

## B AND DELTA HEPATITIS VIRUS INFECTION IN A POPULATION OF WEST AFRICA

N. ZANCHETTA<sup>(1)</sup>, P. VIGANO<sup>(2)</sup>, M.P. FERRARIO<sup>(3)</sup>, G.B. PRIULI<sup>(3)</sup>, O. DJIGBENOUE<sup>(3)</sup>, G.P. NARDI<sup>(1)</sup> & A. PAGANO<sup>(1)</sup>

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### SUMMARY

Among the 424 serum samples examined, the prevalence of hepatitis virus infection turned out to be 89.6%, with 15.6% of HBsAg positivity.

Some of the samples belonged to an afferent population and some other to workers of a West Africa rural hospital (Pop. Rep. of Benin). 27.3% of the positive subjects presented active replication of the virus, shown by the presence of HBcAg.

Among the HBcAb positive subjects the anti-delta antibodies showed a positivity frequency of 19.7%.

HBsAg presence in 15% of pregnant women suggested the importance of HBV mother-foetal transmission in the district.

The examined results can be compared with those obtained in other African areas, with similar socio-economic conditions.

**KEY WORDS:** B hepatitis; Delta hepatitis; West Africa.

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### INTRODUCTION

More than 200 million HBsAg carriers are spread all over the world<sup>5</sup>: their diffusion can considerably change according to different continents and it is very much related to the sanitary and socio-economic conditions of the populations: anyway other important factors, as genetic conditions, can play a significant role in the susceptibility to the infection<sup>2</sup>. Tropical Africa and South East (Asia) seem to be the most involved areas with the HBV infection and HBsAg carriers number is calculated between 5 and 20% of the total population<sup>9</sup>. Moreover, several epidemiological surveys carried out in all continents<sup>6</sup> showed that Delta virus (HDV)<sup>7</sup> is endemic in the population of Southern Europe, of Middle

East and of large areas of Africa<sup>9</sup>. On the other hand the increasing diffusion of the viral agent in risk-population has even been shown in areas never affected by the phenomenon before<sup>3</sup>.

The real importance of HDV as an agent able to change the course of the HBV infection, was proved by the first studies and subsequent researches carried out among subjects suffering from HBsAg positive acute hepatitis and among HBsAg carriers and showed a clear aggravation of the prognosis of HBsAg positive patients who were infected by Delta virus<sup>8</sup>.

In the light of the data already gathered by the literature, the purpose of this study is to evaluate the frequency of HBV and HDV infection in a remote population of the Popular Republic of Benin (West Africa).

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(1) Institute of Hygiene, University Medical School, Milan, Italy.

(2) 2nd. Department of Infectious Diseases. L. Sacco Hospital, Milan, Italy.

(3) St. Jean de Dieu Hospital. Tanguietà, R.P. Benin.

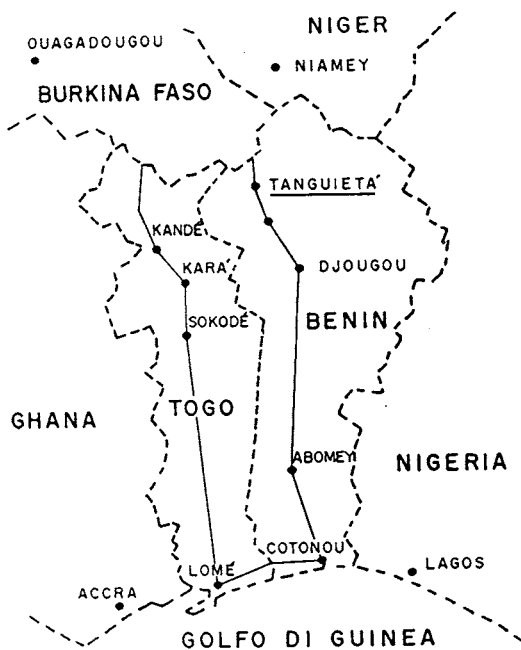


Fig. 1: This work developed in the shown district.

## PATIENTS AND METHODS

The hospital in Tanguieta has 200 beds and it is the only sanitary construction in the Atakora district, an area situated in the southern part of Sahel, in the P.R. of Benin (Fig. 1). The most important villages are provided with dispensaries which are very limited in their functions because of heavy lack of sanitary materials and they depend anyway on the hospital.

The served area is about 20.000 Km<sup>2</sup> and the principal activity of the about 300.000 people living in it, is agriculture, with an annual income of less than 60 US dollars.

Water supply is obtained from rudimental and not guarded wells.

The study was carried out in August 1986 on 424 subjects: 345 (158 m, 187 f) aged between 10 and 70 were in and out-patients (among these, 40 were pregnant women); 35 (34 m, 1 f) ranging from 19 and 41 years old, were blood-donors; 23 (21 m, 2 f) hospital nurses and 21 ill children between 1 and 7 years old.

The patients belonged to different tribes but they were all resident in the previously described district. The 424 serum samples were preserved at a temperature of 4°C for a maximum of 30 days

in appropriate containers homologated for the carriage and preservation of vaccines; then the serum samples were conserved at -20°C before being tested for HBV and HDV markers.

HBcAb and HBsAg presence was investigated using a commercial immunoenzymatic system (EIA tests; Abbott Laboratories, North Chicago, USA). Afterwards HBsAg positive samples were tested for HBcAg and HDV antibodies (EIA tests; Abbott, USA).

The clinical and biochemical results for each group of patients were statistically analyzed by Student's "t" test and Chi square test.

## RESULTS

### Viral markers prevalence in observed population:

The preliminary investigation (table 1) pointed out the HBcAb presence in 380/424 patients (89.6%). The detection of HBsAg gave positive results in 66/424 subjects (15.6%) and negative results in the remaining 314 cases: 44 serum samples (10.4%) determined negative for both markers.

Among the 66 HBsAg positive people (tab.2) 18 subjects (27.3%) were HBcAg positive and only 2/18 of them (11%) showed clinical symptomatology and alterations in the usual laboratory tests consistent with hepatic disease.

The antibody against Delta virus antigens has been globally found in 75/380 positive HBcAb (19.7%); among 66 HBsAg positive subjects, 23 (34.8%) were Delta infected.

### Viral markers prevalence in different groups of population:

The most numerous group of the studied subjects (patients at the hospital) showed signs of an HBV infection. In fact 14.2% were HBsAg positive, 76.2% HBcAb positive and these two markers were isolated or associated with other HBV and HDV markers (table 1).

Blood-donors presented a frequency of HBsAg positivity similar to that of the previously described group, a higher frequency was found in the hospital nurses (21.7%) but this difference was not statistically significant ( $p > 0.05$ ).

Six of the forty pregnant women (15%), were HBsAg positive; three among these (7.5%) were anti-Delta positive.

TABLE 1

HBV infection distribution in the examined population

Population group	Subjects n.	HBV neg. markers	HBsAg pos.	HBsAg neg. HBcAb pos.
patients at the hospital	345	32 (9.3%)	49 (14.2%)	264 (76.5%)
blood donors	35	3 (8.6%)	5 (14.3%)	27 (77.1%)
hospital nurses	23	2 (8.7%)	5 (21.7%)	16 (69.7%)
children (age < 7aa)	21	7 (33.4%)	7 (33.3%)	7 (33.3%)
Total	424	44 (10.4%)	66 (15.6%)	314 (74%)

TABLE 2

HBV and HDV markers distribution in the 66 HBsAg positive subjects

Population group	HBsAg pos. n.	HBeAg pos. n.	HDV Ab pos. n.
patients at the hospital	49	9 (18.4%)	18** (36.7%)
blood donors	5	2* (40%)	2* (40%)
hospital nurses	5	1 (10%)	3* (60%)
children (age < 7aa)	7	2 (28.6%)	4* (57.1%)
Total	66	18 (27.3%)	23 (34.8%)

\* 1 subject with HBeAg and HDV Ab positive parameters

\*\* 3 subjects with HBeAg and HDV Ab positive parameters

# 6 subjects with HBeAg and HDV Ab positive parameters

The small group of children, aged less than 7 years old, pointed out a higher prevalence of HBcAb in absence of HBsAg (33.3%). The HBsAg prevalence in this group was 33.3%.

Among the different ethnic groups of the examined population, no significant difference came out in the virus markers distribution.

## DISCUSSION

The diffusion of hepatic virus infections in the examined population is similar to the data concerning areas with similar socio-environmental characteristics<sup>6,9</sup>.

The presence of HBcAb in 89.6% of the examined subjects could suggest that HBV can be very easily spread in a population living in low sanitary conditions because of the poor water, supply, precocious sexual promiscuity and harsh initiatory rites.

According to the literature data, the research of anti-Delta antibodies shows a high prevalence of this viral agent whose transmission formalities are similar to that of HBV.

HBsAg positive subjects are 15.6% among the examined cases (Table 1); studies on HBcAg (Table 2) give presence of active virus replication in 18/66 (27.3%) HBsAg positive patients with a subsequent high infecting rate<sup>4,10</sup>. Anti-Delta seropositivity has been shown in 23 (34.8%) subjects of the same group of patients.

No case of acute hepatitis is present in all the subjects we examined. Clinical cases of acute viral hepatitis are unlikely to be observed in these areas, in adults especially if we consider the wide presence of virus markers. This is probably due to the following reasons:

- a) Infection diffusion in the first years of life with importance in the maternal-foetal transmission: high children mortality rate would probably conceal this phenomenon in regions lacking sanitary supervision;
- b) population trend in using the hospital facilities only for rather heavy and long duration pathologies;

By comparing the data of different groups of population, it was noticed that the markers distribution in blood-donors is similar to that observed in the total examined population. If these data indicate a careful and rapid selection of these subjects as necessary, on the other hand they point out that the apply to the hospital does not increase the positivity frequency.

As for the hospital workers (table 1), wholly in direct touch with the patients, the higher HBsAg (21.7%) positivity is a phenomenon that had been already observed in some European sanitary structures workers in the pre-vaccine time<sup>1</sup>.

A high virus markers (66.6%) prevalence, related to hepatic virus infections, can be noticed inside the limited number of paediatric patients.

40/345 patients were pregnant women, 6/40 (15%) were HBsAg positive. The maternal-foetal transmission surely plays the most important role in this situation. HBsAg and anti-Delta se-

ropositivity in children (33.3% and 23.8% respectively) has turned out to be higher than in the pregnant women (15% and 7.5%). These data let us suppose that the infection risk is connected to the ritual practices or somehow to the life habits of these populations.

## RESUMO

### Infecção pelo vírus da hepatite B e Delta em população da África Ocidental

Em 424 amostras de soros examinadas, a prevalência da infecção pelo vírus da hepatite B foi de 89,6% com 15,6% de positividade para o HBsAg. Algumas das amostras pertenciam a uma população aferente e outras a pessoas trabalhando em hospital rural situado na África Ocidental (República Popular de Benin). 27,3% dos indivíduos soro-positivos evidenciaram replicação do vírus como demonstrado pela presença do HBcAg.

Nos indivíduos HBcAb positivos, os anticorpos anti-delta foram positivos em uma frequência de 19,7%.

A presença de HBsAg em 15% das mulheres gestantes eleva a importância da transmissão de HBV, da mãe para o filho, nesta região.

Os resultados apresentados podem ser comparados com aqueles obtidos em outras áreas da África, com condições sócio-econômicas semelhantes.

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