Antibiotic resistant bloodstream infections in pediatric oncology patients on levofloxacin prophylaxis

Sunita Sridhar, MD[1], Lauren Ferrerosa[1], Anu Agrawal[1], Brian Lee[2], Prachi Singh[2]

1. Department of Hematology & Oncology, UCSF Benioff Children's Hospital, Oakland 2. Pediatric Infectious Disease, UCSF Benioff Children's Hospital, Oakland

UCSF School of Medicine

Background

Levofloxacin prophylaxis in pediatric oncology patients with chemotherapy induced severe prolonged neutropenia has been shown to reduce risk for febrile neutropenia and bloodstream infections (BSI). With increased use of prophylaxis there is concern for development of antibiotic-resistant infections and rise in infections such as *Clostridium difficile* (*C. diff*).

Objectives

1. Determine incidence of bacteremia in patients exposed to levofloxacin prophylaxis
2. Describe pathogens isolated in episodes of bacteremia while patients were on levofloxacin prophylaxis
3. Describe susceptibility profile of the pathogens identified in BSI
4. Determine incidence of *Clostridium difficile* infection in patients who were on levofloxacin prophylaxis during their neutropenic episode

Design/Method

Retrospective chart review of UCSF Benioff Children's Hospital Oakland pediatric oncology patients who received levofloxacin prophylaxis per institutional guidelines from January 2015-December 2019

Results

Patient data is included in **Table 1**.

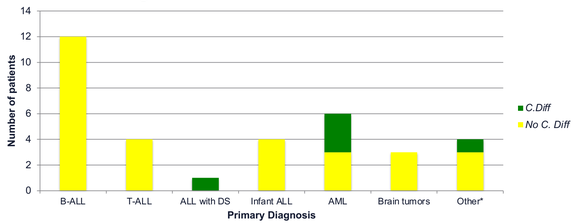
In the 34 patients, there were 96 episodes of levofloxacin prophylaxis. Nineteen percent of the 96 episodes were associated with at least one episode of BSI within a two month period. Fifty percent of prophylaxis episodes were discontinued because of count recovery while forty four percent were discontinued due to fever and need for broad spectrum antibiotics.

Table 1: Demographic information on cohort (n= 34)

			No. of patients with BSI
Sex	Male	22	
	Female	12	
Diagnosis	B-cell ALL[1]	17	5
	T cell ALL	4	0
	AML	6	5
	Brain tumors[2]	3	1
	Other[3]	4	1

1 B-ALL includes B-ALL patients, infant ALL and Down syndrome with ALL
2 Brain tumors includes 2 medulloblastomas and 1 atypical teratoid rhabdoid tumor
3 Other includes Ewings Sarcoma, 2 germ cell tumors, 1 B cell lymphoma
ALL, acute lymphoblastic leukemia; AML, acute myelogenous leukemia

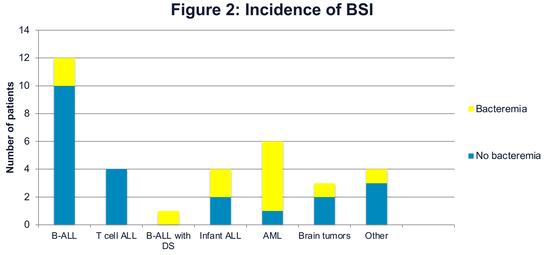
Figure 1: Incidence of *C.Difficile* infection



5 patients (14%) had *C.difficile* infections with 1 of the 5 patients with 2 episodes of *C.difficile*

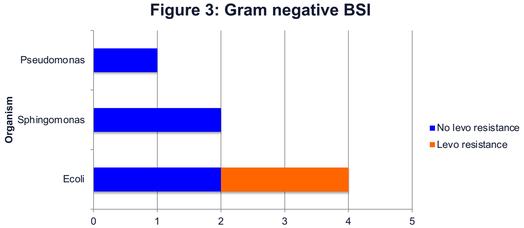
*Other : Ewings Sarcoma, 2 germ cell tumors, 1 B cell lymphoma.

Figure 2: Incidence of BSI



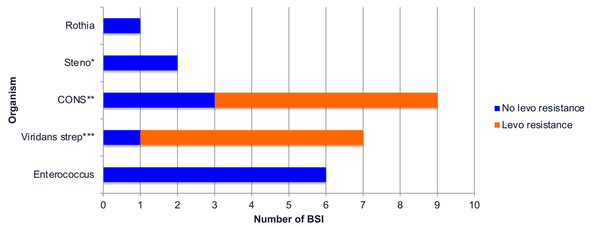
12 of 34 (35%) patients had BSI with highest proportion in patients with AML

Figure 3: Gram negative BSI



32 episodes of BSI, 7 (21%) secondary to Gram negative organisms. 50% of BSI secondary to *E. coli* were levofloxacin resistant

Figure 4: Gram positive BSI



25 (78%) BSI were secondary to gram positive organisms.

86% of the *Viridans streptococcus* isolates and 67% of the *coagulase negative staphylococcus* isolates were resistant to levofloxacin

**Stenotrophomonas*, ***Coagulase negative staphylococcus*, ****Viridans Streptococcus*

Conclusions

In this cohort of pediatric oncology patients, there was a higher percentage of gram positive organisms compared to gram negative in those on levofloxacin prophylaxis with the majority of BSI in AML patients.

There was a high incidence of levofloxacin resistant organisms, particularly in *Viridans streptococcus* isolates. This contrasts with published data from adults which reported low rates of fluoroquinolone resistance.

Although levofloxacin has been described as a risk factor for development of *C.difficile*, it was not apparent in this study.

This case series highlights the need for close monitoring for development of antibiotic resistance as utilization of prophylactic levofloxacin increases in pediatric oncology patients