Hepatitis B screening: Who to target? A French sexually transmitted infection clinic experience ☆

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Background & Aims: Hepatitis B virus (HBV) infection is a major public health burden in France and worldwide. Routine screening for hepatitis B is not currently recommended in France. Medical experts and public health agencies opinions can differ concerning targeting criteria. Our study aims at developing a risk assessment strategy for identifying possible hepatitis B cases among the patients consulting in a French Sexually Transmitted Infection (STI) clinic.

Methods: 6194 asymptomatic patients requesting an STI screening were also screened for hepatitis B infection. The association between hepatitis B surface antigen (HBsAg) positivity and/or total hepatitis B core antibody (anti-HBc) positivity and self-reported risk factors for hepatitis were analysed.

Results: Only male gender, lack of employment, and birth, in medium or high endemic country, were independently associated with HBsAg positivity in multivariate analysis. Sexual behaviour or self-reported vaccination status is therefore not necessary to target high-risk populations. These three simple criteria could save 25% of unnecessary tests and 6–16% undiagnosed hepatitis B compared to usual targeting criteria.

Conclusions: To detect HBsAg carriers, only three simple targeting criteria, without taking into account the self-reported vaccination status or sexual behaviour, could improve screening efficiency and save unnecessary testing.

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Introduction

Hepatitis B virus (HBV) infection is a major public health burden in France and worldwide. Its consequences are severe, both in terms of morbidity, mortality, and cost for the community (the long-term illness can lead to cirrhosis and cancer) [1].

In France, a low endemic country, the prevalence of the antibody to hepatitis B surface antigen (HBsAg) in the general population was estimated at 0.65% in 2004 and the prevalence of the antibody to hepatitis B core antigen (anti-HBc) at 7.3% [2]. HBV causes nearly 1300 deaths per year and 280,000 chronic carriers [3].

Several strategies against the disease have been developed in France: informing the health workers and general population, optimising patient's management, screening of asymptomatic carriers, vaccination of infants, and high-risk population.

One of the missions of the Sexually Transmitted Infection (STI) clinics in France is to offer free and anonymous screening to combat hepatitis B. These clinics have a special place in disease control because they deal with particularly high-risk populations [4]. They have three main goals: to inform patients about the disease, to identify patients with an HBV infection, and to encourage those at risk to be vaccinated.

Routine screening for hepatitis B is not recommended either for the general French population or in STI clinics [4,5]. Screening should only target high-risk populations.

Male gender, age over 29 years, lack of adequate health coverage, birth or residence in an area of medium or high endemicity, intravenous drug use, homosexuality, or previous admission to a psychiatric or social institution were independently associated with anti-HBc positivity in a 2004 French prevalence survey [2]. Currently, medical experts and public health agencies opinions can differ concerning targeting criteria for screening. Risk factors systematically taken into account are: having multiple sexual partners, coming from a medium or high endemic country, intravenous drug abuse, having a chronic HBV carrier among the sexual partners or the household members. Knowledge of prior vaccination, intranasal drug use, tattoos, body piercing, sexual orientation, transfusion, and social status are not clearly identified as targeting criteria for screening [4,5]. These risk factors are generally identified by a questionnaire during the interview of asymptomatic patients. Often the absence of any previous medical record renders the verification of the patient's vaccination history impossible.

In the La Grave STI centre, the following criteria are generally considered: multiple partners (at least two during the last year), hepatitis among sexual partners or household members, birth in

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an area of high or medium endemicity, transfusion history or blood contacts, tattoos, body piercing, and intravenous or intranasal drug use. Self-reported vaccination status is an optional criterion that the practitioner chooses to take into account or not.

Since the main challenge of STI clinics is to identify HBsAg carriers, many centres only offer this specific test. Screening of HBsAg chronic carriers is the most important issue to initiate medical treatment, but detection of all anti-HBc carriers enables the screening of contacts that may have been contaminated during the acute phase of infection. Moreover, carriers of isolated anti-HBc could have occult hepatitis or endogenous viral reactivation. Therefore, some centres first test for anti-HBc and only test for HBsAg if the first test is positive [6,7].

The main objective of this study was to develop a risk assessment strategy for identifying possible hepatitis B cases and targeting the test among the patients consulting in the La Grave STI clinic. The secondary objective was to evaluate whether targeting criteria should depend on the screening goal: identifying HBsAg carriers only or identifying anti-HBc carriers at first.

Materials and methods

From January 2009 to June 2009, all asymptomatic patients coming to La Grave's Hospital STI clinic (Toulouse, France) for STI screening were also offered testing for HBV infection, whatever their risk factors.

All patients completed a self-administered questionnaire regarding vaccination history and potential risk factors for HBV infection (Table 1). The questionnaire was then refined and data were collected with Cupidon software (Epiconcept) with the help of the practitioner during pre-test counselling consultation. After the interview, an additional HBV serologic test was performed on the blood sample usually collected: HBsAg (Architect HBsAg Qualitative Abott Diag) and anti-HBc (Architect anti-HBc II Abott Diag). All patients with at least one of the two markers missing were excluded. All biomarkers were then checked before the analysis and analysed with the STATA 11 software (STATA corp).

The country of birth was categorized into one of three groups regarding the endemic area of HBV, according to the World Health Organisation (WHO) classification: low endemic (⩽2% HBsAg prevalence), mild endemic (2–8% HBsAg prevalence) and high endemic country (⩾8% HBsAg prevalence) [8]. "Blood exposure" was defined as any accidental blood injury or projection on damaged skin/mucous (professional or not) and "hepatitis contact" as having or having had a sexual partner or household member with an HBV infection or undefined hepatitis.

Two risk assessment procedures were developed using HBsAg or anti-HBc as the outcome.

All factors associated with anti-HBc or HBsAg positivity in the univariate analysis (as determined by Chi-squared or Fisher exact tests, as appropriate) at p values ⩽0.2 were entered in the multivariate analysis, to develop a model-based individual risk assessment. A backward stepwise logistic regression was used, and all variables with p values ⩽0.05 were included in the final model. Goodness of fit was examined with the Hosmer–Lemeshow test (H–L test) and area under the Receiver Operating Characteristic (ROC) curve was assessed to evaluate model accuracy.

Results

7692 patients were admitted during the period and 6194 patients (80.53%) were screened for HBV with the two markers (Table 1).

The percentage of non-inclusion is due to non-prescription of at least one of the two markers during the period. The risk factors did not differ significantly between the included and non-included population.

Forty nine (0.79%) participants were HBsAg positive and 275 (4.4%) were anti-HBc positive. Two patients were HBsAg positive

without anti-HBc positivity, 228 patients were anti-HBc positive without HBsAg positivity.

Among the 6194 patients included, 3469 (56%) were female. The majority of patients were in the 20–29 years of age group (61.8%) and 92% were under 40. Nearly 52% of patients were students, which is consistent with the young age of the population, 9.9% were unemployed (Table 1).

92.7% of patients had a complete or partial health coverage, 12.7% of patients reported being born in a high or medium endemic area.

The number of patients claiming to have been transfused (1.3% of the population studied), and those who have already used intravenous drugs (0.7% of the population studied) was low. However, 9.8% reported having used intranasal drug.

Few patients (1.3%) reported having had an accidental exposure to blood, 2.5% reported a notion of hepatitis among the household members or sexual partners, 12% reported having had at least one tattoo and 37.3% having had at least one body piercing in their life.

The proportion of gay or bisexual among men was high (15.7%). 77% of all patients had at least two partners in the past year and almost 7% had over ten partners. Only 29% declared to have always had protected sexual intercourse in the past year.

The majority of patients (63.5%) did not know if they were vaccinated for HBV. 13.6% of patients claimed to be vaccinated and 15.2% said there were not.

Results of the univariate analysis (for HBsAg or anti-HBc) are presented in Table 1.

In multivariate analysis (Table 2), male gender, age over 30 years, unemployment, incomplete health coverage or lack of health coverage, place of birth in a country of medium or high endemicity, awareness of hepatitis contact, and self-reported personal history of hepatitis B were independently associated with anti-HBc positivity.

The model showed a good calibration (H–L test p >0.05) and an excellent area under the ROC curve (0.9221). According to this model, 70.6% (4376/6194) of all patients presenting would be tested, with 268/277 (96.7%) of anti-HBc positives being identified. Then, 48/49 (98%) of HBsAg positives would be identified.

In multivariate analysis, only male gender, lack of employment, and place of birth in medium or high endemic country were independently associated with HBsAg positivity alone (Table 2). The model showed a good calibration (H–L test p >0.05) and an excellent area under the ROC curve (0.9151). In this model, 63.7% (3949/6194) of all consulting patients would be tested, with 48/49 (98%) HBsAg carriers identified.

The current targeting strategy used in the centre was also analysed. This strategy would have resulted in 84% (5205/6194) of patients tested with 46/49 (93.8%) HBsAg positives and 260/277 (93.8%) anti-HBc positives identified, regardless of their vaccination status. If the same strategy had been maintained but without screening those who reported to be vaccinated, it would have showed 41/49 (83.7%) HBsAg positives and 229/277 (82.7%) anti-HBc positives for 72.7% (4504/6194) of patients tested.

Discussion

To detect HBsAg carriers, the targeting strategy should take into account three factors: male gender, birth in an area of high or