*Malaysian J Pathol 2000; 22(2) : 85 - 89*

# BRIEF COMMUNICATION

## Laboratory accidents - a matter of attitude

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*Abstract*

This is a prospective study on accidents occurring in the Pathology laboratories of Hospital Ipoh over the 3-year period from January 1996 to October 1999. 15 mishaps were recorded. The location of the accidents were the histology (40%), microbiology (33%), haematology (20%) and cytology (7%) laboratories. No mishaps were reported from the clinical chemistry, blood bank and outpatient laboratories. Cuts by sharp objects were the most common injuries sustained (47%) followed by splashes and squirts by fluid such as blood or chemicals (27%). There was 1 case each of contact with biohazardous fluid, burn, allergy and accidental drinking of disinfectant. 67% of the accidents involved medical laboratory technicians, 20% involved attendants and the rest were medical officers and the junior laboratory technicians. Although the accidents reported appeared trivial, it is vital to document them and bring them to the attention of all concerned in the laboratory, in order to prevent major accidents and also because of medico-legal implications. The role of the Laboratory Safety Committee cannot be overemphasised. Modification of staff attitude is considered an important remedial goal.

*Key words:* accident, hazard, laboratory

### INTRODUCTION

The objective of this study was to determine the nature of accidents that occur in the Pathology laboratories, Hospital Ipoh. It is also to heighten awareness among the staff about accidents and to recommend preventive measures to avert such incidences in the future.

### METHODS

A prospective study was carried out for the 3-year period from January 1996 to October 1999 involving recording of reports of all accidents occurring in the Pathology Department, Hospital Ipoh. Interviews of staff involved in the accidents were carried out within 2 weeks after the accidents by the Laboratory Safety Committee to evaluate treatment instituted after the injury, identify the cause of the accidents and to recommend remedial action.

Certain hazards such as smarting of the eyes, secondary exposure to formalin, breathlessness, allergic rhinitis and contact allergy to formalin were considered as occupational hazards rather than accidents. These were not recorded under the category of accidents.

### RESULTS

There were 15 reported mishaps during the period studied. About 3 to 5 accidents occurred each year. The location of the accidents were the histology (40%), microbiology (33%), haematology (20%) and cytology (7%) laboratories. There were no cases reported from the clinical chemistry, blood bank and the out-patient laboratories (Table 1). Sharp injuries from the microtome, needles and broken glass were the most common injuries sustained (47%), followed by splashes and squirts by fluid such as blood or chemicals (27%) and contact with biohazardous fluid, burns, allergy and accidental drinking of disinfectant (26%). An unexpected hazard, that is allergy to the glove used, needs to be highlighted (Table 2).

Hands were most commonly involved in the injuries (60%), followed by the face including the eyes and mouth (40%). 67% of the accidents involved medical laboratory technicians, 20% involved attendants and the rest were medical officers and the junior laboratory technicians. Among the laboratory technicians, 3 (50%) incidents were injuries by sharp objects involving

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**TABLE 1: Summary of accidents and injuries reported in the Pathology Department, Hospital Ipoh from January 1996 to October 1999**

| Year | Laboratory | Nature of mishap | Injured body part | Activity related to the accident | Cases/ staff | Remedial action taken |
|---|---|---|---|---|---|---|
| 1996 | Haematology | Burns | Fingers | Touching the microscope bulb while it is still hot | 1 MLT | Reminded that lighted bulbs generate heat |
| | Histology | Allergy | Both hands | Wearing gloves while grossing of specimens. Both hands especially tip of fingers becoming sodden (washer women hands) | 1 Medical officer | To use good quality gloves |
| | | Cuts | Finger | While sectioning with a microtome. | 1 MLT trainee | All trainees have been cautioned that the microtome knife is very sharp and extra care must be taken in its handling. |
| | | Formalin splash | Eyes | Splashed with the fixative while opening a plastic bag containing fixed specimen. | 1 JLA | To wear a face shield for the process. |
| | Haematology | Cut | Hand | Cut by the glass slides while cleaning them. | 1 MLT | To wear gloves. |
| 1997 | Microbiology | Splash (serum) | Eyes and Face | While discarding pipette tip into the sharps container, the serum squirted out and contacted the eyes and face | 1 MLT | Blood tested negative for HIV /HBV and moreover the staff has anti Hbs. Recommended to wear face shield in future. |
| | Histology | Laceration | Finger | While sectioning with a microtome. | 1 MLT | Microtome knife is very sharp and the staff has to be very careful. |
| 1998 | Microbiology | Puncture wound | Palm and finger | During the process of taking and holding a plastic bag of used bottles, tubes etc. while transferring them to the autoclave. | 1 Autoclave operator | Instructed not to hold plastic bag of "waste" at the bottom as it may contain broken glasses etc. |
| | | Splash (Blood) | Face | While cleaning used blood containers . | 1 Attendant | Use face shield during washing containers. Recommended use of disposable instead of recycled bottles. |

| Year | Laboratory | Nature of mishap | Injured body part | Activity related to the accident | Cases/ staff | Remedial action taken |
|---|---|---|---|---|---|---|
| | Haematology | Contact with HIV positive blood | Hand | While processing a blood sample (not wearing gloves), contact with blood which was HIV positive | 1 MLT | To wear gloves. Recommendation to the Hospital to buy "Biohazard Bags" for blood/body fluids |
| 1999 | Histology | Cut | Finger | Removing tissue section from block from the microtome. | 2 MLT | Handle should be locked at the highest position away from microtome blade. Use forceps/brush at all times to remove tissue section or extra wax and never use hand. Put up a warning sign - precaution on using the microtome. |
| | Cytology | Puncture wound | Thumb | While assisting FNAC procedure performed by MO, the pressure from the syringe ejected the needle which then pricked the MLT's thumb. | 1 MLT | The MO / Pathologist should hold on the needle while expelling material from syringe so that it is not ejected out of the syringe due to pressure. |
| | Microbiology | Consumption of chlorox | Mouth | Accidentally drank water containing cleaning agent in the staff room | 1 Attendant | Do not place any drinking containers with disinfectants in staff room. Do not drink "unsure" water. Prohibit consumption of food and drinks in the functional area of laboratory. Encouraged to use staff room exclusively for this purpose. |
| | | Blood squirts | Face | When opening the stopper from a blood sample, some blood squirted out onto the operator's face. | 1 MLT | SOP on how to remove stoppers of specimen containers to be written Stoppers should be opened/ removed away from the operator or twist to open. |

MLT = Medical laboratory technician
JLA = Junior laboratory technician
MO = Medical officer
SOP = Standard operating procedure

**TABLE 2: Categorisation of accidents/injuries and related activities, January 1996 – October 1999**

| NATURE OF INJURY | NO. (%) OF CASES | ACTIVITIES RELATED TO THE ACCIDENT |
|---|---|---|
| Cuts by sharp objects | 7 (47%) | Injury to fingers when dealing with sharps, cutting tissue blocks, throwing rubbish, arranging glass slides, syringes and needles etc. |
| Liquid splash (Blood, chemicals) | 4 (27%) | Splashed with:<br>i. Blood when opening blood containers; discarding pipette tips; washing blood containers.<br>ii. Body fluid/formalin when opening bottle or specimen container. |
| Contact with biohazard fluids | 1 (6.5%) | Processing samples without wearing protective gloves. |
| Burnt finger | 1 (6.5%) | Unexpected accident or carelessness |
| Drank disinfectant | 1 (6.5%) | |
| Allergy | 1 (6.5%) | |

new staff who performed sectioning of paraffin blocks using the microtome. All the staff who sustained the injuries were attended to immediately by applying first aid and later referred to the casualty doctor as soon as possible (Table 1).

## DISCUSSION

The danger and risk in the laboratory are related by the tasks or jobs that staff perform.[1] In this study, no biological accidents involving microorganisms were reported. Exposure to infections such as tuberculosis, hepatitis etc. is a known risk to which laboratory personnel are exposed. Regular, periodic screening tests and X-ray examinations confirmed that laboratory staff were free from these diseases and implied that the laboratories, with their current practices, posed low risks in terms of infection. Although more accidents are reported from certain laboratories, it is pertinent to point out that the figures do not necessarily indicate that one laboratory is more at risk than another, as no analysis according to number of staff involved and workload has been carried out.

The summary of accidents and injuries reported on cursory examination may not be impressive and indicates relatively trivial injuries. However, it is vital to appreciate that these small injuries if not properly documented and brought to attention of all concerned in the laboratory, can result in major problems or accidents. Also, these findings have medico-legal implications.

In general, the accidents or injuries that occurred in our laboratory were not serious, as most of the personnel had adhered to safety regulations and precautions laid down by the Safety Committee.[2] Most of the mishaps were due to carelessness, not following proper procedures, and were definitely preventable. However, a case of accidental drinking of detergent occurred, mainly because of the low level of education of the staff concerned. Hence it should not be assumed that every staff knows about safety.

It must be appreciated that several factors can contribute to the increased number of accidents, such as the number of personnel involved, the space in the unit and the nature of chemicals they are exposed to. Other contributory factors include nature of task, attitude towards work, level of education of staff, discipline and willingness to comply with regulations. The degree of control of hazards is directly proportional to the degree of concern.[1] Everyone ranging from top management to technicians, students, maintenance staff, attendants, and

visitors must have a correct attitude toward safety. To maintain a low level of hazard in the laboratory effectively requires deliberate thought, effort and cooperation of everyone in the laboratory.

In accordance with directives from the Ministry of Health [3,4,5,6] and guidelines from the Safety Committee at hospital level, the Safety Committee at department level[2,7] was formed. Activities and changes were initiated in line with the directive from the Ministry of Health on health and safety policies at work places. These included the organization of courses on fire safety, given by a fire department officer, and a course on basic life support by the cardiopulmonary resuscitation team of Ipoh hospital in 1997. In addition, fire extinguishers were relocated at strategic places as recommended by the fire department and a shower was placed in the main laboratory. Subsequent to the study, there was heightened surveillance among the staff resulted in better documentation of accidents. As a result of that, injuries were attended to promptly and better effort have been made to prevent such injuries from occurring.

Based on the nature of the accidents occurring in the laboratory, specific remedial actions were undertaken. These included:

(1) enhancing awareness among all staff, especially the new ones, to the risk of injuries according to nature of tasks performed. This was done by displaying study reports on notice boards and briefing staff when they report for duty to the sections concerned.

(2) making available a handbook on laboratory hazards in each unit of the pathology department. This handbook included information on potential hazards as well as preventive measures.

(3) drafting standard operating procedures covering the entire remedial action on cases of accidents and circulating these among staff.

(4) displaying signboards or posters on hazards and risks of particular techniques and the recommended steps to prevent the injury. These serve as constant reminders at the site of the instrument used, for example, next to the microtome. A notice was also placed in the main signboard in the laboratory displaying all relevant dangerous chemicals/poisons etc and also showing simple "first aid" procedures to be applied in case of injuries/chemical contact.

We emphaize that safety at the work place is a matter of attitude[1] which embraces the mental attitude to professional ethics, enthusiasm, common sense and attitude to discipline (compliance to procedures). This is an "ongoing process" and it is the responsibility of all involved in the laboratory services to continuously contribute to the maintenance of the safety of the laboratory.

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