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Eurosurveillance, Volume 13, Issue 21, 22 May 2008

Surveillance and outbreak reports

HEPATITIS B VIRUS TRANSMISSION FROM A NURSE TO A PATIENT, FRANCE, 2005

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Citation style for this article: Poujol I, Floret N, Servant-Delmas A, Marquant A, Laperche S, Antona D, Lot F, Coignard B. Hepatitis B virus transmission from a nurse to a patient, France, 2005. *Euro Surveill.* 2008;13(21):pii=18877. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=18877>

Date of submission: 19 May 2008

Introduction

Infection by the Hepatitis B virus (HBV), which is often asymptomatic at the acute phase, can progress to chronic liver disease, particularly when infection occurs early in life.

Hepatitis B is mainly transmitted sexually or through blood or body fluids. Episodes of healthcare-associated transmission of HBV have been previously described [1-3]. Transmission of HBV results either from patient to patient through invasive healthcare procedures with improper disinfection of devices used between patient care or from a patient to a healthcare worker (HCW). Transmission can also take place from a chronically infected HCW to a patient. In those episodes, breaches in healthcare practices and standard precaution play a major role.

Prevention of HBV transmission in healthcare settings also relies on the immunisation of HCW, which has been mandatory in France since 1991. HCW are considered immune if they have documented proof that they were vaccinated before 13 years of age, or if a positive anti-HBs antibody test is provided [4].

Description of the episode

In 2005, the Institut de veille sanitaire (InVS) in France was notified of a case of HBV seroconversion in a 35 year-old-female patient who had been operated on twice in a healthcare facility for a bilateral cirsectomy (excision of a section of a varicose vein) in the lower limbs. The implicated healthcare facility reported the case after being informed by the patient of the occurrence of acute laboratory-confirmed hepatitis B 11 weeks after the two operations. An epidemiological investigation was immediately conducted by the regional unit for nosocomial infection control and district and regional health authorities, together with methodological support and guidance from the InVS.

The investigation initially focused on confirming the absence of other modes of exposure to HBV in the patient by interviewing regarding risk factors. The serological status of the patient's partner was controlled and was negative. The only potential risk factor for the case in the six months preceding the diagnosis of acute hepatitis B was dental care.

We then investigated a potential transmission through healthcare, for which the source could have been either an infectious patient hospitalised at the same time as the case or an HCW involved in treating the patient. All patients (n=5)

who had surgery at both surgical sessions as the index patient were recorded and screened for HBs Ag and anti-HBs Ab. All results were negative. We audited hygiene practices in the operating room based on a standardised questionnaire. Breaches in the implementation of standard precautions were documented, particularly as regards to appropriate hand washing. Procedures for disinfecting medical devices had not been updated (in particular those concerning laryngoscope blades). The results of the audit were presented to all HCWs of the hospital to stress the importance of strict compliance with standard precautions.

The remaining hypothesis to investigate was transmission from an infectious HCW. No exposure to blood or blood products had been reported while the case was hospitalised. The list of current HCWs involved in caring for the patient, either in the surgery room, the recovery room or the hospital ward was established. Screening for HBV proposed to, and done by the 22 health and paramedical workers did not identify any chronic carrier of HBV.

Meanwhile, the investigation revealed that an anaesthetic nurse who was on sick leave at the time of investigation had participated in one of the two surgical procedures for the case. This HCW had been vaccinated for hepatitis B in the early 1990s by the occupational health service. Following a serological control in 1992, the nurse had been considered to be a 'healthy carrier' with clinically healed hepatitis B requiring no follow-up. A date of infection could not be established. Clinical investigations had revealed a chronic hepatitis B with a high level of viral replication. The anaesthetic nurse who had been working in the healthcare setting since 1995, mainly in orthopaedic and vascular surgery, performed anaesthesia with the laying and management of venous perfusions and vertebral anaesthesia. During interview she reported not wearing gloves and needle sticks on several occasions without ever notifying any past blood exposure to the occupational health services.

After obtaining the HCW and the patient's consent, a molecular and phylogenetic analysis of the viral strains was performed. The analysis was carried out on independent regions of the HBV genome (gene S and gene C), and showed 99.8% sequence homology of an HBV strain of genotype D in both subjects.

Discussion

According to published data, over 50 HCW have been involved in HBV transmission to patients during care since the 1970s. Most were surgeons, obstetricians or dentists who performed invasive procedures [3,5,6], and only one episode was linked to a nurse [7].

Our epidemiological and molecular investigation strongly suggests HCW-to-patient transmission. It was not possible, however, to identify the exact mode of transmission. The audit of hygienic practices indicated breaches in hand hygiene. Carrying out invasive care, such as laying or handling peripheral i.v. devices, may have contributed to HBV transmission considering the high viral load of the HCW.

This incident shows that the full and strict adherence to standard precautions must be stressed even in situations which may seem 'ordinary' at first sight. This episode also stresses the importance for occupational health services to document and strictly follow-up HCW immunization status. The most recent immunisation recommendations of the French Ministry of Health define precisely the working conditions for HCW regarding hepatitis B [4].

The discussion on how to manage HBV-infected HCW continues. Different guidelines are implemented in European countries to exclude HCW from performing exposure-prone procedures. A European consensus group produced recommendations for preventing HCW to patient transmission of viral hepatitis in 2003 and agreed that each country may define its own HBV DNA cutoff level [8].

Acknowledgments

The authors thank Jean-Claude Desenclos for his comments and Farida Mihoub for translation.

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