

Risk Factors of Nosocomial Infections

Definition

“A nosocomial infection is an 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.” [1] Risk factors Three main criteria broadly enclose the factors predisposing a patient to infection in a hospital setting:

1) Increased susceptibility: evidently, patients admitted in hospitals have poor state of health, which means lower defence quality against bacteria. This group includes elderly, premature babies and immunodeficient (because of drug abuse, illness or irradiation therapy). Additionally patients with Chronic Obstructive Pulmonary Diseases have specifically increased chances of respiratory tract infection. 2) Invasive devices: for instance intubation tubes, catheters, surgical drains, and tracheotomy tubes as they have already overcome bodies primary defence line. Patients already colonised on admission are instantly put at greater risk when they undergo an invasive procedure. 3) Medications or treatment (e.g. repeated blood transfusions) themselves make the patient vulnerable to infections, e.g. antacid treatment or antimicrobial therapy (which eliminates competitive flora and allows flourishing of resistant organisms)

Sources

Patients

Potential hazard is towards other patients and also health care employees. Most common are patients with tuberculosis, chicken pox, measles, and rubella. Special ventilated care areas (example negative pressure room) help contain the infection. Transmission can be via air, contact, aerosols etc. *Pseudomonas aeruginosa* behold airborne transmission during certain medical procedures (e.g. removal of dressings from leg ulcers or incision of an abscess). Prevalent contamination on upholstery, carpets with Group A streptococci has suggested contribute an outbreak in nursery homes. Hepatitis B virus is another high exposed blood borne pathogen, which is a high risk for health care workers, especially the personnel in the operating theatre. Most of the particles produced are in the respiratory range (smaller than 4 micro meters).

Employee and Environment

On average, a person releases tens of millions of particles per day at a rate of 10,100 particles/min while walking. Of these, 5-10% carry infectious bacteria. Prominent culprits of spread of nosocomial infection from health care workers to others are *Staphylococcus Aureus*, *S. epidermis* and gram-negative rods. *S. Aureus* is becoming extensively important because of its high frequency of surgical site infection and development of Methicillin- (and even vancomycin-) Resistant Strains, MRSA. MRSA is spread mainly by direct contact between health care personnel, followed by mal-maintained ventilation systems. Surgical site infection by *S. epidermis* has been increasing in Sweden since the last 30 years, accountable to the methicillin resistant strain, MRSE. *Legionella* bacteria are also becoming evident as a source from hospital environment, especially in warm water systems (i.e. faucets, showers, humidifiers etc). elderly patients, along with ones suffering from respiratory or renal diseases tend to be more vulnerable to *Legionella*. There should be extra caution with *Legionella* as the detection via routine culturing of respiratory tract is carried out at seldom.

References

[1]"Nosocomial Infection". A Dictionary of Nursing. Oxford Reference Online. 2008. Retrieved 2011-08-15.

BENCKO, Vladimír, et al. Hygiene and epidemiology - selected chapters Praha: Karolinum, 2004. 270 p. ISBN 80-246-0793-X, the materials from our Institute's webpage, and, if feasible, the Institute's textbooks in Czech.