Evaluating Cefepime And Alternative Beta-lactams For The Treatment Of Serratia marcescens Blood Stream Infections (BSI)

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INTRODUCTION

- AmpC β-lactamase enzymes can be produced by Enterobacterales.
- Due to its inducible chromosomal resistance, cefepime is often preferred.
- In vitro analysis and clinical reports have shown AmpC expression can occur less than 5% among *S. marcescens.*

PURPOSE

This study aimed to evaluate the use of cefepime vs. alternative beta-lactams like third generation cephalosporins or piperacillin-tazobactam as treatment of *S. marcescens*.

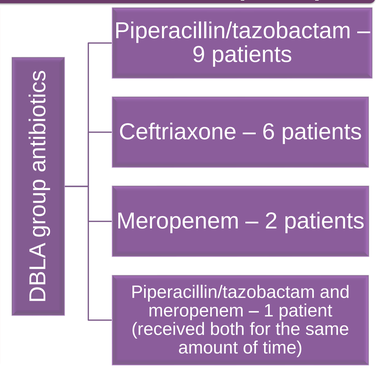
METHODS

- This is a single-center, retrospective review of adult hospitalized patients with *S. marcescens* BSIs over a five-year period.
- The electronic medical record system and *Vigilanz* monitoring program were used to identify eligible patients.
- Patients who received at least 72 hours of antibiotics from index blood culture were divided into definitive cefepime (DCEF) or definitive alternative beta-lactams (DBLA) groups.
- Composite outcome of 30-day re-admission, 90-day reinfection rates, and mortality was used to evaluate treatment failure.
- Definition of phenotypic AmpC organism was dictated by isolates who were in vitro not susceptible to ampicillin, amoxicillin/clavulanate, cefazolin, cefoxitin

Inclusion	Exclusion
▪ Patients 18 years old or older, with *S. marcescens* in blood cultures ▪ Blood cultures obtained over established five-year period ▪ Received at least 24 hours of antibiotic therapy	▪ Polymicrobial BSI (except contaminants) ▪ Patient who didn't get at least 24 hours of antibiotic therapy ▪ Death prior to or within 72 hours of blood culture obtained ▪ Patients transferred from outside hospitals with prior positive culture ▪ Pregnant and/or incarcerated patients

Table 1 and Figure 1. Baseline Characteristics (n = 53)

Average age (yrs)	66
Race (%)	
African American	18 (33)
White	35 (66)
Gender (%)	
Female	16 (30.2)
Male	37 (69.8)
Treatment group	
DCEF	35 (66)
DBLA	18 (33)



RESULTS

Figure 2: Source of infection

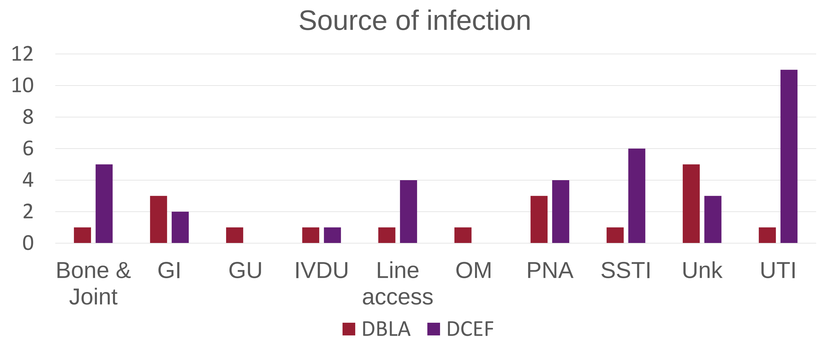


Table 2. Admission characteristics

Characteristic	DCEF (n = 35)	DBLA (n = 18)
Average length of stay (days)	19.6	13.2
Most common source of infection	Bone and joint 5 (27.7)	Unknown source 5 (27.7)
ICU admission	6 (17)	1 (5.6)
CCI, median	6	4.5

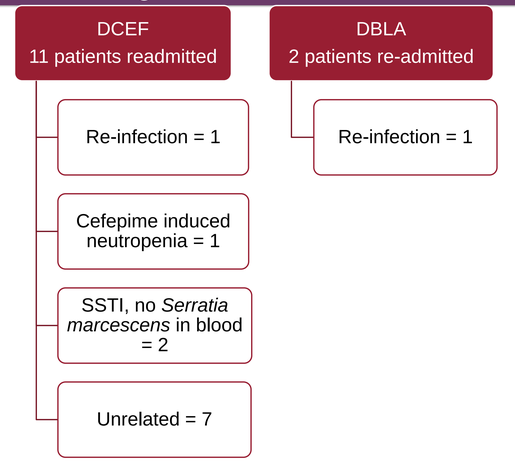
CCI: Charlson Comorbidity Index, LOS: length of stay

Table 3. Treatment characteristics

Characteristic	DCEF (n = 35)	DBLA (n = 18)
Treatment failure	15 (42.8)*	3 (16.7)
90-day re-infection	1 (2.8)	1 (5.6)
30-day readmission	11 (31)	2 (11)
Unrelated	7 (20)	1 (5.6)
In hospital mortality	4 (11.4)	1 (5.6)

**1 patient was re-admitted within 30 days with re-infection*

Figure 3. Re-admission



CONCLUSIONS

- All the isolated organisms met criteria for phenotypic AmpC production.
- More patients received DCEF compared to DBLA, which could potentially be related to acuity.
- The DCEF group had a higher CCI and ICU admissions than the DBLA group. Additionally, average length of stay was higher for DCEF group.
- Overall treatment failure rate was higher among DCEF group. While this group had more re-admissions, most of them were unrelated to *Serratia marcescens* BSI.
- In hospital mortality was higher in DCEF group, but potentially influenced by higher acuity of care in this group.

LIMITATIONS

- Due to the retrospective design and small sample size, it is difficult to infer clinical significance. Additionally, use of carbapenems were included in the DBLA group, which might affect results. These findings prompt further investigation into the difference in treatment failure between these groups.

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