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EXTENDED ABSTRACT

The Challenge of Tuberculosis in Developing Countries

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Tuberculosis (TB) is a worldwide disease and nosocomial transmission is known to occur. It poses a challenge especially for developing countries which should develop protocols customized to the specific needs of the locality. Four principles will be discussed and Hong Kong will be taken as an example.

1. Integrate important fundamentals from other existing guidelines

Internationally accepted guidelines such as from the CDC[1] and the WHO[2] should be consulted. A useful concept in these guidelines is the three levels of control measures, which are ranked according to their importance and priority. The first level and the most important is Administrative Controls, which are aimed at reducing the TB exposures of health care workers (HCWs). This is followed by the second level of Engineering Controls, which are environmental methods to reduce the concentration of droplet nuclei in the air. The final level is Personal Respiratory Protection for HCWs who need to be exposed in the course of patient care.

2. Collect local epidemiological data

In most countries, TB is a notifiable disease and such data have been shown to approximate the true incidence of TB.[3] In surveillance, this would be a good place to start. In Hong Kong, after 1952 when BCG was made mandatory at birth, there was a drastic reduction of both the incidence and the crude death rate. Nevertheless, TB remains endemic for the past decade at 1/1000.[4] However, data for HCWs will be useful and this is best conducted by hospitals. In Hong Kong, this is collected by the Infection Control Units and staff health and it shows that the incidence of HCW with active TB is consistently below that of the general population even after age adjustment.[4] The incidence of TB among HCWs provides some idea on the effectiveness of the infection control measures for TB in the hospital. In Hong Kong it suggests that the measures in the hospital are reasonably effective.

3. Take into account local capabilities and priorities

A guideline is introduced for Hong Kong public hospitals. Salient points of the guideline include:

I. Administrative Controls:

Management of Patients: TB is generally treated in the outpatient setting. The hospitalisation of TB patients is minimised by providing 24-hr laboratory service for Acid Fast Bacilli smear whenever possible. The Infection Control Nurse will review all newly diagnosed cases to facilitate rapid discharge or transfer to designated TB hospitals. An attempt will be made to isolate patients with active disease for two weeks, but as facilities are limited, priority is given to those who are strongly smear positive (+++), AIDS patients,

and those suspected of having MDR TB. If isolation cannot be maintained for 2 weeks, it will be kept for up to 5 days after the commencement of effective chemotherapy.

Management of contacts: Admission rates for TB patients in Hong Kong hospitals are rather high and draconian measures to investigate contacts are not recommended. However for a strongly smear positive (+++) patient in a high-risk area (with neutropenic patients or neonates), a list of contacts in the same cubicle will be generated. Those with prolonged contact >-3 weeks or suggestive symptoms will be given chest X-ray. All contacts who are immuno-compromised or children <-3-year old will be followed up for 3 months. Chemoprophylaxis is generally not recommended for contacts but may be considered for infants that are exposed. All contacts are counselled to obtain a chest X-ray if they develop respiratory symptoms lasting >3 weeks.

II. Management of staff:

A surveillance programme to detect TB infection among HCWs and an analysis to assess the possibility of nosocomial transmission is conducted for every case. Physical therapists are to avoid chest drainage on patients who are smear +ve unless they are connected to a close suction system. Respirator mask will be provided for HCW if intubation is needed for patients who are smear +ve. Survey of HCWs for Tuberculin Skin Test conversion is not done, as well as survey by chest X-rays or symptomatology because these are reported to be rather inaccurate.[2]

N95 respirator is provided for staff caring for active TB. Routine fit testing and medical screening is not conducted, for even specialists within the USA have questioned its benefit.[5,6]

III. Engineering Controls:

In hospitals with central air-condition, the patient will be isolated in a negative pressure room. When there is no central air-conditioning, the WHO stated that hospitals ought to "maximize natural ventilation through open windows".[2] Recent studies have shown that natural ventilation is safe because of the high air change achieved.[7, 8] In a recent WHO guideline, specific criteria for a natural ventilated isolation room for airborne infections are provided.[9] This is designated an "airborne precaution room" in contrast to the "airborne isolation room" that is mechanically ventilated.

Other control measures for proven TB cases are also included in the guideline. Expiratory filters are used on ventilated patients and changed daily. Heat Most Exchangers are recommended to avert frequent tubing change. Finally for patients in the ICU, a close suction system with disposable suction canisters and tubings are advised.

Ultraviolet lights and portable HEPA are not recommended in Hong Kong.

Ongoing monitoring for Efficacy

It is important that ongoing monitoring is done and the best rate to use is the incidence rate of HCWs infected with TB. All clustering should also be analyzed. In Hong Kong it is reassuring to note that up till the present the incidence of TB in HCWs continue to be lower then that of the general population even after age adjustment.

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