EDITORIAL

INFECTION CONTROL – A COST CONTAINMENT MEASURE IN THE HEALTH INDUSTRY

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INTRODUCTION

Cost containment in health care was an issue enthusiastically discussed and attempted in the 1980s in Europe and the United States[1]. It is now an issue that is currently of interest in Singapore in view of the escalating health care costs experienced by all in the island. The high health care cost is partly attributed to the increased medical technology we have in the present health industry. Apart from this, health care cost is proportionally related to the number of inpatient days.

Estimates from the Centers for Disease Control's (CDC) Study on the Efficacy of Nosocomial Infection Control (SENIC) projected an overall rate of nosocomial infections at 5.7 per 100 admissions. Of these, about one-third would be avoidable with the establishment of a surveillance system[2]. The Study also showed that wound infections, pneumonia and septicaemia are the most expensive nosocomial infections. In 1986, Haley estimated the average nosocomial infection cost to be about US$1,800 with a maximum of US$42,000[3]. In Germany, it was estimated to cost DM 500 million to 1 billion annually (at 1984 prices)[4].

Studies have been done to explore whether a fully staffed infection control programme is able to reduce rates of infection and whether it will be cost-effective. The SENIC study showed that in hospitals with a full-time infection control nurse and where there are compliance with infection control guidelines, there was an average reduction of 32% nosocomial infections. In contrast, in hospitals where there was no infection control nurse and no compliance with specified control guidelines, there was an increase in nosocomial infection rate of 18%[2]. Recent studies in a 1,400-bedded teaching hospital in Hong Kong also revealed similar findings[5]. The nosocomial infection rate showed a reduction from 10.5% to 5.6% prevalence after three infection control nurses ensured the compliance of agreed infection control policies. The avoidable costs of nosocomial infection were calculated to be 130 lives, 42,000 bed days and antibiotics costing US$0.3 million[6]. It is therefore clear that infection control is an important component in the strategy of cost containment in the health care system.

SURVEILLANCE SYSTEM

The use of surveillance methods to control nosocomial infections was first practised by Dr Ignaz Semmelweiss in Vienna in the 1840s. He meticulously collected and analysed his surveillance data to give us the well-remembered story of the first demonstration of the importance of person-to-person spread of puerperal sepsis and of the effectiveness of handwashing with an antiseptic solution. Since then, many hospitals practise some form of surveillance system with the main purposes of identifying epidemics and evaluating control measures. Unfortunately, we do not often have the luxury of fulfilling CDC's recommendation of one infection control nurse to survey 250 acute care hospital beds[7]. In reality, because of the shortage of infection control nurses it will be a waste of time, manpower and money to practise continuous surveillance of all patients and all infections in the hospital. It will be far more cost-effective to practise targeted surveillance. Parts of the hospital may be surveyed on a rotating scheme. Alternatively, surveillance may be conducted in a unit-directed or priority-directed manner[8]. For the latter, the approach is to focus on those nosocomial infections with known high rates.

Interhospital comparison of infection rates is only possible when adjustment has been made to the data for patient's intrinsic and extrinsic risks for infection. The National Nosocomial Infection Surveillance (NNIS) system was designed for this and is the present system adopted in the United States of America. The use of device associated, device day infection rates for intensive care units and high risk nurseries and an NNIS surgical wound infection risk index have been recommended by the CDC for use as data for interhospital comparison. The reporting of surgeon-specific surgical wound infection rates to the surgeon concerned under confidential cover has proven to be an excellent quality assurance measure[9]. Haley reported a reduction of 35% in the rate of surgical wound infection with this feedback system when used in conjunction with an ongoing strong surveillance and control programme[2]. It is therefore particularly beneficial to the surgeon concerned to monitor his own surgical wound infection rates in comparison with his colleagues. If his rates are abnormally higher than the others, then he may wish to investigate why this is so and take any possible corrective measures. It must be emphasised that the reporting of surgeon-specific rates must be done under confidential cover with only the surgeon and the infection control nurse knowing his rate.

UNIVERSAL PRECAUTIONS

The emphasis on universal precautions has been fuelled by the human immunodeficiency virus (HIV) epidemic. This entails the application of the protocol to all persons regardless of their infection status and reinforcing the emphasis on appropriate handling and disposal of all sharps[10]. It requires health care workers to assume all patients are potentially infected with HIV or other blood-borne agents, and to use barriers and other protective equipment (gloves, masks and protective eyewear, protective apparel) to prevent parenteral, mucous membrane, and non-intact skin exposure to blood and certain body fluids of all patients. The aim is to protect the health care worker from possible acquisition of blood-borne pathogens eg HIV, Hepatitis B virus (HBV), Hepatitis C virus, due to the frequent exposure to blood or needle sticks. The practices, as recommended by

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CDC, apply to blood, and other body fluids that contain visible blood, semen and vaginal secretions. It does not apply to faeces, saliva, nasal secretions, sputum, sweat, tears, urine, or vomitus unless they are visibly contaminated with blood.

Needlestick injuries happen frequently in the ward and commonly to nurses[11]. Most of these injuries were due to the recapping of needles or improper disposal of sharps. An estimated 800,000 needlestick injuries occur yearly in US hospitals[12]. Studies have shown that infection occurs after 6%-30% of sharps-related HBV exposures and 0.4% of HIV exposures. It will be to the health care workers' advantage that the hospital formulate her own needlestick injury protocol which should then be made known to all health personnel. The objective is early and appropriate prophylaxis in the event of a probable HBV or HIV exposure. Each hospital has a unique epidemiology of sharps injuries and needs to understand how these events occur. Surveillance of these injuries will help enlighten the institution on appropriate programmes for the reduction of needlestick injuries among health care workers.

The pivotal role of handwashing in infection control has been well established by Dr Semmelweiss. The endemic problem of the methicillin resistant *Staphylococcus aureus* and the increasing incidence of multi-resistant Gram-negative bacilli in most of the major hospitals testifies to the real need in reiterating the importance of handwashing for the control of the problem. Time must be spent by the infection control team to reinforce this message to all health personnel. Wearing gloves does not replace the need for handwashing. Hands should be washed, even if gloves are used, after touching any infective material and after taking care of any infected patient or patient colonised by multiple-drug-resistant bacteria.

ANTIBIOTIC CONTROL

Parallels in antibiotic use and antibiotic resistance have been clearly seen in various studies[13]. Nosocomial pathogens are known to be more resistant than their counterparts in the community. This is due to the selective pressure on these pathogens by the type of antibiotics used in the hospital setting. Infection with these pathogens result in the use of third generation cephalosporins or other broad spectrum antibiotics for therapy. This cycle of event has important influence to the ecology of microbial flora in the hospital environment. Antibiotics are expensive and they consume about 30% of the total drug budget. Moreover, the use of some of these antibiotics are not without adverse effects. The hospital bill for the unfortunate patient with a nosocomial infection with a multi-resistant bacterium can be then expected to be phenomenal.

It is impossible to reduce cost without control of antibiotic usage and infection control programmes will be incomplete without antibiotic control. Control of antibiotics use is commonly done through education, the hospital formulary, antibiotic order policies, drug utilisation review, restriction policies, control of laboratory susceptibility testing data and the limitation of contact time between pharmaceutical representatives and physicians[14]. The integration of these strategies into the routine infection control programme of the hospital will certainly play an important and effective role in reducing the incidence of multi-resistant micro-organisms and simultaneously reduce health care cost via reducing the cost of therapy. Advice on appropriate antibiotic usage is an additional cost-saving measure that is available in most hospitals with the services of the infectious disease physicians and clinical microbiologists. A patient who has been started on an expensive broad-spectrum antibiotic may be equally efficaciously treated with a cheaper narrow spectrum antibiotic.

CONCLUSION

Infection control requires teamwork from the administrators, all health care personnel and pharmaceutical representatives. The current health related issue of cost containment has forced us to adopt a more diverse yet intense interest in infection control. It involves more than just the mere collection of hospital-wide surveillance data that we did in the past. A more cost-effective approach to infection control is required. Hence, each hospital has to study her own infection control issues and adopt the relevant cost-effective strategies.

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