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

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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 and Mortality 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, indicating for the health care.

Rezumat: Acest studiu descriptiv prospectiv și-a propus să determine incidența reală a infecțiilor nosocomiale 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 nosocomială. Ratea globală a incidenței infecțiilor nosocomiale a fost de 6,35% pacienți externați; incidența pe secțiuni a fost cea mai mare pentru secțiția ATI: 22,84% , iar frecvența pe situsuri anatomiche a predominat pentru infecția de plasă chirurgicală: 38,97%. Etiologia a fost reprezentată preponderent de bacili gram-negative: 78% din care E.Coli 28,19%. Tulpiinile secretoare de ESBL au fost identificate în proporție de 33,08% de cazuri. În concluzie, infecțiile nosocomiale sunt o cauză importantă de morbiditate și mortalitate, cu consecințe economice considerabile, fiind un indicator fidel al calității asistenței medicale prestată în spital.

RESULTS

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 sites 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.

The bacterial spectrum 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 acquired, the number of the reported infections per patient, the number of the isolated germs per single infection, the bacterial cultures and the sensitivity 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 injection aetiology on germs category: gram-negative ones and gram-positive, with the quantification of the percent of multidrug germs resistance (MDR).
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 anatomical situs of the infection

<table>
<thead>
<tr>
<th>Anatomic situs</th>
<th>No. of infection</th>
<th>Percent value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical wound infections</td>
<td>99</td>
<td>38.97%</td>
</tr>
<tr>
<td>Urinary tract infections</td>
<td>61</td>
<td>24.02%</td>
</tr>
<tr>
<td>Pneumonia/ Bronchopneumonia</td>
<td>48</td>
<td>18.89%</td>
</tr>
<tr>
<td>Blood infections</td>
<td>26</td>
<td>10.24%</td>
</tr>
<tr>
<td>Genital infections</td>
<td>10</td>
<td>3.94%</td>
</tr>
<tr>
<td>Skin infections</td>
<td>4</td>
<td>1.57%</td>
</tr>
<tr>
<td>ENT infections</td>
<td>3</td>
<td>1.19%</td>
</tr>
<tr>
<td>Digestive tract infections</td>
<td>2</td>
<td>0.79%</td>
</tr>
<tr>
<td>SNC infections</td>
<td>1</td>
<td>0.39%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Ward</th>
<th>NI number</th>
<th>Discharge number</th>
<th>Specific impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATI wards</td>
<td>89</td>
<td>3896</td>
<td>22.84%</td>
</tr>
<tr>
<td>Surgical wards</td>
<td>130</td>
<td>14819</td>
<td>8.77%</td>
</tr>
<tr>
<td>Medical wards</td>
<td>35</td>
<td>21384</td>
<td>1.63%</td>
</tr>
</tbody>
</table>

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

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

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 and 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 semnificative in numbers in the great universitary 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 patologies 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 accordind 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.

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 coci 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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