

NOSOCOMIAL INFECTIONS MANAGEMENT IN SURGERY AND INTENSIVE CARE SETTINGS

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Abstract: *The article presents certain data about the Management of Hospital Infections: definition, identification of risk factors, the scale introduced by the American Society of Anaesthesiologists – ASA - which divides the patients into 5 classes, preventing measures against hospital infections, waste management measures.*

Keywords: *nosocomial infections, management, prophylaxis, risk factors*

Rezumat: *Articolul prezintă câteva date despre Managementul Infecțiilor Nosocomiale, definiție, identificarea factorilor de risc, scala introdusă de Societatea Americană de Anestezie – ASA - ce împarte pacienții în 5 clase, măsuri de prevenire a infecțiilor nosocomiale, măsuri de gestionare a deșeurilor.*

Cuvinte cheie: *infecții nosocomiale, management, profilaxie, factori de risc*

Nosocomial infections are defined as hospital-acquired infections; there is no need to prove that the infection was present or was incubating at the moment of discharge. Any infection that occurs 48-72 hours after hospitalization is considered a nosocomial infection. Any infection that occurs only in the moment of hospitalization, it is usually considered to be present before hospitalization, only if it is epidemiologically related to a previous hospitalization or to a certain procedure performed upon hospitalization.

The nosocomial infection occurs 30 days, at the most, after the surgery or up to one year, in case of prosthesis; therefore, it is important that the patient should be supervised after the surgery, including the above-mentioned period of time. The control of the nosocomial infections has an impact on morbidity, mortality, hospitalization days and costs related to the surgical orthopaedics units (Garner JS, Jarvis WR, Emori TO, Horan TC, Hughes JM. 1996).

IDENTIFICATION OF THE RISK FACTORS

The risk for developing nosocomial infections in surgical units depends on the host organism, wound hygiene and surgery length. The risk for developing nosocomial infections depends on these factors and on others as well, including the hospitalization days and the

proper management of the hospital environment. The identification of the risk factors of the host may help establishing the infection potential and the measures necessary for prevention and control.

Patients' susceptibility to infection may be estimated in relation with the following variables: age, diseases severity, physical status, prolonged post surgical hospitalization, morbid obesity, malnutrition, immunosuppressive therapy, smoking, pre-surgery colonization with *S. Aureus*, co-existent infections.

The American Society of Anaesthesiologists (ASA) introduced a scale that divides the patients into 5 classes according to their physical status (Table 1).

Significant differences in the rate of infections were proved in the patients with different diseases. In a prospective study (Britt MR, Schlepner CJ, Matsumiya S, 1978), the diseases severity (fatale, ultimately fatale or non-fatal) has predictive value for the endemic nosocomial infections: the rate of the nosocomial infections in the patients with fatale disease was of 23,6%, in comparison with 2,1% in the patients with non-fatale diseases. A number of relational factors regarding the surgical procedure may be associated to the risk of developing nosocomial infections: hair removing method (that may injure the skin), the improper use of the antimicrobial prophylaxis, surgery length and wound contamination level.

The antimicrobial prophylaxis is used for all antiseptic operations that involve intra-articular or intra-vascular prosthesis and will be applied in all surgeries in which the wound nosocomial infection registered increased morbidity. A comprehensive study (Classen DC, Evans RS, Pestotnik SL, 1992) showed that the administration of the antimicrobial prophylaxis two hours before the surgery may reduce the risk of a nosocomial infection.

MEASURES FOR PREVENTING THE NOSOCOMIAL INFECTIONS

In surgery, the manoeuvres and the procedures used should comprise measures that should prevent the occurrence of the infection:

- Skin disinfection and hand washing practices;
- The pre-surgery preparation of the patient's skin (ex. depilation and the use of antiseptics); the infection

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control programme should include a depilation procedure for the pre-surgical preparation of the skin; the hair will be removed with devices for once-only use in the morning before the surgery in order to prevent the occurrence of folliculitis that requires the postponement of the surgery; the teguments will be dressed with betadine and those allergic to iodine will be dressed with alcohol;

- c. The prophylactic use of antibiotics;
- d. Techniques for preparing the area that will be surged;
- e. The post-surgery cleaning of the wound, dressings;
- f. Practice standards for the surgery team (for example: the use of the surgical coat, gloves and masks);
- g. Sterilization and disinfection of the instruments.

Table no. 1. ASA scale

Class 1	Healthy person
Class 2	Patient with systemic disease of medium gravity
Class 3	Patient with systemic disease of severe gravity of incapacity
Class 4	Patient with systemic disease with a handicap that threatens life constantly.
Class 5	Dying patient who does not survive 24 hours after/without surgery.
E	Emergency interventions are added

In order to investigate the debut of the nosocomial infection, it is recommended:

1. to check the diagnosis and to confirm the specific infection, because other factors may also contribute to the increase of the infection incidence;
2. to formulate the case definition in order to look for the affected patients;
3. to accomplish a graphic of epidemics, which should reveal the number of infection cases in relation to the moment when the diseases started, which will allow to establish the probable period of time of incubation and of the way of transmitting the disease (for example: common source versus transfer from a person to another).
4. to analyse the medical observation sheets in order to establish demography, exposure, medication, therapeutic manoeuvres and other important variables;
5. to elaborate a list of cases in order to identify a common contact;
6. to estimate the infection rate, when the numerator is the number of the infected patients and the denominator is the number of the risk patients;
7. to formulate an hypothesis in order to explain the source and the way of transmission;
8. to test the hypothesis by using the case-control study, cohort study, prospective intervention study; the case-control study is more often used: regarding the witness batch, the patients who have undergone surgical procedures without infection were selected and who were hospitalized at the same time with the

those identified during the epidemics, comparable in terms of age, gender, surgical intervention, date of surgery and health condition (ASA score); two or three witness patients were chosen for each infected case; the cases of nosocomial infections and the witnesses were compared from the point of view of the possible exposures that might increase the risk of disease;

9. to review the measures for periodical check ups by the involved medical personnel, in order to determine their efficacy and the possibility to improve them

The risk factors related to the development of the infections resistant to anti-biotherapy (for example: the infection with *Enterococcus* resistant to vancomycin) include the number of hospitalization days, liver transplant, catheterization for the food supply, dialysis and the exposure to cephalosporin.

In order to prevent the occurrence of the treatment-resistance micro-organisms, the following are necessary:

1. antimicrobial optimal prophylaxis for the surgical interventions;
2. elaboration of good practice guides for the use of antibiotics, feedback of the team who accomplishes the research, for the medical personnel, regarding the resistance to antibiotics.
3. reporting the evolution and tendencies of the antimicrobial resistance;

The elaboration of a plan of identification, transfer, discharge and re-hospitalization of the patients resistant to the antibiotics treatment is also a benefic strategy. The control primary standards of the environment for the care units and surgery rooms should include: proper lightening, ventilation, water, cleaning and area disinfection, sterilization of the instruments, uncontaminated food and the proper storage of the waste. It is necessary to train the medico-sanitary and auxiliary personnel regarding the waste management, resulted from the medical activity. This has been accomplished in our hospital, based on the Order of the Minister of Health and Family no. 219/2002. Waste producers are obliged to keep apart the dangerous waste from those non-dangerous, at the production site.

CONCLUSIONS

A research in the control of the nosocomial infections implies "data collection", as well as microbiologic and logistic support for realistic studies, involving human and material resources for these activities.

Preventing and controlling the transmission of the nosocomial infection in hospitals refers to:

1. preventing the infection to be transmitted from one patient to another;
2. monitoring the environment (for example: facilities and ventilation);
3. procedures for the sterilization of the equipment and instruments;
4. implementing sterilization procedures for surgeries and other invasive procedures;

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5. control strategy regarding the antibiotics administration;
6. strategies and protocols for labour health;
7. implementing isolation measures.

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