

STUDY OF SERUM PROTEINS IN INDIANS FROM THE ALTO XINGU, CENTRAL BRAZIL

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SUMMARY

A study was undertaken to evaluate the protein content of the serum and other electrophoretic fractions in a group of Indians of the Alto Xingu. The values for gammaglobulin fractions were significantly higher when compared to a non-Indian population comprised by a control group and a malaria group. A general increase in the IgG levels and a high percentage of increase in IgM protein were also observed in the sera of the Indians. For a better understanding of the causes of these immunological variations further investigations are suggested.

INTRODUCTION

Several studies of the immunoglobulin classes IgA, IgM and IgG in different populations have revealed similar results with regards to race, genetic and environmental factors^{1,7,11,13,18,20,21,23}.

In Brazil, a number of isolated Indian populations living in the Southern region of the Parque Nacional do Xingu, named Alto Xingu, is of special interest.

A detailed characterization of these isolated groups has been described in former papers^{2,19}.

Studies were performed on the age distribution of neutralizing antibodies for several viruses^{5,15,16,17}. The results for measles virus were in agreement with the epidemiological data and have provided the basis for a vaccination program⁵. Regarding to antibodies to herpes virus¹⁷, the results were similar to those observed in a population studied in São Paulo¹⁶. However, for the enteroviruses the distribution pattern of antibodies was different when compared with those of non-Indian populations¹⁵. Regarding Coxsackie B and Echoviruses, no antibodies were detected by neutralization test in tissue culture¹⁵. This was an unexpected re-

sult because apparently the Indian population was previously exposed to the viruses.

Therefore, the present study was undertaken to determine the protein content of the serum and other electrophoretic fractions in a group of Indians of the Alto Xingu, in a trial to explain the results obtained in aforesaid papers.

MATERIAL AND METHODS

Sera from Indians — After blood samples were obtained sera were separated from the blood and refrigerated during transportation to São Paulo. The sera were stored at -25°C until used. In this study 35 sera were taken randomly from the different tribes.

Sera from malaria cases — Blood samples from nine patients with malaria living in the State of Goiás (also Central Brazil) were collected. These specimens were handled in an identical manner to those above mentioned sera. The results were compared with the control group extensively defined by VAZ et al.²².

Total serum protein — It was determined by the biuret reaction, according to the method outlined in GORNALL et al.⁹.

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Electrophoresis — The electrophoretic separation of protein fractions was performed according to the method of KOHN¹² as modified by VAZ et al.²². Briefly, the technique involved a Mikrophor-Boskamp chamber. Each serum sample of 0.05 microliter was applied to a 25.5 x 145 mm cellulose acetate membrane (CAF) and run in a veronal acetate buffer, at pH of 8.6 with ionic strength of 0.06 μ , at 2 mA, for 20 minutes.

Staining — Staining of the protein fraction was accomplished by using Amidoschwartz 10B (Merck) according to VAZ et al.²².

Estimation of relative serum protein fractions — Densitometry was performed in a com-

bined extinction-integration Zeiss model EI-3 recorder.

Immuno-electrophoresis — The micromethod of FERRI & COSSERMELLI⁸ as modified from GRABAR & WILLIAMS¹⁰ was used to qualitate and semi-quantitate the serum immunoglobulins using the Mikrophor-Boskamp equipment.

RESULTS

Analysis of the data (Table I) shows that the gammaglobulin fractions in the sera of the Indians (2.89 g/100 ml) are significantly higher than those observed in the control group (1.19 g/ml) and in the malaria group (1.53 g/100ml).

T A B L E I

Values of total protein and electrophoretic fractions in sera of Indians from Alto Xingu, a non-Indian group with malaria, and a control group

Total serum protein and fractions	Indians		Malaria group		Control group (*)	
	relative %	g/100 ml	relative %	g/100 ml	relative %	g/100 ml
Pre-albumin	0.8	0.07	—	—	1.8	0.13
Albumin	48.3	4.00	55.4	3.59	63.5	4.5
alpha-1-globulin	2.1	0.18	4.7	0.29	2.4	0.17
alpha-2-globulin	4.8	0.39	6.2	0.39	6.8	0.48
betaglobulin	10.0	0.83	9.8	0.63	9.4	0.67
gammaglobulin	34.5	2.89	23.6	1.53	16.7	1.19
Total protein		8.32		6.47		7.10

(*) According to VAZ et al., 1971

Table II shows the variations in the amounts of immunoglobulins through immuno-electrophoresis.

T A B L E II

Variations in levels of immunoglobulins A, M and G in Indians from Alto Xingu, Central Brazil

Level variation	IgA		IgM		IgG	
	No.	%	No.	%	No.	%
Increase	10	28.6	25	71.4	35	100
Decrease	10	28.6	2	5.7	0	0
Normal	15	42.8	8	22.8	0	0

DISCUSSION

Owing to the fact that malaria was demonstrated to have a higher prevalence in the region of Alto Xingu^{2,3,19} than in other endemic

area of Brazil, sera from non-Indian patients with malaria, inhabitants of Central Brazil, were included for comparison (Table I). This group presented higher values for gammaglobulin than the controls, but significantly lower than the Indian group.

Study of the sera of the Indians through immuno-electrophoresis demonstrated variations in the levels of immunoglobulins when compared with values considered as normal. Such variations were always associated with the intensity of the precipitin lines. An increase in the IgG levels was observed in all studied Indian sera. A high percentage of increase of IgM was also observed. Nearly one third of the Indian population showed an increase in IgA amounts. In contrast, one third demonstrated a decrease in this fraction (Table II).

In further studies performed on Indians, in which seric factors were compared with other groups of patients with rheumatoid arthritis, myeloma, malaria and normal individuals, a high percentage of sera from those Indians presented rheumatoid factor as the slide latex agglutination test was carried out (unpublished data).

So, the present findings of hypergammaglobulinemia seem to be, at least, due to malaria, as suggested by previous epidemiological survey³ and to rheumatoid factor. Since the incidence of this factor among Indians is not well known, as for white and negro individuals¹³, better studies on this aspect should be done.

Apparently, the overall view of the mechanism of humoral immunity seems to be stimulated in the Indians and can not explain the absence of antibodies to Coxsackie B and Echoviruses as verified in previous studies¹⁵. Nevertheless, it is also known that multiple infections can induce partial or complete immune depression⁶.

Although deserving additional investigations, the present results are in agreement with previous quantitative studies on immunoglobulins performed in a group of Indians^{3,4}.

The observation of serum protein profiles among Indians seems to bring additional valuable information to clinical application when deviations were found in the humoral immunity.

RESUMO

Estudo de proteínas séricas em índios do Alto Xingu, Brasil Central

Estudo de proteínas séricas e outras frações eletroforéticas foi feito num grupo de índios do Alto Xingu. Os valores para a fração gamaglobulina foram significativamente mais elevados quando comparados com uma população não indígena composta de um grupo controle e um grupo de casos de malária. Aumento generalizado nos níveis de IgG e alta porcentagem de aumento de proteína IgM foram também observados nos soros dos índios. Melhor conhecimento da causa dessas variações imunológicas pode ser obtido em estudos futuros.

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