

Abstract

This research project is aimed on the diagnostic laboratory of medical institution to explore the problems associated with laboratory biosafety. The project started from literature review of international guideline dealing with laboratory biosafety, so as to facilitate the choice in establishing domestic guidelines. In attempting to establish domestic guidelines, a regional hospital was chosen as model institution and two faces were explored for the establishment work. In the managerial face a 「Self auditing format for the management of examination and manipulation of infectious agents in a medical institution」 was designed and tested in the model hospital. The self auditing format covers managereal policy, managereal program, management system and organization, managerial implementation, emergency actions, auditing, and evaluation from management level. The overall score of 54.25 indicated that the model hospital still has long way to go for further improvement. This result also suggests that the model hospital focuses its efforts on the involvement of top management , strengthening the auditing system, and substantiating its emergency action protram for the further improvement in the safety and healthy management of operating the laboratory biosafety system. In the operation face, *Mycobacterium tuberculosis* was employed as indicator organism so as to reveal the extent of contamination in the laboratory and hospital environment. A real-time PCR system was employed in the environmental examination. The results indicated that chemical hood and staing bench involved in the acid-fast stain as well as the door, door opening knoger, hand washer, and a portable nurshing table of the ICU were surface contaminated with the indicator organism. Even more significantly the indicator organism was detected in the air of the buffer room of both the ICU and general patient care wards. This positive aerosol result was deemed as a break through achievement. These contamination situations suggest that the hospital should change its acid-fast staining work, at least for smear preparation , to the biosafety cabinet on the one hand, and also have better control in the entry and exit of peronel, aeration control of the buffer rooms in patient care wards, and wearing the protective glove in patient care on the other hand. Based on these findings we suggest that a national guideline for the laboratory biosafety covering various biosafety levels, instead of the current attempt directing only to the biosafety level 3, be established in the near future. Also suggested is that each individual laboratory, based on the published national guideline, should establish its own tailor made guideline so that specific biosafety requirement of each laboratory can be met. The protection of laboratory and surrounding personnel from possible biohazard would thus be hopefully ensured. The break through result of aerosol examination is deemed to be due to the development of a fermaerator air sampler. Optimalization of the formaerator as well as further contribution of the fermaerator in the aerosol sampling in nosocomial infection, among others, will be our future efforts.

Keywords : Laboratory infection ; Laboratory safety practice ; aerosol sampling ; tuberculosis ; *Mycobacterium tuberculosis* ; Hepatitis B virus ; Laboratory safe operate experimentation 、 nosocomial infections