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ROLE OF TRIATOMA (CONE-NOSE BUGS) IN TRANSMISSION OF HEPATITIS-B ANTIGEN

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SUMMARY

Feces of triatoma (cone-nosed bugs) which have fed on patients with HBsAg-acute viral hepatitis tested by xenodiagnosis method, were demonstrated to be HBsAg positive. Antigen tests were carried out by radioimmunoassay (Ausria). HBsAg was observed in 100% of feces evacuated on the first week; 5% in fifteen days and the tests were negative after thirty days. Individual homogenate of triatoma was negative for HBsAg. These results suggest the possibility of passive transmission of HBsAg by feces besides **Trypanosoma cruzi.** On the other hand intracellular replication does not seem to occur.

INTRODUCTION

The transmission of hepatitis-B antigen (HBsAg) by parenteral route is well known. On the other hand, liquids and human secretions [6] blood-sucking insects like mosquitoes [4,2] and bed bugs [2] were recognized as important vectors of HBsAg infection.

Some areas of Central West Brazil are endemic for Chagas'disease or American-trypanosomiasis, whose vectors are hematophagous insects. The triatoma are a genus of bugs of the family Reduviidae, called "cone-nose bugs". The most important vectors in our area are: **Triatoma infestans, Triatoma sordida,** and **Panstrongylus megistus.**

Based on the fact that the triatoma are obligatory hematophagous insects, we studied their possible participation in transmission of HBsAg like other hematophagous.

MATERIAL AND METHODS

a) Triatoma

Eighty 3rd stage nymphs of **Triatoma infestans** (clean laboratory-bred bugs) were used. They were separated in 40 small plastic boxes with two triatoma in each one. The boxes were specially prepared for xenodiagnosis. The "cone-nose bugs" were kept unfed at room temperature.

b) Patients with acute viral hepatitis (HBs Ag)

Twenty volunteer patients with acute viral hepatitis (HBsAg positive) admitted to the Hospital for Infections Diseases served as infection source for the triatoma.

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c) **Xenodiagnosis**

Xenodiagnosis is diagnosis by means of finding in feces of clean laboratory bred-bugs fed on the patient, the infective forms of the organism causing the disease, used in diagnosis of Chagas' disease.

Two xenodiagnosis-boxes containing two triatoma each were adapted on to the patients; the triatoma fed during one hour. After this procedure the insects were isolated into individual boxes kept at room temperature.

d) **HBsAg test**

All human blood, feces and homogenised triatoma were tested by the radioimmunoassay (R.I.A), using "Ausria" kits (Abbott Laboratories). The tests were carried out in accordance with the recommended manufacturer instructions. For the blood test, the assays were carried out with normal serum as control. Results were expressed in standard deviation (S.D).

The serum was considered positive to HBs Ag if it was $\geqslant$ 7.5 S.D. units from the mean of negative control [4]. The specificity of each positive specimen was demonstrated after incubation with an equal amount of positive HBs Ag serum and after incubation with an equal amount of negative human serum. Only specimens in which neutralization was evident were considered to contain HBsAg.

Feces from triatoma emited on 7th, 15th 30th days were tested. All materials evacuated on these days from each 80 triatoma were diluted in 0.5 ml saline solution and them homogenated. The HBsAg test was carried out as described above the human blood. Feces from ten triatoma served as negative controls.

On the 80th day only 48 triatoma were alive and were individually triturated. Forty-eight homogenated were tested to HBs Ag. Ten nymphs of same stage were also triturated and used as negative controls.

RESULTS

Our results are showed in the Table I. The presence of HBsAg in feces during the first week was demonstrated in 100% of the triatoma. The positivity index decreased enormously at the ending of the second week (5%), and was completly negative on the 4th week. At the end of 80th day only 48 triatoma were alive and the HBsAg was negative in the homogenated triatoma.

DISCUSSION

Hitherto, we did not have an exact notion of the incidence of HBsAg in the Brazilian chagasic population. Our data concerning blood donors in our region, which the complement fixation reaction to **Trypanosoma cruzi** was negative, the incidence of HBsAg was 1% [5].

On the other hand, the number of chagasic patients in endemic areas of Brazil is about from 20% to 40% of the population. The possible role of triatoma in passive transmission of HBsAg added a new problem to this endemic area.

Triatoma hematophagy is quite unique; no odd factors in the human blood interfers with it. METSELAAR et al. [2] observed that the bile pigments of jaundiced patients make the blood less attractive to the mosquitoes. In spite of the deep jaundice in our patients the triatoma did not refuse to feed on them. When kept on a rich diet, the triatoma do not feed daily, but the evacuations are almost daily. So, in the feces after feeding with blood from acute viral hepatitis patients, HBsAg could be demonstrated. It seems evident that the antigen disappears in parallel with digestion of blood as we observed on the second week.

TABLE I

HBsAg in feces and homogenated of triatoma (cone-nosed bugs) after xenodiagnosis in patients with HBsAg acute viral hepatitis

Period	Number of triatoma	Tested materials	Positive	(%)
7 days	80	Feces	80	100
15 days	80	Feces	4	5
30 days	80	Feces	0	0
80 days	48	Homogenated (trituration)	0	0

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However, considering the possibility of intracellular replication of the viral agent or its reappearance in the salivary glands, we carried out trituration of all surviving triatoma. The absence of HBsAg in the homogenate may suggest an enzymatic alteration of HBsAg after blood-meal or any other mechanism, which impedes the intracellular replication. This fact does not, however, minimize that situation. Adult triatoma can remain unfed for 30 days after a plentiful meal; but they may feed twice weekly [3]. On the other hand, 1st and 2nd stage nymphs feed more often. First-stage nymphs, when interrupted during the course of feeding on man, may continue to feed after a short interval.

Because of this, we believe that passive transmission is quite possible. The mechanism of transmission could be identical to that of **Trypanosoma cruzi,** that is, by the deposal of feces on human skin following blood-sucking; the antigen penetration into the blood stream, as it happens in Chagas' disease is favoured by scratching.

Triatoma has its favorable habitat in poor dwellings and can remain there for long periods. This fact suggests that HBsAg transmission may occur among the residents of a same house.

An antigen carrier or a person with acute or chronic viral hepatitis will be obvious in this cicle.

RESUMO

Papel dos triatomíneos (barbeiros) na transmissão do antígeno da hepatite B

Os Autores demonstraram a existência do antígeno de hepatite B (HBsAg) em fezes de barbeiros **(Triatoma infestans)** alimentados com sangue de pacientes portadores de hepatite viral aguda HBsAg positivo, através do xenodiagnóstico. A pesquisa do antígeno foi feita pela técnica de radio-imunoensaio (Ausria). O HBsAg foi detectado em 100% das fezes eliminadas na primeira semana, em um lote de 80 insetos; a incidência caiu para cinco por cento em quinze dias e foi negativa após 30 dias.

Ao fim de 80 dias, os insetos sobreviventes foram triturados individualmente, mostrando-se tal homogeneizado negativo para o HBsAg.

Os resultados sugerem a possibilidade da transmissão passiva do HBsAg pelas fezes de barbeiros, ao lado do **Trypanosoma cruzi.** Não houve evidência de reprodução intracelular do vírus nesses insetos.

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