RECENT INSIGHTS INTO NOSOCOMIAL INFECTIONS- A NEGLECTED CONDITION

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ABSTRACT

Nosocomial infections (NI), also known as hospital acquired infection (HAI), is infection whose development is favoured by a hospital environment, such as one acquired by a patient during a hospital visit or one developing among hospital staff. Such infections include fungal and bacterial infections and are aggravated by the reduced resistance of individual patients [(4)]. Nosocomial infections continues to be of major clinical and epidemiologic importance in developing countries [(2,3)] as it constitutes a major source of morbidity, mortality and significant incremental health care expense for the hospitalized patient, despite major advances in clinical sciences. As per the Study on the Efficacy of Nosocomial Infection Control (SENIC) routine surveillance of NI has become an integral part of infection control and quality assurance in US hospitals because its potential of reducing nosocomial infections[(1)]. Studies performed in the United States have demonstrated that an integrated infection control program that includes targeted device-associated surveillance can reduce the incidence of nosocomial infection by as much as 30% and lead to reduced health care costs[(1)].

ملخص: عدوى المستشفيات (NI)، المعروف أيضا باسم عدوى المستشفيات المكتسبة (HAI)، هي العدوى التي يساعدها على النمو بيئة المستشفى، مثل التي يحصل عليها المريض خلال زيارة المستشفى أو أحد العاملين في المستشفى. هذه الأمراض تشمل الأمراض الفطرية والبكتيرية والتي تفاقمت من جراء انخفاض المقاومة من المرضى الفردية (غارنر JS، 1996). عدوى المستشفيات لا تزال ذات أهمية كبرى السريرية والوبائية في البلدان النامية (جيفيك MA، 2005؛ روزنتال VD، 2004) كما أنها تشكل مصدرا رئيسيا للوفيات والمراضة وخاصةالرعاية الصحية المتزايدة على حساب المريض في المستشفى، على الرغم من التقدم الكبير في العلوم السريرية. وفقا لدراسة حول فعالية مكافحة العدوى المكتسبة بالمستشفيات المراقبة الروتينية (SENIC) على(NI) أصبحت جزءا لا يتجزأ من مكافحة العدوى وضمان الجودة في مستشفيات الولايات المتحدة بسبب إمكاناتها للحد من عدوى المستشفيات (هالي RW، 1985). وقد أظهرت الدراسات التي أجريت في الولايات المتحدة أن مكافحة العدوى المتكاملة برنامج يتضمن استهداف جهاز المراقبة المرتبطة يمكن أن تقلل من حدوث العدوى المكتسبة داخلة بنسبة تصل إلى 30٪، وتؤدي إلى خفض تكاليف الرعاية الصحية (هالي RW، 1985).

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INTRODUCTION

Nosocomial are caused by a wide variety of pathogens; including Pseudomonas aeruginosa, Klebsiella spp., Escherichia coli, Enterococci, Staphylococci etc. Staphylococci and Enterococci are major causes of nosocomial infections. They cause superficial skin lesions such as boils, styes and more serious infections such as pneumonia, mastitis, phlebitis, meningitis and urinary tract infections; and deep-seated infections, such as osteomyelitis and endocarditis. Methicillin-resistant S. aureus (MRSA) is a strain of S. aureus which by definition is resistant to the semi- synthetic penicillins (i.e. methicillin, nafcillin, and oxacillin). As such, it is resistant to all other beta-lactam antibiotics (including other penicillins, cephalosporins and cephamycins). Additionally, MRSA is often resistant to other classes of antibiotics including aminoglycosides, macrolides and quinolones. Thus, MRSA is not only methicillin resistant but also multiply-resistant as well[19].

Surveillance of NI is a necessary first step toward reducing the risk of infection among patients treated through trained nurse epidemiologists who should assume increasing responsibility for education of personnel and for performance of studies designed to elucidate the mechanism and prevention of hospital infections. The next step is to apply infection control practices that have been shown to prevent nosocomial infections.

PREVALENCE OF NOSOCOMIAL INFECTION

NI are found to be more prevalent in Hospital Departments & Individual Systems[14,15,16]. In general nosocomial infection rates vary by service and by levels of invasive management of seriously ill patients. Accordingly the incidence of Nosocomial infections are highest in Intensive care Unit (ICU) followed by Coronary care unit (CCU), High dependency Unit, Post-operative ward etc in prevalence to be followed gradually in rank by general surgical and medical departments. Departments with low infection rates include Ophthalmology and Maternity.

Studies on Nosocomial infections show that incidence of HAI is highest in large teaching or academic hospitals, intermediate in small teaching hospitals and lowest is small non-teaching Hospitals. These studies show that immunity of the patient is the major factor in Hospital Acquired infection. In large Hospital, more seriously ill patients are admitted sophisticated therapy is given. These patients are immunocompromised by the disease as well as the treatment (surgery ± chemotherapy + radiotherapy) that is immunosuppressive therapy etc.

As for the sites of infection, Urinary tract infection (UTI) by far, is the commonest infection Pneumonia, Surgical wound infections are the next most common, Skin infection, though relatively un-common in temperate zone, are relatively more prevalent in hot countries. Then comes. Blood stream infection namely septicaemia, bacteraemia , IV infection site infection. Infection of the peritoneal cavity (peritonitis).

CLASSIFICATION OF NOSOCOMIAL INFECTION

NI may be endogenous, arising from an infectious agent present within a patient's body, or exogenous, transmitted from another source within the hospital. In addition to patient-to-patient spread, others may be involved, including staff, students, visitors and voluntary workers[18].

COMMON MODES OF TRANSMISSION

1. Direct Contact: E.g. Direct contact between patients is the most important mode of transmission.
2. Self-infection: From patients own pathognomic floras of skin, nose, mouth, throat periniusn, infected lesions.
3. Indirect Contact: E.g. Indirect contact with contaminated inanimate objects like improperly sterilized instruments, dressing materials; contaminated fomites e.g. bed pans, blankets etc etc.
4. Air Borne Transmission: From outside hospital-With air flow from infected areas like-Dustbins, open morgues.
5. Vector Borne Transmission: E.g. Via. Mosquitoes-malaria, Dengue etc.
6. Transmission by Common Vehicles: e.g. via. Food, blood, Water (contaminated) Medications etc.

PREVENTION OF NOSOCOMIAL INFECTION

The other frustrating fact regarding the natural history of Nosocomial or Hospital Acquired Infections is that they cannot be eradicated entirely; but many of them can be prevented by proper control measures. In places where control programs can be implemented, there had been a proven reduction of morbidity and mortality. Furthermore, the money that can be saved by reduction of nosocomial infections is much more used for infection control[13].

Several approaches have been adopted in order to limit pathogen colonization. Strict hygienic practices by healthcare personnel e such as basic hand washing e along with regular disinfection of the hospital environment are considered by some of basic importance. However, it should be noted that routine disinfection of the hospital environment is controversial [21,22,23]. Since nosocomial infections remain an important problem even for hospitals with well-organized and decisively implemented infection control programs, studies of innovative infection control measures are warranted.

Guidelines on hospital hygiene.
- Disinfection.
- Sterilization.
- Cleaning.
- Laundering.
- Catering.
- Waste-disposal.

Guidelines on procedures:
- Urethral Catheterization.
- Prevention of surgical wound infection.
- Tracheostomy.
- Intravenous fluid administration.
- Prevention of nosocomial Pneumonia
- Hand washing etc.

Guidelines on special issues:
- Prevention of nosocomial H.I.V Infection.
- Hepatitis B immunization.
- Prevention of infection in hemodialysis unit; transplant unit etc.

Three fundamental principles govern the measures that should be taken in order to prevent the transmission of HAI in health-care facilities:

Isolation: Identify and separate/segregate from other patients:

- Known infected patients,
- Patients with certain symptoms or
- behaviors (e.g., poor hygiene),
- Patients with high potential for contamination of the environment (uncontained, draining surgical wound)

Routes of transmission: Eliminate or minimize potential routes of transmission

from sources of microorganisms (e.g., use aseptic technique when inserting IV catheters).

Barrier Techniques: Use basic barrier techniques to eliminate or minimize the risk of transmitting infectious agents from patient to patient, from patient to caregiver, and from caregiver to patient. Presume all patients are infected until proved otherwise.

Guidelines used in other hospitals or countries should be adapted so that they are appropriate to be implemented in the hospital. The guidelines should cover most routine procedures and treatments as follow[17].

Nosocomial infection caused by Methicillin resistant Staphylococcus aureus (MRSA)

The worldwide emergence of multidrug resistant bacterial strains is of growing concern. These infections are difficult to eradicate due to resistance to many antimicrobials, thus major cause of morbidity and mortality, leading directly and indirectly to an enormous increase in cost of hospital stay for the patients and also emergence of new health hazards for the community.

MRSA colonization and infection in acute and non-acute care facilities have increased dramatically over the past two decades, evidenced by the increasing number of reported outbreaks in the medical literature. Because of its resistance to antibiotics, management of MRSA infections requires more complicated, toxic and expensive treatment. It is important for the health care professional to understand the difference between colonization and infection. Colonization indicates the presence of the organism without symptoms of illness. S. aureus permanently colonizes the anterior nares of about 20% to 30% of the general population. Hospital workers are more likely to be colonized than persons in the general population, presumably because of increased exposure[20].

IMPROVED HAND HYGIENE-REDUCTION IN NOSOCOMIAL INFECTION

Hand hygiene is a fundamental aspect of infection control, with several studies showing a decline in nosocomial infection rates when compliance with hand hygiene is enhanced[5,6,7]. Despite universal acknowledgement of the pivotal role that hand hygiene plays in reducing nosocomial infection, compliance among health care workers remains poor, with rates ranging from 16% to 81% [8,9,10].

Pittet et al studied predictors of noncompliance with hand hygiene in an observational study and found that, in multivariate analysis, physicians and nursing assistants had lower compliance rates than nurses. Of concern, compliance was lower in ICUs and during procedures that carried a high risk of contamination[11]. Dubbert et al found that, although education alone improved compliance rates transiently, performance feedback resulted in a more sustained improvement in compliance[9]. In a pre- and post-intervention study in an inpatient rehabilitation unit, McGuckin et al used a patient education model consisting of patients asking HCWs coming into contact with them whether they had washed their hands. Compliance (measured through soap/sanitizer usage per resident-day) improved to 94% during the 6-week intervention. However, adherence to hand hygiene fell to 40% in the follow-up period[12].

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