



**OCCULT HEPATITIS B IN BLOOD DONORS AT THE NATIONAL
BLOOD TRANSFUSION CENTRE IN OUAGADOUGOU
(Burkina Faso)**

Kadidiatou Cissé¹, Oumar Traore¹, Alassane Alfousséni Doumbia¹, Mohemmedine Touré¹
Ousmane Diarra², Drissa Goita³, Traore Madou⁴, Hector Godonou⁵, Abdel Karim Sermé⁵.

1Medical Service, Unit of Gastro-Enterology, Regional Hospital of Sikasso, Mali

1Service of Medecine, Unit of Internal Medicine and Diabetology, Sikasso Hospital, Mali

1Service of Medecine, Unit of Rheumatology, Sikasso hospital, Mali

2Commune V Reference Health Centre, Mali,

3Service of infectiology, Luxamburg Hospital of Bamako, Mali

4Service of infectiology, Regional Hospital of Sikasso, Mali

5 Sercice of hepatogastroenterology department CHU yalgado Ouedraogo

Correspondence:

Dr kadidiatou CISSE

Hepato-gastroenterologist at Sikasso Hospital

Contact: 00223 92319895

Mail: kadidiatoucisse@yahoo.fr

SUMMARY

Introduction:

Hepatitis B is a major public health problem in highly endemic countries such as Burkina Faso. Occult hepatitis B is defined by the presence of viral DNA in the absence of HBs antigen. At the Centre national de transfusion sanguine (C N T S) in Ouagadougou, HBsAg is the only marker sought to discriminate between blood donors for HBV infection. This practice exposes donors to the risk of HBV transmission.

The aim of this study was to estimate this risk by determining the prevalence of occult hepatitis B (positive HBcAb) in blood donors at the Ouagadougou CNTS.

Patients and methods:

A prospective study was carried out over two months of blood donation collection. Total HBc antibody was tested in the serum of HBsAg-negative donors. If AchBc positive, DNA by real-

time PCR and anti-HBs antibody were requested. An outpatient consultation was carried out after informed consent had been obtained from DNA-positive patients.

Results:

Our sample included 987 HBsAg-negative donors, of whom 430 were HBc antibody positive (43.5%). 79 of the 430 donors were received for the study and 37 either (46.83%) were able to perform DNA testing. Thirteen out of 37 had detectable DNA (35.13%). DNA levels ranged from [2.23-73672] IU/ml with a mean of 953 IU/ml. Transaminases were normal. Liver fibrosis was not assessed. One case of occult HIV/HBV co-infection was noted.

Conclusion:

A high prevalence of occult B infection among blood donors (35.13%) at the Ouagadougou CNTS. Excluding only HBsAg-negative donors from blood donation represents a major risk of HBV transmission during blood transfusions. Excluding HBsAg-positive and/or anti-HBcAb-positive donors will greatly reduce this risk of transfusion transmission.

Key words: HBV, occult hepatitis B, DNA, anti-HBc, blood donors.

INTRODUCTION

Despite the existence of an effective vaccine, hepatitis B infection remains a major public health problem worldwide, particularly in Africa.

According to the World Health Organisation (WHO), two billion people are infected worldwide, with between 350 and 400 million suffering from chronic hepatitis.

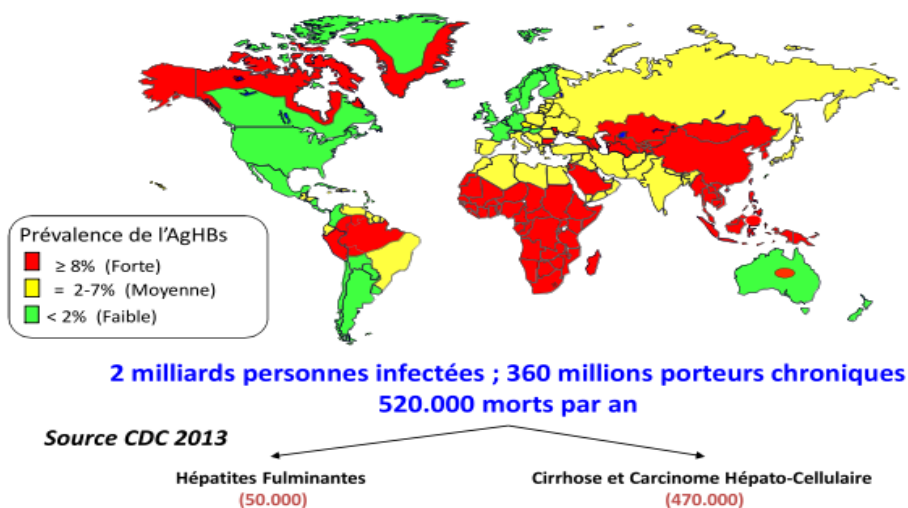


Figure 1: Global distribution of hepatitis B prevalence (CDC 2013) [6].

The method of preventing HBV transmission through blood transfusion adopted by blood banks in our regions is the exclusion from blood donations of subjects carrying HBs antigen (HBsAg) only.

However, in 1978, Hoofnagle et al [8,9] described the transmission of B infection via the transfusion of blood from a donor who was negative for HBsAg and anti-HBs but positive for anti-HBc.

Occult hepatitis B is characterised by the presence of B viral deoxyribonucleic acid (DNA) in the absence of HBsAg in blood and/or hepatocytes. Its prevalence varies from 0.5% to 50% or more [20]. It is therefore a potential threat in transfusion medicine. The aim of this study was to determine the prevalence of occult B infection in blood donors at the Ouagadougou national blood transfusion centre.

METHODOLOGY

This was a prospective two-month study from July to August 2013 of the blood donation collections of 987 donors. Total HBc antibody was tested in the serum of HBsAg-negative donors. In HBsAg-negative and HBcAb-positive donors, viral load by real-time PCR and HBsAb titration were requested after an outpatient consultation at the hepato-gastroenterology department. Informed consent was obtained from the donors included in the study. The cost of additional tests was borne by the donors, with the exception of anti-HBc tests.

The data collected on the collection forms were entered and analysed on a microcomputer using Epi 3.5.4 software (French version).

RESULTS

79 donors were seen on an outpatient basis out of 430 HBsAg-negative and antiHBc positive donors,

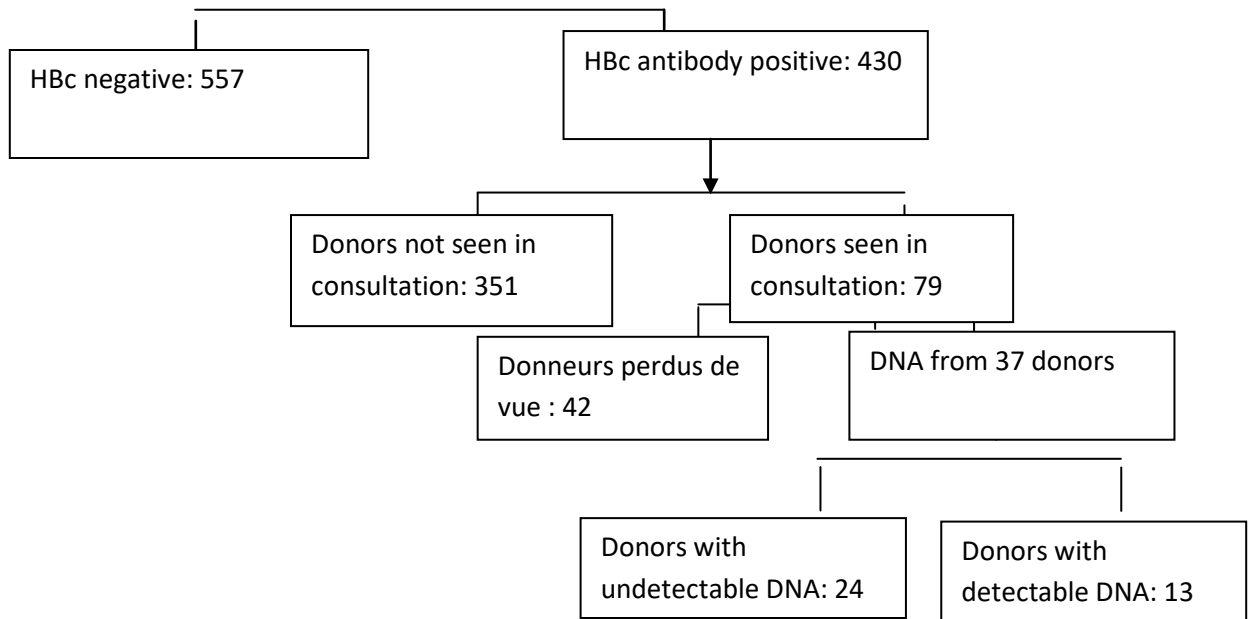


Figure2: summary of donor selection

Socio-demographic aspects

In our series, 13 detectable donors out of 37 had produced their viral DNA, giving a prevalence of occult B infection of 35.13%.

There were 10 men and 3 women, giving a sex ratio of 3.33.

The mean age was 33.15, with extremes of 24 and 54. The age range [21-30] years was the most common, with 8 donors, 3 of whom were 30 years old.

Nearly half of our donors were married (6), followed by single donors (4).

Risk factors and history

Certain factors were found in our donors and are grouped in the following table

TABLE I: Summary of risk factors and history

Risk factors	Workforce
Medical history	5
Jaundice	2
Gesteendoscopy	2

Blood transfusion	1
Surgical history	10
Surgical operation	3
Circumcision	7
Excision	3
Dental care	3
Human bites	3
Scarification	3
Collective use of a disturbing object	8
Nail clippers	8
Razor	4
Blade	3

Clinical aspect

The clinical examination of our donors did not reveal any specific signs of liver disease. This finding has been noted in other studies. However, evolution towards chronic liver disease or reactivation is possible in certain situations.

Paraclinical aspects

Viral load The HBV viral load (DNA) was determined by real-time PCR in four laboratories using three techniques. The mean was 953.55 IU/ml (5549.71copies). Only one donor had a viral load greater than 2000 IU/ml, which was 73672.68 IU/ml.

HBsAb: was detected in 10 donors, 7 of whom had levels above 10 IU/ml, i.e. a protective threshold.

HBeAg and HBeAb: only 02 donors had tested for HBeAg and HBeAb. They came back negative and positive respectively.

HCV serology: none of the 13 detectable donors had positive HCV antibody serology.

HIV serology: only one case of HBV-HIV co-infection was found.

DISCUSSION

The prevalence of occult B infection is highly variable, with figures ranging from 0 to 50% in the literature according to Vallet-Pichard A, Pol S [20] in 2008.

In our study, 13 donors had detectable HBV DNA out of 37 tested, giving a prevalence of 35.13% of occult B infection in blood donors.

In our series, the prevalence of occult hepatitis B is higher than that of Coulibaly M L in 2011[5], Moresco M. Ndos S [11], Oluyinka OO [12] in 2015, Said Z N 2013[17] and Doumbia B in 2017[6], who respectively found prevalence rates of :

- 2.7% of 3600 samples were negative for HBsAg and positive for HBV DNA;
- 17.2% occult B infection in 3167 HBsAg-negative donors,
- 17% occult B infection in blood donors.
- 11.9% occult B infection in the general population

Lower prevalences of 0.006%, 0.22%, 0.05% and 0.0006% than that recorded in our study have been reported by Oluyinka OO et al [12] respectively in the European countries of Poland, Italy, Spain and Germany, which are countries known for their low prevalence of HBV infection.

In our series, this high prevalence of occult B infection could be explained by Burkina Faso's location in a highly endemic HBV zone, the small size of samples tested for DNA, and by improvements in DNA detection techniques (real-time PCR), which are now more sensitive.

Carriage of anti-HBc antibodies

In our study, we noted a prevalence of anti-HBc antibody carriage of 430/987 or 43.5% in HBsAg-negative blood donors.

Barro L [2], also in Burkina Faso, found an HBcAb carriage rate of 38.07% in HBsAg-negative blood donors.

Biwole et al [3] in Cameroon in 2015 reported a higher seroprevalence rate of anti-HBc antibodies than in our study, of 57% in HBsAg-negative blood donors.

These differences may be explained by the sensitivity of the tests used and the level of endemicity of the study population.

Socio-demographic aspects

The mean age of the patients in our series was 33.15 years, with extremes of 24 and 54 years. Rios-Ocampo W A [15] and Oluyinka OO [12] found respectively higher mean ages: 39.7 ± 10.97 years and 40.2 ± 13.9 years.

The sex ratio of 3.33 can be explained on the one hand by the generally low participation of women in blood donation, and on the other hand by the cost of complementary examinations which are often out of reach for women. Les facteurs de risque

- Surgical history was found in 10 donors and medical history in 5 donors. Circumcision was noted in 7 of the 10 men and excision in all 3 women.
- The collective use of sharp objects was noted: nail clippers (8 donors), razors (4 donors) and blades (3 donors).
- In our regions, these practices help to promote and maintain HBV transmission.
- Clinical aspect
- In our series we did not note any signs of liver disease, but four clinical situations may be circumstances for the discovery of HBV. These are
- - Transmission of occult HBV infection to a recipient:
- During the work-up of generally acute hepatitis in a recipient. In France, the post-transfusion risk is 1 in 45,000 (twice that of hepatitis C and 4 times that of AIDS). This risk of HBV transmission in anti-HBc positive subjects has long been demonstrated [8].
- - Reactivation of an occult B viral infection

This has been described in the literature during immunosuppression in the case of chemotherapy, transplants (kidney, marrow, liver) and immune deficiencies [7].

Vallet-Pichard A and S Pol 2008 found a frequency of viral reactivation of around 0.5% in kidney transplantation and 5% in haematopoietic stem cell transplantation in recipients with anti-HBc antibodies [20].

- Chronic liver disease and occult B infection

In our study, fibrosis had not been assessed, but on clinical examination and ultrasound we noted no signs suggestive of chronic liver disease.

- Hepatocellular carcinoma [19]

In our series, we did not observe any cases of HCC, although anatomopathological examinations were not performed in our patients.

The prevalence of occult hepatitis B varies from 10-60% or even more in cases of HCC of unknown cause according to some authors [18, 20].

Paraclinical aspects

Occult hepatitis B is a complex biological entity.

Viral load (viral DNA)

Approximately 2 thirds (24/37) of the viral loads were carried out in a single local laboratory using the PCR/Appliedbiosystems 7500 platform technique.

In the present study, for 13 cases of detectable DNA, HBV viral loads ranged from [2.23-73672.68IU/ml] with an average of 953.55IU/ml corresponding to

[13-428775copies/ml] with a mean of 5549.71 copies/ml.

Only one donor had a viral load greater than 2000 IU/ml (73672 IU/ml).

Our results are superimposed on those of certain authors:

- In Nigeria, Oluyinka O [12] reported a viral load of between 18.4 and 224.3 IU/ml. However, one of these patients had a viral load of over 4000 IU.
- In Europe, a study by Candotti et al [4] found a viral load of between unquantifiable and 5640 IU/ml, with a median of 25 IU/ml.

In sub-Saharan Africa, two studies carried out in donors with occult hepatitis B found a median viral load of 17 IU/ml (A) and 48 IU/ml (D).

In the literature, HBV viral load is generally low in cases of occult B infection. These values were less than 4 logs [10, 20].

We did not perform HBV sequencing in our series, but Allain J P et al [1] found a predominance of A1 genotype (23 strains)/54, and D genotype (07 strains) was noted.

Anti-HBs antibody

The anti-HBs antibody titration was greater than >10 IU/ml in 07 donors.

Our results are similar to those of Raimondo G[14], who found that his donors with occult B infection were all anti HBc positive. However, Oluyinka O et al [12] reported an anti-HBs carriage rate of 30% lower than our results, i.e.

21/ 72 cases of occult B infection.

DNA sequencing could have made it possible to identify the types of genes associated with occult hepatitis B.

HBcAb

We noted a carriage rate of anti-HBc of 43.5%. This high prevalence of HBcAb carriage has been found in several series, particularly in highly endemic countries [3, 7, 13].

Oluyinka O [12] reported an anti-HBc carriage rate of 43.05%, similar to that in our study, and Said Z N [16] found a lower rate of 14.2% anti-HBc carriage among blood donors in Egypt.

The prevalence of IBO is high in anti-HBc positive subjects, especially in the absence of anti-HBs.

Only one case of HIV-HBV co-infection with a HBV viral load of 411copies.

The prevalence of IBO was high in anti-HBc-positive subjects, especially in the absence of a protective level of anti-HBs.

The rest of the standard liver work-up is generally normal, with transaminases normal or less than 04 times normal.

Occult hepatitis B is a chronic hepatitis that is usually inactive.

Conclusion

In view of these high frequencies: 43.5% and 35.13%, occult hepatitis B is common, but it is most often latent in the absence of a cofactor.

Eliminating only HBsAg(+) donors remains a potential risk of HBV transmission during blood transfusions.

Excluding HBsAg(+) and anti-HBc(+) blood donors from blood donations will greatly reduce this risk of transmission, but this practice is still proving difficult in our countries.

Proper screening and vaccination from birth onwards are essential preventive measures against HBV.

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