

THE IMPACT AND ETIOLOGY OF THE BACTERIAL NOSOCOMIAL INFECTION INSIDE A COUNTY EMERGENCY CLINICAL HOSPITAL

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Keywords: nosocomial infection, rate, incidence/impact, germs, sensitivity to antibiotics

Abstract: This prospective and detailed study wanted to reveal the real impact of the nosocomial infection inside several hospital wards from the County Clinical Emergency Hospital of Sibiu, as well as its etiological spectrum. Between 01.01.2010 - 31.12.2010, 40,120 patients were included in a study. The patients' pathology was studied under the perspective of the nosocomial infection criterion. The global rate of the nosocomial infection impact was 6.33% from the outpatients; the highest frequency was in the ATI wards: 22.84% and the frequency on the anatomic situs were more present for the surgical wound infection: 38.97%. The etiology was prevalent for the gram negative bacilli: 78% - especially E.Coli-28.19%. ESBL secreting strains were identified in 33.08% of the cases. So, as a conclusion, the nosocomial infection has a great importance for the mortality and morbidity process, with huge economical impact, being an accurate indicator for the quality of the hospital health care.

Cuvinte cheie: infecție nozocomială, rată, incidență, germeni, susceptibilitate la antibiotice

Rezumat: Acest studiu descriptiv prospectiv și-a propus să determine incidența reală a infecției nozocomiale în câteva secții ale Spitalului Clinic Județean de Urgență Sibiu, precum și spectrul lor etiologic. În perioada 01.01.2010 – 31.12.2010 au fost incluși în studiu un număr total de 40.120 pacienți. Cazurile au fost analizate sub aspectul criteriilor de definiție pentru infecția nozocomială. Rata globală a incidenței infecției nozocomiale a fost de 6,33% pacienți externati; incidența pe secții a fost cea mai mare pentru secția ATI: 22,84% , iar frecvența pe situsuri anatomice a predominat pentru infecția de plagă chirurgicală: 38,97%. Etiologia a fost reprezentată preponderent de bacilii gram-negativi: 78% din care E.Coli 28,19%. Tulpinile secretoare de ESBL au fost identificate în proporție de 33,08%. În concluzie, infecțiile nozocomiale sunt o cauză importantă de morbiditate și mortalitate, cu consecințe economice considerabile, fiind un indicator fidel al calității asistenței medicale prestate în spital.

INTRODUCTION

The bacterial nosocomial infections are an important cause for the morbidity and mortality rate, highly topical over the whole world, being a problem beyond the Infection Disease register, with huge financial impact for the health care. Due to their hospital origin, the nosocomial infection is a very accurate indicator for the health care.

The nosocomial infection (NI) is defined, after CDC (Center of Disease Control, Atlanta, Georgia, SUA) and in Law No.916/2006 of the Ministry of Health, (5) as a medical fact, where there was no presence of the infection when the patient was hospitalized, but it has appeared during the hospitalization, after no more than 30 days after the patient was discharged, if not the medical procedures had involved an implant, or up to an year after the discharge, where the patient is the receptor of an implant (4).

THE STUDY OBJECTIVES

It is evaluated the real incidence of the nosocomial infection in a county clinic hospital under the aspect of the global rate of the impact and frequency structured on types of wards and anatomical situs, and, of course, the etiological spectrum of the germs will be identify, as well.

MATERIAL AND METHODS

The study has realized a prospective analysis of the patients

hospitalized in County Hospital Emergency Clinic of Sibiu, between 01.01.2010 – 31.12.2010 (N=40.120). The cases which presented the nosocomial infection were identified by a weekly check out of the patients' observation sheet, patients who met the diagnostic criteria above mentioned. In this study, all the patients who were infected with a bacterial nosocomial infection during their hospitalisation, were included (284). 5 patients were excluded: 3 of them- whom the nature of the etiology was fungal, and 2 of them who had not an antibiogram. The sampling was the stratified type, by using as criteria: the demographic data (age, sex), the anatomical place of the infection, the ward where the infection was aquired, the number of the reported infections per patient, the number of the isolated germs per single infection, the bacterial cultures and susceptibility to antibiotics of germs and mortality.

The data was written in a form by using Excel. By using this soft facilities, the following rates were calculated: a) the global impact, b) the frequency upon different health care types (surgical ones, medical or non-surgical and ATI wards), c) the frequency upon injured anatomical situs, d) the death rate e) the infection aetiology on germs category: gram-negative ones and gram-positive, with the quantification of the percent of multidrug germs resistance (MDR).

RESULTS

During the investigation, a number of 254 bacterial

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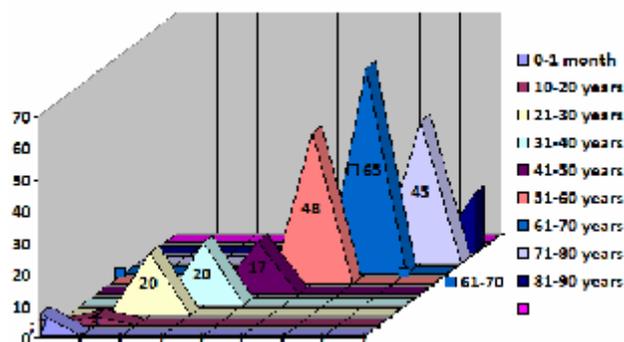
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nosocomial infections were identified, among 284 patients, from 40.120 hospitalized patients. The impact of the nosocomial infection, upon the studied group, was 6.33% from the discharged patients.

The demographic data was: 51.57% men, 48.42% women.

The medium age of the studied group was 54, 23 years, with a minimum value of 11 days and a maximum of 90 years; the age randomisation can be seen in fig. 1.

Figure no. 1. The randomization on age groups



The frequency on anatomical situs of the infection is revealed in the no 1 chart.

Table no. 1. The bacterial nosocomial infection frequency based on the anatomic situs of the infection

Anatomic situs	No. of infection	Percent value
Surgical wound infections	99	38,97%
Urinary tract infections	61	24,02%
Pneumonia/ Bronchopneumonia	48	18,89%
Blood infections	26	10,24%
Genital infections	10	3,94%
Skin infections	4	1,57%
ENT infections	3	1,19%
Digestive tract infections	2	0,79%
SNC infections	1	0,39%

The specific impact on hospital wards, reported to the number of discharges, by types of wards, is shown in chart 2.

Table no. 2. The specific impact on each type of hospital ward

Ward	NI number	Discharge number	Specific impact
ATI wards	89	3896	22,84%
Surgical wards	130	14819	8,77%
Medical wards	35	21384	1,63%

Mortality cases with NI were 12.59% (32 deaths).

341 bacterial strains were isolated, with the following etiology: 262 strains of gram-negative bacilli (78%), 75 strains of gram-positive cocci (22%). A number of 199 patients acquired only one infection, 23 of them revealed 2 infections and 3 patients showed 3 different types of infections. The mono or multi-etiological type of the nosocomial infections was evaluated as follows: 164 monoetiological infections, 78 infections with double etiology and 7 infections with triple etiology. The etiological spectrum of the gram-positive strains is shown in fig. 2

The etiological spectrum of the gram-negative bacilli is shown in fig.3

Figure no. 2 The etiological spectrum of the gram-positive cocci

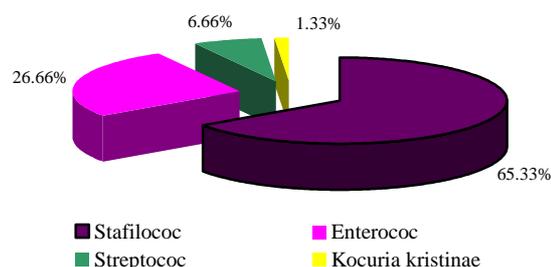
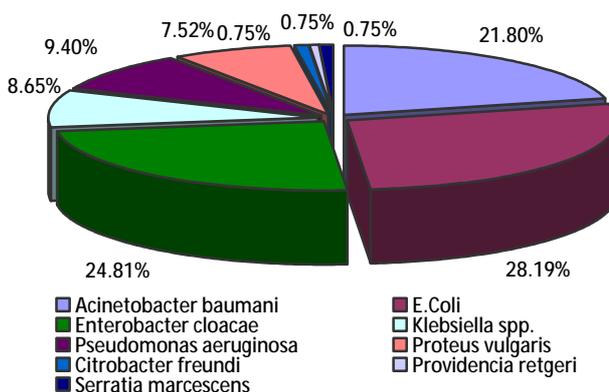


Figure no. 3. The etiological spectrum of the gram-negative bacilli



From the gram-positive cocci, 54.66% were stafilococci methicillin-resistant. Enterococci strains kept their susceptibility to glycopeptides.

From the gram-negative bacilli, a number of 88 strains (33.08%) were given a secretion of betalactamase with wide open (large) spectrum (ESBL).

DISCUSSION

The impact of nosocomial infection has different ways to be reported wide world, based on the health care system specific to each country apart. In USA, it is reported a medium impact of 5%, a death rate of 10%, a cost of 100 dollars/patients and an excess of hospitalization for about 3 days long, meaning more than about 15 millions of patients acquired a nosocomial infection, the entire costs being of 1,5 miliarde de USD (1). The real impact of the nosocomial infection depends on the hospital size, much significant in numbers in the great university emergency clinic hospitals; depends on the type of the ward where the patient is hospitalized: larger in ATI wards with also a surgical profile, being in a direct proportion with the complexity of the cases. The huge progress acquired by the medical science in the pharmacy industry during the last years, made possible the heart disease patients survival, which, not long ago, were considered incurable, the fact that increased the rate of the hospitalization. The new diagnostic methods and treatments are more invasive, exposing the patient with complex pathologies to a higher risk of morbidity, unfortunately, the costs are the nosocomial infections. This explains the impact and the higher and higher mortality caused by the NI in ATI ward, where the infection can reach values as 20 or 6% (2). In these wards, the germs density and variety (often MDR) is higher, first of all due to the large or ultralarge spectrum antibiotics use, as well as in prophylactic care as in therapeutic one. (3).

The receptivity to infection, as a necessity for the NI presence, is different according to pathology background, age (age extremes being more susceptible to infection, as the other

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age groups, by a specific immunology reaction (2,6).

The death rate by NI is difficult to be quantified, an important percent from this rate belongs to the pathology background and to the patients' age who proved severe infections: pneumonia and bronchopneumonia associated with mechanical ventilation or nosocomial sepsis (2).

The etiological spectrum of NI is changed year by year, as the use of the antibiotics is increasing, but because of a lack of accurate charts of the susceptibility to antibiotics in every region, as well.

The accuracy of the statistics is in a direct relation with the size of the study group; the great results obtained in these resources have to stand in the test of time, because the statistics indicators may vary from time to time, due to social-economic problems apart from the quality of the health care.

Nozocomiale, Editura Muntenia, 2004, 53-60.

CONCLUSIONS

1. The nosocomial infection is a real clinic entity today, and not so rare as some hospital used to report. This study confirms the NI presence evaluated to 6, 33% of the discharged patients.
2. The impact of NI is higher in ATI wards - 22.84%, due to the complexity of the cases in this medical department.
3. The most frequent NI type reported was the infection acquired after surgical interventions: 38.97% from the entire NI, followed by the urinary tract infection: 24.01%.
4. The most of the NI were identified at the age group of 60-70 years old, and the death rate was calculated at 12,59%.
5. The most of the NI were monoetiological: 164, but there were at least 3 different bacterial strains identified to every 7 infections.
6. The gram-negative bacilli dominated the etiological spectrum of the bacterial nosocomial infections, being isolated in proportion of 78%; from these ones, 28.19% were E. Coli strains.
7. The MDR germs presence was significant: 54.66% gram-positive cocci being Staphylococcus MRSA strains (methicillin resistant Staphylococcus aureus), and gram-negative bacilli: 33,08% were generating ESBL.
8. For these reasons, the prevention of the nosocomial infection must be reconsidered and has to become a major priority in national health care programmes.

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