Common cause of bacteremia in pediatric cancer patients with fever and vetropeni in Shafa Hospital, Ahvaz; 2009-2010

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ABSTRACT

Background and Objective: Neutropenia can cause life-threatening infections in patients with cancer and is Gram-negative staphylococci are the most common pathogens. The pattern of infection of bacteria has changed significantly over the past decades. We aimed to access the bacterial and fungal causing infection in patients with fever of malignancy

Material and Methods: It was cross-sectional study which has done on 70 patients aged 0-15 years with fever, neutropenia and malignancy; those were referred to Shafa hospital during 2009-2010. From all patients has requested to collect two samples of blood culture and in case if it was necessary one sample of fungal culture. Data has entered and analyzed by SPSS software (version 21). Statistically significant difference was indicated at significance level (P-Value) of 0.05.

Results: Finding of this study has shown that number of female and male were 28 and 42 respectively and the mean age of patients was 8.02 ± 4.18 years and average Absolute neutrophil count (ANC) was 7.377 ± 47/398 L. Neutropenia was the most common underlying disease causing Acute lymphoblastic leukemia (ALL) (50%). Out of all patients, 3.24% of them had bacteremia and none of them had fomony. The most common gram-negative organisms was Pseudomonas Annoroza (35.83%) due to bacteremia, followed by Acinetobacter, Escherichia coli, Klebsiella and Atro bacteria attitude. All gram-positive strains of S. Coe types were negative. Gram-negative microorganisms have had highest susceptibility to imipenem, amikacin; ceftazidime Jentmaysyn. gram negatives compared to only 8.13% were susceptible

Conclusion: The model organism isolated from patients with fever and neutropenia in cancer is not the same in different parts of the world and Still the most common gram negative Ayevah emergence of the region are therefore therapeutic direction for empirical therapy should be focused on Gram-negative. Ceftazidime is not a good choice for initial treatment

Introduction

Patients with malignancies, especially those who are chemotherapy are susceptible to infectious diseases. Infection of the blood (Blood stream infection) is one of the major causes of death and complications in children with cancer are treated with chemotherapy. (1) Cancer patients are more likely to cause bloodstream infections are the most important causes of impaired cellular immunity and reduce the number of neutrophils (2) Gram-negative organisms including Pseudomonas aeroginusa, Klebsiella and Escherichia coli and Staphylococcus aureus, such as coagulase-negative Staphylococcus and koagolaz are most common infections in children with neutropenia. The pattern of fever in cancer patients and neutrophil is to reduce the number of circulating neutrophils (less than µL 1500) allegedly. There are not diagnostic criteria for infections. (3, 4, 5) child safety system of patients with cancer and the effects of anti-cancer drugs are directly to cancer at stake. Mucous membrane disorders, catheter in the body, malnutrition, prolonged administration, antibiotics and repeated hospitalizations for
all children at increased risk of infection. (2) Gram-negative organisms including Pseudomonas Aerogenusa Klebsiella and E. coli and Coli and the like Staphylococcus and Staphylococcus Coagulase most negative published. Infections are in children with neutropenia. Organisms causing infections in cancer patients with fever during the past decades has made the difference (3-5). Due to the fact that cancer patients are at risk of various infections and by the emergence of evidence increasing high bacteria resistant by AntiBiotic, required by the first sign of bacteremia (fever), blood cultures and antibiotic susceptibility test has been the standard culture media tested. (6In the 2008 study by Saeed Pour the pattern of bacterial infections in children with cancer neutrophils was done, negative gram organism pathogen Pseudomonas aeronorjoza most commonly isolated. (7) In a study by santolaya (santolaya) and colleagues in 2007 was Pediatric cancer patients with fever and neutropenia were the Von review to determine whether the death was related to an infection that was detected in 14 cases (6.3%) deaths were related to infection. (8) In a study performed by the part and colleagues in 2008, 222 episodes of fever and neutropenia in children with cancer were analyzed retrospective. In this study it was found that respiratory infections were the most frequent infection. (9) However, due to the changing pattern of causes septicemia in these patients over time and Our limited studies in this research to investigate the causes Bacterial and fungal-fever in this group of patients has been achieved by providing a treatment strategy based on bacteriological wonderful side effect of preventing invasive infections, and the policy clearer treatment leads to savings parents are spending more and more time and satisfaction. 

**Methodology:**
It was a cross-sectional study involving children with cancer less than 15 years who had been admitted to hospital emergency healing. The sample size was estimated to 70 consecutive non probability sampling method was in this way since the beginning of the study, all patients who met our inclusion criteria (Children under15 years old with fever and neutropenia either before chemotherapy or after chemotherapy) Were selected for specific reasons, and those with non-infectious Febrile transfusion of blood products, such as those in the early hours or 24 hours after chemotherapy had fever And the fever itself was discontinued within 24 hours were excluded and this continued until the final volume samples. In this study, peripheral blood samples of two ounces of 2 Separated locations with at least one child under the age of 15 years, 70 hours of fever and neutropenia were admitted to the emergency ward of Shafa Hospital of Ahvaz were taken and hematological, and in sterile conditions to standard blood culture bottles (medicine company antibodies Tehran) Containing 20 ml of broth medium by Triticale soy brot (Tripticase soy brot) . sample transferred to the laboratory of Shafa hospital incubated for 48 h at 37 °C were maintained. After 48 hours, blood was taken from the bottle and on the environment of, mechanical, agar and blood agar and incubated and kept in an incubator for 18 hours to 24 hours. In the event that the bacteria were grown on medium Gram stain of colonies of bacteria was developed to identify the enzyme (catalase, oxidase, coagulase) were evaluated. In the case of gram-negative bacteria grown in blood culture samples and biochemical identification of the sample (Triple Sugar Iron Gar, lysine carboxylase, Malunyt, citrate, urea and acid-farmentaiv ativan) was used and if coci gram was positive we used Coagulase, Neobiosin test and the other tests in order to identify. But if the culture medium, bacterial was not growth again one week after the blood culture bottles .we inoculated depot to the sites of mektangi culture depot and bloody depot. Testing to determine susceptibility patterns and antibiotic resistance of bacteria isolated by
the Kirby-Bauer (Kirby Bauer’s method) using the generator hinton agar disk diffusion method according to the guidelines in CLSI (Clinical and laboratory standard institute) was done. In cases of fever after 5 days of intravenous antibiotic therapy was not discontinued, 5 ml of venous peripheral blood was taken again and then kept in an incubator at 37 ° for 24 to 48 hours, the laboratory of mycology unit, medical school, was transferred And the environment for fungal culture were inoculated sober, and dextrose. The characteristics of patients were recorded in the questionnaire and the data were analyzed by software spss16 and the occurrence of t-test and Pearson correlation coefficient between the variables examined significant level tests above 05/0 was considered.

Results:
In this study, 70 cancer patient with fever ventropeni aged 5-15 in emergency Shafa hospital were admission. Oral and axillary temperatures were recorded. Recorded cases of axillary method were adjusted from 38 ° C to 40.5 ° C. From all subjects, 28 (40%) were female and 42 (60%) were male. Patients age of mediocrity 1811/4 ± 8.21 years (6 months to 14.5 years) who were divided into four groups (Table 1).

Table 1: Distribution of age groups of patients with cancer, fever and neutropenia.

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3</td>
<td>17</td>
<td>24.3</td>
</tr>
<tr>
<td>4-7</td>
<td>13</td>
<td>18.6</td>
</tr>
<tr>
<td>8-12</td>
<td>20</td>
<td>28.6</td>
</tr>
<tr>
<td>12-15</td>
<td>20</td>
<td>28.6</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>

About 35 cases (50% of cases) was the most common underlying disease. Willms tumor and retinoblastoma, the lowest number (4.1%) of all malignancies were included. (Figure 1)

Figure 1: Percentage frequency of malignancy in patients with fever and neutropenia

In this study patients with ALL had the highest percentage in the group of severe neutropenia (9.37%). No statistically significant association was found between the severity of neutropenia and underlying disease (171.1 P =). Neutropenia was severe in females than males (4.71%) vs. (7.66%). Of the 140 samples submitted for bacterial culture in a total of 70 patients, 17 (3.24%) were considered positive blood cultures. (Figure 2)

Figure 2: Percentage of positive cultures in patients with venotropeni fever and malignant

The most common gram-negative organisms isolated were Pseudomonas aerogenusa (3.35%). All strains were gram-positive, coagulase-negative staphylococci. All of these patients had clinical signs of infection (Table 2).
Table 2: Frequency of microorganisms grown bacteremia in cancer patients

<table>
<thead>
<tr>
<th>Type of macro-organism</th>
<th>The number of positive in first cultures</th>
<th>The number of positive in second cultures</th>
<th>The suspect in both culture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Pseudomonas aerogenusa</td>
<td>6</td>
<td>35.3</td>
<td>6</td>
</tr>
<tr>
<td>Osinobakhter</td>
<td>2</td>
<td>11.8</td>
<td>2</td>
</tr>
<tr>
<td>Enterobacter</td>
<td>1</td>
<td>5.9</td>
<td>1</td>
</tr>
<tr>
<td>Borkhoadria Sepaya</td>
<td>1</td>
<td>5.9</td>
<td>1</td>
</tr>
<tr>
<td>E. coli</td>
<td>2</td>
<td>11.8</td>
<td>2</td>
</tr>
<tr>
<td>Klebsiella</td>
<td>2</td>
<td>11.8</td>
<td>2</td>
</tr>
<tr>
<td>Coagulase-negative staphylococci</td>
<td>3</td>
<td>17.6</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
<td>16</td>
</tr>
</tbody>
</table>

Cases of suspected fungal infection in 21 cases (30%) samples were prepared for mushroom cultivation blood cultures were negative except in one case. 0.1 . 32% female and 19% male had Cases of suspected fungal infection in 21 cases (30%) samples were prepared for mushroom cultivation blood cultures were negative except culture Positive bacteria. In one case. 0.1 .32% female and 19% male had significant relationship between gender and culture setup with k square test (k 2) were not found. (P=0.21). 35% (n = 11) of cases with positive cultures belonged to ALL. However, no statistically significant association was found between disease and culture. (P = 1.027)

Comparison of age for both sexes, according to the T-test with (P = 0.82) was not significant. The mean age for females was 161.8 and for males was 929.7 percent. By T-test statistically was not any significant association found between age and outcome cultivation. (P=0.72)

Most cases of severe neutropenia with positive cultures, 12 cases (6.70%) were found. statistically significant correlations were not found between the severities of neutropenia outcome cultivation. (P = 1)

Anti-bio gram was performed after a positive culture in which all microorganisms including gram positive and gram negative isolates were resistant to clindamycin.

During this study 1.4% of patients (6 patients) died by the end of the study period.

Discussion:

In the present study the underlying disease was more common in children with febrile ALL neutropenia with other studies such as Lee et al Said Pur corresponded to the. (7.10)

At this moment the average number of WBC / μL 2.797 ± 14.887 medium / μ L ANC 7.337 ± 06.398, however in the study of Said Pur et median WBC Lμ / 2940 ± 3368 medium ANC Lμ / 407 ± 643, respectively. This difference may be because our study was conducted on children with cancer with vetropeni and the
study of Said Pur and colleagues was on neutropenia patients both cancerous and non-cancerous been investigated. (7)
The most common causative organisms were gram-negative bacteremia in this study (35/82%) which is consistent with the study of Lee (09.10)
The most common Gram-negative infections in neutropenia patients were between the 1980-1960Gzarsh Basil showed that 80-10% of the gram-negative infections, respectively. (11)
The most common gram-negative organism in this study were Pseudomonas Aerogenus, Osinobakhter, Borkhoadria Sepaya, Ashershiacoli and Klebsiella several possibilities positives and Gram-negative Staphylococci In the studies of Li et al said pur colleagues and Nellie also had gram negative Pseudomonas head. (12.7.10)
The growth of Staphylococcus aurous and coagulase-negative staphylococcal bacteremia in this study was the low number of cases investigated in the future. Perhaps because of the lack of good growth of these organisms vary by culture, as in most studies of Bectec (Bectec) is used. Although it should be noted that the pattern of organisms isolated from neutropenia patients are not the same in different parts of the world. In the study of suspected cases had not positive blood cultures Fangmy just one example of the genus Aspergillums fumigates grew from a patient with a brain tumor. Perhaps because of the lack of proven fungal infection is the limited number of samples. Although other studies proved low Fongmy percent. (7) Of the 1135 patients were included in the study Almahalavy of the Fangmy only 18 were positive (13).
The sensitivity of organisms to antibiotics has been seen as susceptible to imipenem (69%), amikacin (6.63%) and gentamicin (5.51%) had the highest sensitivity with Nelly, Almahalavy and Mehta also is read. (14 .3.13)

Conclusions:
The study showed a pattern of isolated organisms in neutropenia patients are not the same in different parts of the world and Gram-negative pathogens are most common in this area jointly so it seems that the modified empirical antibiotic therapy against gram-negative pathogens should be considered when there is a high incidence of side fonogy. Ceftazidime is not the drug of choice for first-line empiric therapy. Due to the quality controls of infection, particularly with regard to clinical care And microbiological diagnosis of infection and neutropenia are essential elements in the care of children with cancer.

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