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Cost Effective Infection Control:A Three-Pronged Approach

Hospital acquired (nosocomial) infections, i.e. infections developing 48 hours or more after admission to hospital, are a global problem. The proportional rise in the ageing population, and consequently of the patient population in hospital, the ever increasing use of prosthetic materials and of intravascular devices, and increasing prescription of immuno - suppressive drugs for various indications are but a few of the important causative factors for the increased prevalence of these infections. Obviously, the result is an increased nosocomial morbidity, and even mortality due to infection. Moreover, nosocomial infections result in a substantial financial burden for both the hospital and society in general. The increased costs can be accounted for by a longer duration of hospital stay, increase in use of diagnostic procedures and therapeutic agents (antibiotics), and in longer absence leave.

To make things worse, the causative micro-organisms of hospital acquired infections are increasingly likely to be antibiotic resistant, due to the worldwide increased use of antibiotics. The financial burden of these infections is higher compared to infections caused by antibiotic susceptible agents. Treatment of infections caused by antibiotic resistant micro-organisms will often result in the use of new, recently developed antimicrobial agents, which are more expensive and carry a higher risk of side effects.

Therefore, the control of nosocomial infections is a priority in hospital care, but there are several misconceptions regarding this control. Firstly, many believe that nosocomial infections are inevitable and their control very expensive implying that infection control programmes are not costeffective. The second misconception is that the problem of antibiotic- resistant nosocomial infections cannot be controlled to any meaningful degree, since antibiotic resistance is a natural and inevitable consequence of antibiotic use. We intend to correct these misunderstandings.

Effective control measures require clear understanding of the causes of the (antibiotic resistant) nosocomial infections.

The cornerstones for a cost-effective infection control programme will include amongst others:

Education to understand how bacteria spread from healthcare worker or environment to patient and vice versa;

Hand hygiene to reduce the risk of transmission to the patient, and

Implementation of an antibiotic policy to control antibiotic resistance.

i) Education and Training of Healthcare Workers

Education and training of healthcare workers concerning the basic principles of infection prevention and control is essential to increase awareness of the risks of a hospital acquired infection for patients and themselves. For an effective education programme, a stepwise approach is advisable. First, lectures regarding the most common causative agents of hospital acquired infections and their route of transmission. Effective methods for the prevention of spread of these micro- organisms (control of crossinfection) need to be addressed. Second, lectures ought to focus on ward-specific problems; a surgical ward encounters other infection problems, involving other possible transmission routes, and therefore other control measures than a haematological ward. Based on this notion, we recommend that the education programme is set up in close cooperation with the infection control physician, infection control nurse and the healthcare workers of the different wards.

In our view further general prerequisites for an effective education programme are:

The programme needs to be repeated on a regular basis;

The healthcare worker must be actively offered the opportunity to follow the training sessions. Compulsory attendance ought to be seriously considered, and

Commitment of the management of the ward and of the higher echelons of management of the hospital is pivotal.

There is ample experience, including papers published in leading journals, that lectures, seminars, posters and/or flyerreminders on infection control increase awareness of infection prevention and results in improved compliance with infection control measures. In other words, the better the edu cation programme is, the more acute the awareness will be, and the more effective the control of hospital acquired infection will become.

ii) Implementation of a Hand Hygiene Programme

It is well established that most nosocomial infections are spread via hand contact of healthcare workers, and although hand cleansing is the most cost effective infection control measure, its practice is notably poor, especially among (hospital) doctors. The study of Pittet et al. Has clearly shown that the implementation of a hospital-wide programme to improve the compliance with hand hygiene resulted in a significant decrease in overall prevalence of nosocomial infection from 16.9% to 9.9% of patients. Importantly, these investigators emphasise that institutional commitment, support of the medical and nursing directors and approval of the senior hospital management are indispensable to designate the programme as a hospital- wide priority and to im ple ment the hospital wide programme successfully.

iii) Implementation of an Antibiotic Policy Protocol

Antimicrobial agents are used to prevent an infection (prophylaxis) or to treat patients with a possible or proven infection. Worldwide, the increase of antibiotic resistance is a matter of great concern. In some areas resistance has rendered the treatment of a surgical wound infection caused by its most common cause, the bacterial species Staphylococcus aureus, ineffective with the mainstay antibiotics in the majority of cases. The same is true for the treatment of pneumonia, e.g. in Japan S.aureus pneumonia cannot be treated with flucloxacillin in 63% of cases, and 4% of cases of Streptococcus pneumonia pneumonia, the most common type of pneumonia, is untreatable with penicillin.

The main risk factor for antibiotic resistance is antibiotic use, whether appropriately prescribed or not. To control the use of antibiotics a rational antibiotic policy needs to be implemented. The aim of a rational antibiotic policy is to prescribe antibiotics in a costeffective way, i.e. the correct indication, the right choice of the agent and for the appropriate duration. The choice of the agent strongly depends on the antibiotic resistance pattern of the bacterial species causing the infection. As the resistance patterns of the bacterial flora not only differ between countries or provinces, but also between hospitals, and even between individual people, only general recommendations can be formulated on a national level. This implies that hospitals have a task, and a duty to translate these national formularies into local hospital or regional formularies, into which local resistance data have been taken into account. Every hospital should therefore have a committee appointed, which represents prescribers and advisors of antibiotic treatment, and which has antibiotic policy as its sole responsibility.

In conclusion, our plea is that implementation of effective infection control programme is practically feasible, and will reduce the prevalence of nosocomial infections, including those caused by antibiotic resistant micro- organisms. The individual patient, as well as the quality and economics of healthcare in general will benefit from effective control programmes. Such a programme is based on a) education and training of all healthcare workers, b) the implementation of a meticulous hand hygiene/ disinfection protocol for all healthcare workers, and c) the implementation of an antibiotic policy. Furthermore, the commitment not only of the management of the ward, but also of the higher echelons of management of the hospital is pivotal for a successful programme. Last, the benefits of such a programme outweigh the costs, as long as the programme is designed to reach 90% of the desired achievement, not 100%. The final 10% of desired achievement is disproportionally costly, requiring up to 80% of costs in terms of money and time.

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