Accidental exposures to blood and body fluid in the operation room and the issue of underreporting

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A retrospective review of all exposure injuries affecting members of the operative care line at a single university hospital between January 2000 and December 2007 was performed. A questionnaire survey on current status of adherence to barrier precautions was also completed by 164 staff members. Of 136 exposure injuries, 87 (64.0%) were in surgeons, and 49 (36.0%) were in scrub nurses. Surgeons were most commonly injured during suturing (49, 56%), followed by ''handing over sharps'' (7, 8%), whereas scrub nurses were most commonly injured during ''counting and sorting of sharps'' (15, 41%), followed by ''handing over sharps,'' and ''splash.'' The questionnaire survey revealed that compliance with goggles, face shields, and double gloving was poor, and only 9% of respondents routinely used the hands-free technique. Only 22% of staff who had experienced exposure injuries reported every incident. Because circumstances of exposure injuries in operating rooms differ by profession, appropriate preventive measures should address individual situations. To reduce exposure injuries in the operating room, further efforts are required including education, mentoring, and competency training for operation personnel.

Key Words: Sharps injury; operation room.

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Mucocutaneous or percutaneous exposures to blood and body fluids (exposure injuries) subject health care workers to the risk of occupational infection. The overall incidence of exposure injuries in some countries has been reduced significantly over past decades.[1-3] This has been achieved through information, increased training in safety precautions, and wider access to safety containers and safety devices. Conversely, recent research suggests that surgical personnel remain among those most at risk of exposure injuries.[4-6] Many studies and reviews focusing on the impact of precautionary practices have been published,[7,8] but research regarding the current status of the nature and circumstances of exposure injuries is sparse. To develop strategies to reduce exposure injuries among members of the operating team, patterns of injuries in the operation room (OR) must first be determined. The aim of this study was thus to address the current status of exposure injuries in the OR and to shed light on the underlying problems.

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METHODS

This study was conducted at Kyoto University Hospital, Japan, a hospital with 1200 beds that performs more than 5000 operations annually. In our hospital, staff are encouraged to report every exposure injury to the infection control team, and all personnel are vaccinated against hepatitis B virus. The injured staff fills out the Exposure Prevention Information Network (EPINet) form immediately after the incidence. Each EPINet report is carefully reviewed by team members to allow more effective measures against exposure injuries to be implemented and to ensure a year-long follow-up for seropositive cases. Appropriate informed consent was obtained, and the guideline for human experimentation of the Kyoto University Internal Review Board was followed.

Review of the incidence of exposure injuries in the OR (part A)

Data on characteristics of exposure injuries (ie, number of exposure injuries, devices causing injury, purpose of using sharps, circumstances surrounding exposure injuries, and infection status of contaminant) were collected from the EPINet database in our hospital between 2000 and 2007. Incidences of exposure injuries were obtained by dividing the number of cases by person-years.

Survey on notification rate of exposure injuries in the OR and compliance with preventive measures (part B)

A 1-page questionnaire was used to determine the notification rate of injuries and to determine the use of behavioral methods of protection against occupational exposures (eg, face shield/protective goggles, double gloving, shoe covers, and hands-free techniques) during the last 12 months. A total of 260 questionnaires were distributed, with a questionnaire given to every surgeon and scrub nurse who had worked in the OR in that year.

Statistical analysis

Categorical variables were compared using χ^2 and Fischer exact tests. Two-tailed probability values $<.05$ were considered statistically significant.

RESULTS

Review of the incidence of exposure injuries in the OR (part A)

A total of 136 exposure injuries was reported during the 8-year study period (range, 9-30 cases per year; average, 17 cases per year). Of the 136 injured workers, 87 (64%) were doctors, and 49 (36%) were nurses. The average length of experience was 9.4 years (range, 3 months to 33 years) for doctors and 4.2 years (range, 1 month to 25 years) for nurses. We did not identify any specific surgical procedures resulting in a higher incidence of exposure injuries. Whereas the overall incidence in our hospital gradually decreased over the study period, the number of exposure injuries in the OR remained fairly consistent (Fig 1). The proportion of seropositive contaminants was significantly higher for exposure injuries in the OR than for those in the hospital as a whole (Table 1). Circumstances of injuries clearly differed by profession (Table 2). The most common circumstances surrounding exposure injuries involved ''suturing'' in the case of surgeons and ''counting or sorting sharps'' and ''handing over sharps'' in the case of scrub nurses.

Survey on notification rate of exposure injuries in the OR and compliance with preventive measures (part B)

A total of 164 questionnaires was returned (63.1%). Respondents comprised 130 surgeons and 34 scrub nurses. Response rate was 59% for surgeons and 85% for scrub nurses. Although 95 responses indicated experience of exposure injuries (72 surgeons, 23 nurses), only 22% of these staff had reported every incident, whereas 41% had reported incidents only if the contaminant was seropositive for either hepatitis B (HBV), hepatitis C (HCV), or human immunodeficiency virus (HIV). This survey revealed that compliance with goggles, face shields, and double gloving was low, and only 9% of respondents routinely used the hands-free technique. Survey results are summarized in Table 3.

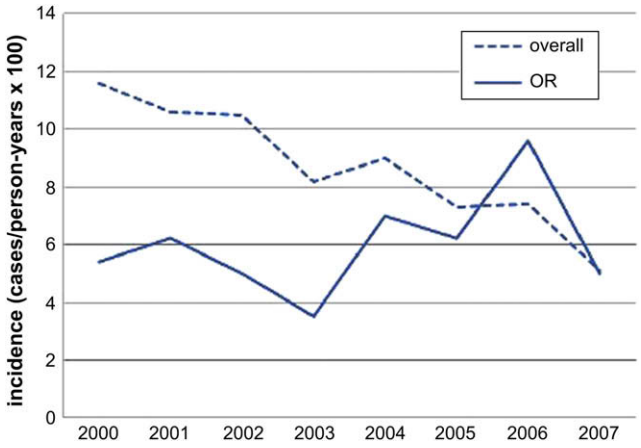

Fig 1. Annual incidence of exposure injuries. OR, operation room.

DISCUSSION

The results of this study remind us of the uniqueness of the OR environment. Surgeons and scrub nurses work very closely together, handling the same instruments in a confined space. Consequently, surgeons and scrub nurses have been thought to be injured in similar ways with similar equipment and not infrequently by each other. Nonetheless, circumstances of exposure injuries differed between surgeons and scrub nurses in this study, suggesting that preventive measures should depend on the situation.

We were surprised to find that scrub nurses experienced many exposure injuries during counting or sorting of sharps. Scrub nurses, mostly single gloved, routinely perform these tasks shortly after every operation when they may be fatigued. Unfortunately, durations of the preceding procedures were not recorded in the EPINet forms, so we were unable to examine correlations between procedure duration and risk of exposure injury after the procedure. Further investigation of this issue is thus warranted. However, because degree of fatigue of operation personnel has already been demonstrated as a risk factor for exposure injuries, immediate improvements of this situation are needed. In addition to the necessity of double gloving, this finding suggests the need for a method of counting and sorting sharps without touching them or, alternatively, washing them before handling.