Bacterial Blood-Stream Infections in Neutropenic Children with Hematologic/Oncologic Disorders at a Tertiary Care Centre in Saudi Arabia


Background: The aim of this study is to determine predominant pathogens and their susceptibility patterns in our pediatric patients with hematologic oncology disorders for proper selection of empiric antibiotic therapy.

Methods: Retrospective chart review of children with hematologic/oncologic disorders and bacteremia between January 1998 and December 2005. Demographic data, underlying diseases, bacterial isolates, and antibiotic susceptibility were reviewed.

Results: One thousand seventy nine bacteremia episodes were identified. The majority of isolates were GPC (52%) whereas Gram-negative bacteria (GBN) caused five hundred and fourteen episodes (48%). The most occurring GPC was coagulase negative staphylococcus (32%), S. aureus (24%), S. pneumoniae (15%), Enterococcus spp. (13%), and viridans streptococcus (10%). VRE was not isolated. For the Gram-negative isolates the most occurring were E. coli (23%), K. pneumoniae (19%), P. aeruginosa (18%), Enterobacter spp. (9%). The percentage of GNB isolates changed over the years accounting for 41%, 42%, 48%, 44%, 58%, 49%, 47%, and 47% for the years 1998, 1999, 2000, 2001, 2002, 2003, 2004, and 2005, respectively. The sensitivity patterns for the healthcare associated blood stream infections indicated an increase in susceptibility for gentamicin from 60% to 64% to 74% for 2003, 2004, 2005 respectively; Ceftazidime has shown an increase from 77% in 2003 to 85% in 2004, then a decrease in 2005 to 69%. Cefepime sensitivity showed a slight increase from 77% in 2003 to 81% in 2004 then a decrease to 76% in 2005. Tazocin indicates an increase from 58% in 2003, 64% in 2004 and 80% in 2005. In addition, Amikacin shows an increase in sensitivity from 62.5% in 2003 to 84% in 2004 and 85% in 2005. The changes in susceptibility patterns may be due to the change in the empirical therapy which occurred in June 2003 from tazocin and gentamicin to cefepime and gentamicin.

Conclusions: Our results concur with observations from other studies that in children with cancer GPC is a major causative pathogen of bacteremia, with shift to GNB. These results support the exclusion of vancomycin as part of the initial empiric therapy regime in febrile neutropenic patients.

Evaluation of a LightCycler PCR Assay for the Detection of Invasive Aspergillosis in Pediatric Patients with Onco-hematological Diseases

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Background: Invasive Aspergillosis (IA) is associated with high mortality. Successful outcome with treatment is linked to early diagnosis, but culture and histology are late positive, whereas clinical-radiological signs do not allow a certain diagnosis.

Objective: To evaluate the role of LightCycler PCR in the early diagnosis of IA in pediatric patients who underwent high doses of chemotherapy or hematopoietic stem cell transplantation; furthermore, to evaluate sensitivity, specificity, PPV and NPV of LightCycler PCR compared to ELISA test for detection of galactomannan antigen (GM test).

Methods: 96 patients (mean age 10 years) at high risk for fungal infection or with suspected fungal infection underwent clinical, radiological and microbiological evaluations from January 2004 to October 2005. Microbiological evaluations included GM test and LightCycler PCR test for fungal DNA in blood. A total of 579 blood samples were collected and examined by LightCycler PCR with FRET (Fluorescence Resonance Energy Transfer) technique, a very specific method.

Results: 9/96 (9.4%) patients developed IA, classified as 5 proven, 3 probable and 1 possible (EORTC/MSG criteria). Sensitivity, specificity, PPV and NPV of LightCycler PCR were respectively 87.5%, 56.32%, 15.55% and 98% when 1 positive sample was sufficient to consider the test positive, and 62.5%, 86.2%, 29.41% and 96.15% when at least 2 positive samples were required to consider the test positive. Sensitivity, specificity, PPV and NPV of GM test were respectively 50%, 96.2%, 57.14% and 95.06% when 1 positive sample was sufficient to consider the test positive, and 50%, 100%, 100% and 95.23% when at least 2 positive samples were required to consider the test positive. Considering a positive result from GM or LightCycler PCR test (and 2 consecutive positive samples as criterion for positivity), the sensitivity, specificity, PPV and NPV were 75%, 85.18%, 33.33% and 97.18% respectively.

Conclusions: LightCycler PCR had a good sensitivity and a high NPV: if negative, IA is unlikely; GM test
is less sensitive but has a higher specificity and PPV than PCR. One possible future scenario is the combined use of both tests to design a strategy of pre-emptive antifungal therapy in order to select the patients who do not need of early empirical treatment.

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Trend Towards Reduced Burden of Proven/Probable Invasive Fungal Infections (IFI) in Adult Non-Allo-HSCT Neutropenic Patients with Acute Leukemia

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Background: In leukemic patients IFI are associated with severe morbidity and high mortality (30 to 90%). Moreover, IFI may have a negative impact on treatment and outcome of leukemia. Recent progresses in diagnosis and management of IFI may have improved outcome.

Objectives: To evaluate the morbidity and mortality of proven/probable IFI in adult non-allo-HSCT neutropenic patients with acute leukemia.

Methods: Clinical, radiological, and laboratory data were prospectively collected in consecutive neutropenic patients with acute leukemia (2002–2005). Antifungal prophylaxis was not used routinely. IFI were classified as proven, probable, or possible (EORTC-BAMSG). Proven/probable IFI cases were compared to controls (no IFI).

Results: 157 neutropenic episodes (91 induction chemotherapy, 64 consolidation, 2 auto-HSCT) occurred in 86 patients (73 AML, 13 ALL). Median age was 57 yr (range 19–77). IFI was proven/probable in 26 cases (14 aspergillosis, 14 candidiasis, including 2 mixed IFI) and possible in 28. Proven/probable IFI occurred during induction chemotherapy in 69% of cases. At admission neutropenia was present in 27% of IFI cases. Median days of in-hospital neutropenia were 25 (range 16–71) vs. 20 (range 7–59), respectively (p < 0.05). Antifungal therapy was started after a median of 3 days (range 0–13) after fever onset. Initial antifungal therapy consisted of amphotericin B-deoxycholate (n = 17), voriconazole (n = 5), caspofungin (n = 2), fluconazole (n = 2). Criteria for proven/probable IFI were met a median of 12 days (range 1–51) after fever onset. Morbidity and mortality in proven/probable IFI (n = 26) cases versus controls (n = 103, no IFI) were as follows: Median days of hospital stay (range): 43 (26–90)* vs 32 (16–68), P < 0.05 (*4 patients had thoracic surgery). Median days between recovery from neutropenia and next chemotherapy (range): 15 (11–45) vs 11 (1–53), P < 0.05. Patients requiring ICU: 4 (15%) vs 9 (9%), NS. ICU because of IFI: 2 (8%). Mortality: 3 (11.5%) vs 2 (2%), NS. Mortality due to IFI: 1 (4%).

Conclusions: In adult non-allo-HSCT patients with acute leukemia and neutropenia, proven/probable IFI were associated with moderate morbidity (low rate of ICU admission, minimal delay of initiation of next chemotherapy) and low attributable mortality (4%) despite prolongation of hospital stay, suggesting a trend towards reduced burden of IFI.

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Nosocomial Candidemia over a 6-year Period at a Medical School Hospital in Japan

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Background: Bloodstream infections due to Candida species are becoming increasingly important causes of morbidity and mortality in immunocompromised and other severely ill patients.

Objective: The aim of this study was to evaluate the incidence of nosocomial candidemia among patients admitted to our hospital. Cases included patients undergoing most medical and surgical interventions. Causative pathogens, potential predisposing factors, treatment, and risk factors for death were also evaluated.

Methods: Demographic information, risk factors, therapy and outcome of all patients who contracted candidemia at Saitama Medical School Hospital from January 2000 to December 2005 were identified through the records of the department of Clinical Microbiology and reviewed retrospectively. Cases of candidemia were dated to the first isolation of any Candida spp. from the patient's blood culture.

Results: A total of 104 episodes of Candida bloodstream infections occurring in 104 adult patients were identified. In this retrospective study, the average incidence of candidemia was 0.38 cases per 10,000 patient-days. The candidemia patient population comprised 68 males and 36 females, with a mean age of 67 years. Among these patients (n = 104), the most frequent underlying diseases/conditions were neoplasia (41%) and cardio-vascular diseases (36%). Candida albicans was the most frequently isolated species