SHORT REPORT

Exposure to blood borne viruses and the hepatitis B vaccination status among healthcare workers in inner London

P Gyawali, P S Rice, A J Tilzey

Abstract

Occupational exposure to blood borne viruses was examined during one year at a London teaching hospital. A total of 236 incidents occurred of which 83% were related to sharps, 32% were clearly avoidable, and 7% involved an infected source patient. Overall uptake of hepatitis B vaccine was 78% but it was particularly low in paramedical (70%) and domestic staff (45%). Continued effort needs to be applied to improve uptake of hepatitis B vaccine and to maintain high standards of control of infection.

(*Occup Environ Med* 1998;55:570-572)

Keywords: healthcare workers; blood borne virus; hepatitis B

Occupational exposure to blood and body fluids places healthcare workers at risk of infection with blood borne viruses including hepatitis B, hepatitis C, and HIV.

The risk of infection with hepatitis B (with an "e" antigen positive source) and hepatitis C after percutaneous exposure to blood is about 30% and 3% respectively.¹ Although the risk of HIV infection after such an exposure is much lower (0.3%),² occupationally acquired HIV infection has occurred in 93 healthcare workers worldwide and is presumed in a further 166 up until July 1997 (personal communication, PHLS AIDS Centre, CDSC).

If infection with hepatitis B or hepatitis C becomes chronic, a lengthy course of anti-viral treatment may be necessary, and if this fails, healthcare workers who perform exposure prone procedures may need to be retrained.³

The risk of infection with blood borne viruses can be reduced by adherence to universal precautions and maintaining high standards of infection control including prompt reporting of incidents.⁴ The benefit of rapid reporting was recently emphasised after prophylaxis with zidovudine was shown to reduce the risk of infection by 79% after exposure to HIV.⁵ Indeed, the United Kingdom Health Departments have recommended that triple antiretroviral treatment be started, ideally within 1 hour

of exposure, for healthcare workers occupationally exposed to HIV.⁶

Infection with hepatitis B is preventable by immunisation and Department of Health recommendations in 1993 aimed to improve hepatitis B vaccine uptake among healthcare workers. It stated that all surgeons should be vaccinated against hepatitis B by mid-1994 and all other staff performing exposure prone procedures by mid-1995.⁷

In this study we examined the incidence and nature of reported exposures to blood and body fluids in staff during one year at a London teaching hospital. Rates of uptake of hepatitis B vaccine were evaluated.

Methods

An incident form is completed for healthcare workers in the Guy's and St Thomas' Trust who report an exposure to blood or body fluids to the Occupational Health Department. The information provided includes staff details, nature of the incident, information about the source patient, and the hepatitis B vaccination status and management of the healthcare workers. In April 1994 this form was modified to allow recording of the healthcare worker's occupation. We retrospectively analysed all forms completed in 1994.

Staff were classified by occupation and area of work and incidents as either hollow bore or solid sharps injury, mucocutaneous exposure, or penetrating bite. A description of how the exposure occurred, if given, allowed the cause to be defined as clearly avoidable—for example, resheathing needle—or unclassifiable if it did not fall readily into the former category.

Source patient details and test results for hepatitis B surface antigen (HBsAg) and antibodies to HIV and hepatitis C were noted. Patients were ranked as high or low risk according to recorded risk factors—for example, intravenous drug user, male homosexual.

In accordance with national guidelines, the management of incidents took into account the hepatitis B vaccination status of staff and risk factors of the source patient.⁸ If the source was anti-HIV or hepatitis C positive the healthcare worker was followed up at 3 and 6 months.

Department of
Virology, Guy's and St
Thomas' NHS Trust,
St Thomas' Hospital,
Lambeth Palace Road,
London, UK
P Gyawali
P S Rice
A J Tilzey

Correspondence to:
Dr A J Tilzey, Department of
Virology, Guy's and St
Thomas' NHS Trust, St
Thomas' Hospital, Lambeth
Palace Road, London
SE1 7EH, UK.

Accepted
25 February 1998

Results

A total of 236 exposures were reported during 1994. Nursing staff were involved in 79/236 (33%) incidents, medical staff in 33/236 (14%), paramedical and dental staff in 37/236 (16%), and porters/domestic staff in 9/236 (4%). Due to modification of the incident form in May 1994, staff occupation was not recorded in 33% of cases. Of exposures among medical staff, 17/33 (52%) and 6/33 (18%) were among physicians and surgeons respectively, and 3/33 (10%) involved medical students. The rates of reported exposures on wards (63/236 (27%)) and in operating theatres (62/236 (26%)) were similar.

Most incidents (197/236 (83%)) were sharps injuries, of which 122/236 (52%) were hollow bore; 30/236 (13%) exposures were mucocutaneous and nine involved bites from patients. Of all exposures, 76/236 (32%) were clearly avoidable and most of these (71/76 (93%)) were due to sharps injuries. Indeed, resheathing of needles was the cause of 15/122 (12%) hollow bore needlestick injuries and improper disposal of sharps was the cause of almost all (8/9) domestic staff exposures.

The source patient was identifiable in 197/236 (83%) cases with 61/197 (31%) classified as high risk. Blood was available for testing from 131/197 (66%) patients with results recorded in 107/197 (54%) cases. Of the 61 high risk patients, testing showed three, eight, and six to be positive to HBsAg, anti-hepatitis C, or anti-HIV, respectively. Thus 16/236 (7%) exposures involved blood or body fluid positive for at least one bloodborne virus. One patient was coinfecting with HIV and hepatitis C. All patients who were anti-HIV or HBsAg positive had been identified before the incident. Two of eight patients positive for anti-hepatitis C were, however, identified only after the incident.

A complete course of hepatitis B vaccine was documented in 185/236 (78%) staff, with uptake rates similar among nursing (66/79 (83%)) and medical staff (28/32 (88%)) (table). Two healthcare workers were naturally immune. Twenty one per cent of healthcare workers were not vaccinated, or had not completed a course when exposed, with domestic staff showing the lowest uptake (4/9 (45%)). Uptake rates were also low for paramedical staff with 11/37 (30%) not vaccinated. Of the 185 staff who had completed a full course, an anti-HBs result was recorded in 144 (77%). Thus only 144/236

(61%) of staff were known to be protected against hepatitis B at the time of exposure.

Eight staff were exposed to blood positive for hepatitis C antibody; five were followed up at 3 and 6 months, none of whom seroconverted and three were lost to follow up. Seven staff exposed to HIV had no evidence of infection at 6 months.

Discussion

This study analysed reported exposures to blood or body fluids in healthcare workers in a London teaching hospital over one year. The true rate of exposure however, is likely to be higher as underreporting, especially among doctors, and in particular, surgeons, is well documented.⁸⁻⁹ In our study, the incidence of reported exposures was similar on wards and in operating theatres, yet only six exposures were reported by surgeons compared with 17 in physicians. Furthermore, injuries with hollow bore needles were reported twice as often as those involving solid bore instruments, consistent with studies from the United States.¹⁰ As injuries involving hollow bore needles pose a higher risk than those involving a solid sharp instrument, staff, and in particular surgeons, may be underreporting punctures from solid sharp instruments.

Our study supported the findings of an Australian study¹¹ that showed that almost one third of exposures were clearly avoidable, and that most of these were related to sharps. Resheathing of needles, a practice which is no longer recommended, and inadequate disposal of sharps were examples of avoidable causes. In some cases needles were left under paper towels or discarded into bags intended for household waste. Other clearly avoidable causes included overfull or unavailable sharps bins. These data emphasise the need for continuing education on the practice of high standards of control of infection and the proper disposal of sharps. Furthermore, as 10% of exposures of medical staff occurred among medical students, education needs to be part of undergraduate teaching.

Our study showed that 78% of staff who reported an exposure had received a full course of hepatitis B vaccine with the lowest uptake rates in paramedical and domestic staff. This figure is similar to that found in a previous study at another London teaching hospital between 1989 and 1991.¹² It should be stressed, however, that this earlier study predated the 1993 United Kingdom Health Departments guidelines whereas our study analysed data from 1994. The especially low uptake (45%) in domestic staff may reflect a low perception of risk among this group. We have shown, however, that they are at risk, particularly from inappropriately discarded sharps.

After publication of the United Kingdom Health Department's recommendations on post-exposure prophylaxis (PEP) after exposure to HIV, ours and other Trusts in the United Kingdom have produced protocols on the management of exposed healthcare workers. Such protocols should be widely distributed, especially in "high risk" areas such as

Table Hepatitis B vaccination according to occupation in healthcare workers

Occupation	Completed course (n (%))	Not begun or incomplete course (n (%))	Total
Nursing	66 (83)	13 (17)	79
Medical	28 (88)	4 (12)	32
Paramedical	26 (70)	11 (30)	37
Porters or domestic	4 (45)	5 (55)	9
Unstated	63 (80)	16 (20)	79
Total	187*(80)	49 (20)	236

* Includes two members of staff who were naturally immune

accident and emergency, genitourinary medicine, and pathology laboratories. These guidelines should raise awareness of the risk that blood borne viruses pose to all staff and encourage prompt reporting of all exposures to blood or body fluids. After possible exposure to a blood borne virus, the complete recording of staff details onto a computer database would enable audits to be performed, alert Occupational Health Departments to problem areas within the hospital and thus improve the management and education of healthcare workers involved in such exposures.

We thank all the staff of the Occupational Health departments of Guy's and St Thomas' Trust for collecting the data and Professor JE Banatvala for constructive discussion in the preparation of the manuscript.

- 1 Tibbs CJ. Methods of transmission of hepatitis C. *J Viral Hepat* 1995;2:113-9.
- 2 Henderson DK, Fahey BJ, Willy M. Risk of occupational transmission of HIV. *Anns Intern Med* 1990;113:740-6.
- 3 Dusheiko GM, Khakoo S, Soni P, et al. A rational approach to the management of hepatitis C infection. *BMJ* 1996;312:357-64.
- 4 British Medical Association. *A code of practice for the safe use and disposal of sharps*. London: BMA, 1990.
- 5 Centers for Disease Control. Case-control study of HIV seroconversion in healthcare workers after percutaneous exposure to HIV infected blood: France, United Kingdom and United States: January 1988—August 1994. *MMWR CDC Surveill Summ* 1995;44:50.
- 6 UK Health Departments. *Guidelines on post-exposure prophylaxis for health care workers occupationally exposed to HIV*. London: UK Health Departments, June 1997. (PL/CO(9)1.)
- 7 NHS Management Executive. *Protecting healthcare workers and patients from hepatitis B virus infection*. Lancashire: Department of Health, 1993. (Health Service Guidelines HSG [93]40.)
- 8 Mangione CM. Occupational exposure to HIV: frequency and rates of under-reporting of percutaneous and mucocutaneous exposures by medical staff. *Am J Med* 1991;90:85-90.
- 9 Smith ER, Tilzey AJ, Banatvala JE. Hepatitis B vaccine uptake among surgeons at a London teaching hospital: how well are we doing? *Ann R Coll Surg Engl* 1996;78:447-9.
- 10 Jagger J, Hunt EH, Brand-Elnaggar J, et al. Rates of needlestick injury caused by various devices in a University Hospital. *N Engl J Med* 1988;39:284-8.
- 11 Mallon DFJ, Shearwood W, Mallal SA, et al. Exposure to blood borne infections in HCWs. *Med J Aust* 1992;157:592-5.
- 12 Oakley K, Gooch C, Cockcroft A. Review of management of incidents involving exposure to blood in a London teaching hospital, 1989-91. *BMJ* 1992;304:949-51.

Occupational and Environmental Medicine and the electronic age

OEM has an Email address which is 100632.3615@compuserve.com. We welcome contact by Email, including letters to the editor. Many of our reviewers send us their reports by Email, helping to speed up the peer review process.

Our publishing system is now fully electronic, and authors are sending their revised copy to us on disk as well as paper. Watch for revised Instructions to Authors.

The Editor