Infectious Complications and Microbiology During Induction Chemotherapy Over a Decade at a Community Pediatric Cancer Center

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Infectious Complications and Microbiology During Induction Chemotherapy Over a Decade at a Community Pediatric Cancer Center

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Introduction

- Bloodstream infections (BSIs) remain a significant cause of morbidity and mortality in children with leukemia.
- Oncology patients are at at an increased risk of infectious complications secondary to intense chemotherapeutic regimens during induction resulting in prolonged and profound neutropenia.
- To our knowledge, there is limited literature regarding microorganisms and antibiotic resistance from smaller institutions similar to ours.

Objectives

- The primary objective of this review was to describe the microbiology of BSIs
- To evaluate our rates of BSIs during induction chemotherapy as compared to larger institutions

Methods:

DESIGN

Retrospective chart review including the following:

- Inclusion criteria: Patient from age 1 to 21 years with newly diagnosed leukemia at our institution between May 1, 2010 and May 31, 2020
- Exclusion criteria: Patients who did not complete entirety of induction chemotherapy at our institution

DEFINITIONS

- A microbiologically documented infection was defined as a causative pathogen isolated from the blood in the setting of fever and/or neutropenia.
- Fever as per current standards defined as a temperature > 101°F or two consecutive temperatures of 100.4°F.
- Neutropenia was defined as an absolute neutrophil count (ANC) of less than 0.5x109 cells/L.

Results

- Of the 82 patients who completed induction chemotherapy, 12 (14.6%) patients had a BSI during induction chemotherapy (Table 1)
  - Gram-positive cocci (75%)
  - Gram-negative bacilli (16.6%)
  - Gram-negative cocci (8.3%).

12 out of **82** patients had a BSI during induction chemotherapy

TABLE 1: BLOOD STREAM INFECTIONS DURING INDUCTION CHEMOTHERAPY

	N (%)
Pathogens	**12 (14.6%)**
Gram-positive bacteria	
Staphylococcus aureus (MSSA)	5 (42%)
Streptococcus pneumoniae	1 (8%)
Streptococcus agalactiae	1 (8%)
Streptococcus gordonii	1 (8%)
Staphylococcus epidermidis	1 (8%)
Gram-negative bacteria	
Escherichia coli	1 (8%)
Pseudomonas aeruginosa	1 (8%)
Moraxella	1 (8%)

- Methicillin-susceptible Staphylococcus aureus (MSSA) was the most frequently isolated organism (42%) overall.
- No methicillin-resistant Staphylococcus aureus (MRSA) was identified.
- Of the Gram-negative bacteria isolated, Escherichia coli (8%) and Pseudomonas aeruginosa (8%) were identified.
- No extended spectrum beta-lactamase (ESBL) or multi-drug resistant organisms were identified.
- No fungi were isolated.

Conclusion

- The incidence of BSIs in children during induction chemotherapy at our institution is similar to what is reported from larger cohorts.
- Gram-positive cocci comprise 75% of BSIs with no MRSA isolates in 10 years.
- Both Pseudomonas aeruginosa and Escherichia coli show no multi-drug resistance or ESBL production, which is in contrast to larger pediatric cancer centers.
- Gram negative organisms in our cohort were pan-susceptible, which is in contrast to larger pediatric cancer centers.
- Current empiric monotherapy with a fourth generation cephalosporin at the onset of febrile neutropenia remains adequate for our pediatric oncology patients.

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