide-spread indeed. They are in agreement with the data of other authors (3, 9, 11, 12). We support the opinion of some investigators (1, 7, 8) that the antibody titers in blood serum of 1:80 and upwards can be used as indicators for the diagnosis of yersiniosis.

The serologic assay of patients with rheumatoid syndromes and the detection of specific antibodies against *Y. enterocolitica* serovariant 0:3 confirms the results received by W. Knapp et al. (10) and distinguishes them in the same time from those reported by J. Szita et al. (13). Similarly to other authors (4, 5) we suppose that the detection of blood serum antibodies of healthy persons is not seldom. In such cases it concerns probably a previous non-apparent infection which has induced the production of specific antibodies.

The specific antibodies against *Y. enterocolitica* serovariant 0:3 established by us in sera of patients and some farm animals' species support the literature data and allow us to presume that this disease pertains to the group of zoonoses which make its prophylaxis relatively difficult. The diagnosis of rheumatoid syndrome could be added by directed search for yersinial infection.

REFERENCES

1. Антонов, В. *Военномед. ж.*, 1977, 5, 42—53. — 2. Козаров, А., Н. Николов. В: Конгр. микробиол., V. Варна, 12—14. X. 1981 г. (под печат). — 3. Кононова, Д., Ф. Шубин, Г. Сомов. ВЪВ: Всес. конф. прир. очаг. болезн., II. Душанбе, 1979. — 4. Королюк, А. *Военномед. ж.*, 1978, 6, 48—52. — 5. Королюк, А., М. Стрелкова, В. Авраменко. *Ж. микробиол. эпидемиол. иммунол.*, 1980, 6, 19—22. — 6. Хаджидимова, Д. Микробиологична диагностика. С., Медицина и физкультура, 1975. — 7. Ющенко, Г. Кишечные йерсиниозы. М., Медицина, 1977, с. 72. — 8. Ющенко, Г., В. Дунаев. *Лаб. дело*, 1980, 6, 367—369. — 9. Воскетцхе, Y., J. Roth. *Zentralbl. Bact. Hyg. I. Abt. Orig. A*, 240, 1978, 86—93. — 10. Кнарр, W., В. Прогел, С. Кнарр. *Deutsche med. Wochenschr.*, 106, 1981, 34, 1054—1060. — 11. Pedersen, K. *Contr. Microbiol. Immun.*, 5, 1979, 253—256. — 12. Rusu, V., Z. Ciocalten, A. Muscan, D. Maragoae. *Arch. roum. pathol. experim. microbiol.*, 40, 1981, 1, 25—31. — 13. Szita, J. et al. *Acta microbiol. Acad. sci. hung.*, 27, 1980, 103—109.

**ИССЛЕДОВАНИЯ ЙЕРСИНИОЗА ЛЮДЕЙ И НЕКОТОРЫХ ВИДОВ
ДОМАШНЕГО СКОТА В ВАРНЕНСКОМ ОКРУГЕ**

К. Божкова, А. Козаров, Г. Капрелян

Р Е З Ю М Е

Проведены серологические исследования распространения йерсиниоза среди людей и некоторых видов домашнего скота. Была исследована кровяная сыворотка 516 человек и кровяная сыворотка 473 животных — свиней и крупного рогатого скота.

Обнаружены специфические антитела против *Yersinia enterocolitica* сывороточный вариант 0:3 методом быстрой предметной капельной реакции агглютинации (БПКРА) с помощью цветного антигена — при 135 человеческих, 180 говяжьих и 33 свиных сыворотках, а также и методом медленной пробирочной реакции агглютинации (МПРА) с применением вареной культуры — при 39 человеческих, 55 говяжьих и 16 свиных сыворотках.

Авторами допускается возможность участия *Yersenia enterocolitica* сывороточный вариант 0:3 при инфекциях среди людей и домашнего скота.