Occupational exposure to HIV: response to a system failure

THIS REPORT DOCUMENTS a multifactorial failure of the system of reporting and responding to occupational exposures, which led to a substantial delay in instituting prophylaxis for HIV exposure. About half the percutaneous sharps injuries sustained by healthcare workers in the United States go unreported.[1] At our 621-bed institution, 66 needlestick injuries were reported in 2001–2002, translating to a rate of 10.6 per 100 beds per year. As data from the US Exposure Prevention Information Network suggest that hospital healthcare workers incur about 30 needlestick injuries per 100 beds per year,[2] our rate of 10.6 probably reflects significant underreporting. Increased staff confidence in the quality and confidentiality of follow-up for occupational exposures may help increase reporting.[3]

The average risk of HIV transmission for healthcare workers after percutaneous exposure to HIV-infected blood is about 0.3%.[4] However, post-exposure prophylaxis with zidovudine has been shown in a retrospective case–control study of healthcare personnel to reduce transmission by about 81%.[4] The Department of Human Services (Victoria) recommended in 1997 that post-exposure prophylaxis be initiated promptly, preferably within 1–2 hours of exposure (based on 1996 recommendations from the US Centers for Disease Control and Prevention).[5]

The US Department of Health and Human Services recommends that employers protect healthcare workers from needlestick injuries by providing a safe working environment with effective programs and safer needle devices, notwithstanding additional costs. This includes a combination of prevention strategies for reducing needlestick injuries, and involving workers in the effort.[6]

Clinical record

At 03:00 on a Friday in 2002, a clinical staff member in the intensive care unit sustained a needlestick injury involving a suture needle through a glove. An unrelated cardiac arrest occurred soon after, causing a delay in reporting of the injury.

At 07:00 (4 hours after the injury), the staff member (recipient) reported the injury, using the paging arrangement and occupational exposure protocol at the time (ie, a message was left for the staff health nurse, as no designated person was on-call for occupational exposures overnight).

At 10:00 (7 hours), the recipient received a response to the report from the staff health nurse who initiated action in accordance with the protocol in place at the time.

The source patient had a recently recorded *negative* HIV antibody result by enzyme-linked immunosorbent assay (ELISA).

At 10:30 (7.5 hours), a further blood sample was collected from the source patient, along with a baseline blood sample from the recipient. These were processed at 12:30 (9.5 hours).

At 13:00 (10 hours), the source patient's ELISA test gave a *positive* result for HIV antibody. However, because of the previous negative result, this was assumed to be a false positive.

On Sunday, a repeat (western blot) HIV test was performed for confirmation and was again positive for HIV antibody.

On Monday at 10:00 (79 hours), the infectious diseases unit was notified of the positive HIV antibody result.

At 15:00 (84 hours), the recipient was counselled by an infectious diseases physician and commenced post-exposure prophylaxis.

The laboratory subsequently tested stored serum samples from the source patient; all four samples were positive for HIV antibody. Investigation of the previous negative result revealed that the test specimen was not from the source patient, but from another patient with the same surname in the same ward.

Improving response to occupational exposures

At Southern Health, the occupational exposure protocol was under review before this incident occurred. Root-cause analysis of the incident led to the following changes to occupational exposure and pathology protocols:

- A uniform system of notification that was under development was implemented across all sites in the Southern Health service of Melbourne. Changes included:
  - A dedicated pager number, operating 24 hours a day 7 days a week, was provided at each site for reporting of occupational exposures and was advertised by posters displayed prominently in clinical areas. Previously, there were different contact numbers for different times of the day, and cover was not around the clock.
  - Occupational exposure coordinators were appointed (one per shift at each site) and attended inservice education about occupational exposure, provided by the infection control unit.
  - Staff were informed of the new pager number and notification process through a memorandum sent to all nursing and clinical support staff and an internal flyer sent to all senior medical staff from the Chair of the Infection Control Advisory Committee for Southern Health; the latter highlighted the urgency in reporting exposures.
  - The new notification process is described in the orientation material for new staff.
- The pathology department implemented a streamlined testing protocol for all specimens related to occupational exposures; these are processed urgently, and all results are reported to the occupational exposure coordinator.
- The pathology department also reviewed protocols for blood collection and reception; use of informal "norms" rather than strict adherence to protocol was deemed unacceptable, and inservice education and review were conducted in all areas.
- All high-risk exposures are discussed by the occupational exposure coordinator with the on-call infectious diseases physician to develop an action plan.
- Future quality assurance activities will include surveys of staff awareness of the notification process and training status of occupational exposure coordinators.

Outcome of measures to improve response

Ten weeks after this adverse event, 58 health service staff had been trained as occupational exposure coordinators. The senior infection control practitioner conducted nine education sessions for these coordinators, providing course notes and contact details for troubleshooting or general enquiries. An infectious diseases physician discussed issues of informed consent for testing for bloodborne viruses at each session.

Lessons from practice

- The system for staff to report an occupational exposure needs to be simple and available 24 hours per day, 7 days per week.
- Testing after an occupational exposure needs to be prioritised and processed urgently to ensure results are available as soon as possible.
- High-risk exposures need to be discussed with the on-call infectious diseases physician to develop an action plan.
- All serum should be collected with strict adherence to blood collection and labelling protocols. Serum from the source patient should be collected and tested at the time of the incident to confirm HIV status, even if a recent negative result is known.

Initially, reports of occupational exposures increased threefold, from 1 every 48 hours before implementation of the new protocol to 3 per 48 hours after implementation. Within 4 weeks of implementation, reporting returned to the previous level. The posters displayed in clinical areas appeared to prompt reporting; some exposures occurred before implementation of the new protocol but were reported only after the posters were displayed.

The time from occupational exposure to reporting of HIV results for source patients decreased from a range of 7.5–192 hours to 1.1–23 hours (including any delay in reporting by healthcare workers, as well as laboratory processing time).

This report demonstrates the importance of effective mechanisms for reporting exposures, accurate specimen labelling, urgent processing of pathology tests and accurate reporting of results with appropriate follow-up, in achieving timely and appropriate action after an occupational exposure. Recognition of the system failure in this incident led to a system change at our institution designed to minimise future incidents and improve quality of care. The education and reporting systems have been revised to be efficient and robust and to achieve long-term effectiveness in reducing morbidity from occupational exposure.

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