

Evaluation of Local Pathogens and Management of Diabetic Foot Infections

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Background

- The prevalence of diabetes and its sequelae, including diabetic foot infection (DFI), are rising in the United States¹
- Complications of DFI such as amputation illustrate the importance of early and effective therapies such as antibiotics and surgery
- Per IDSA consensus guidelines, antimicrobial selection for DFI treatment should be guided by the severity of infection²
- This institution observed a lack of compliance with consensus guideline recommendations
 - Regardless of severity, hospitalized patients receive broad-spectrum antibiotics that included coverage for both methicillin-resistant *S. aureus* (MRSA) and *P. aeruginosa*
- CDC strongly recommends that antimicrobial stewardship programs create facility-specific guidance for common infections³
- Study Purpose: Evaluate current practice with a goal of creating institution-specific treatment guidance for providers to optimize the management of DFI

Objectives

Primary objective: Rate of guideline-compliant empiric antibiotic regimens

Secondary objectives:

- Rate of empiric MRSA coverage
- Rate of empiric *P. aeruginosa* coverage
- Duration of antibiotic therapy per patient

Methods

Patients identified by ICD-10 code for DFI between 8/1/18 – 7/31/19; n = 193

114 patients included

Exclusion criteria:

- Antibiotics were continuation of outpatient therapy or being used for a concomitant infection
- Any admission beyond the patient's first admission in study period
- Pregnancy

Data collection (retrospective chart review)

Creation of institution-specific guidance for multidisciplinary management of DFI

Data compared with consensus guideline recommendations to determine compliance

References

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- Nelson A, Wright-Hughers A, Backhouse MR, et al. CODIFI (Concordance in Diabetic Foot Ulcer Infection): A Cross-Sectional Study of Wound Swab Versus Tissue Sampling in Infected Diabetic Foot Ulcers in England. *BMJ Open* 2018;8:e019437.

Methods (cont.)

Table 1: DFI Severity Classification, Expected Pathogens, and Recommended Empiric Therapy²

IDSA Infection Severity	Pathogens	Antibiotics Recommended
Mild (local infection involving only the skin/subcutaneous tissue)	MSSA, <i>Streptococcus</i> spp.	Dicloxacillin, clindamycin, cephalexin, amox-clav
	MRSA	Doxycycline, SMX-TMP
Moderate (involvement of deeper structures – abscess, osteomyelitis, septic arthritis, fasciitis – without signs of systemic response)	MSSA, <i>Streptococcus</i> spp., Enterobacteriaceae, anaerobes	Levofloxacin, ceftriaxone, amp-sulbactam, moxifloxacin, ertapenem, ciprofloxacin w/ clindamycin
	MRSA	Linezolid, vancomycin, daptomycin
Severe (moderate infection and meeting ≥ 2 SIRS criteria)	<i>P. aeruginosa</i> *	Pip-tazo, cefepime, ceftazidime, aztreonam, meropenem

*coverage indicated in severe infections or in patients with validated risk factors, such as previous isolation of *P. aeruginosa* or frequent foot soaking

Results

Table 2: Baseline Characteristics

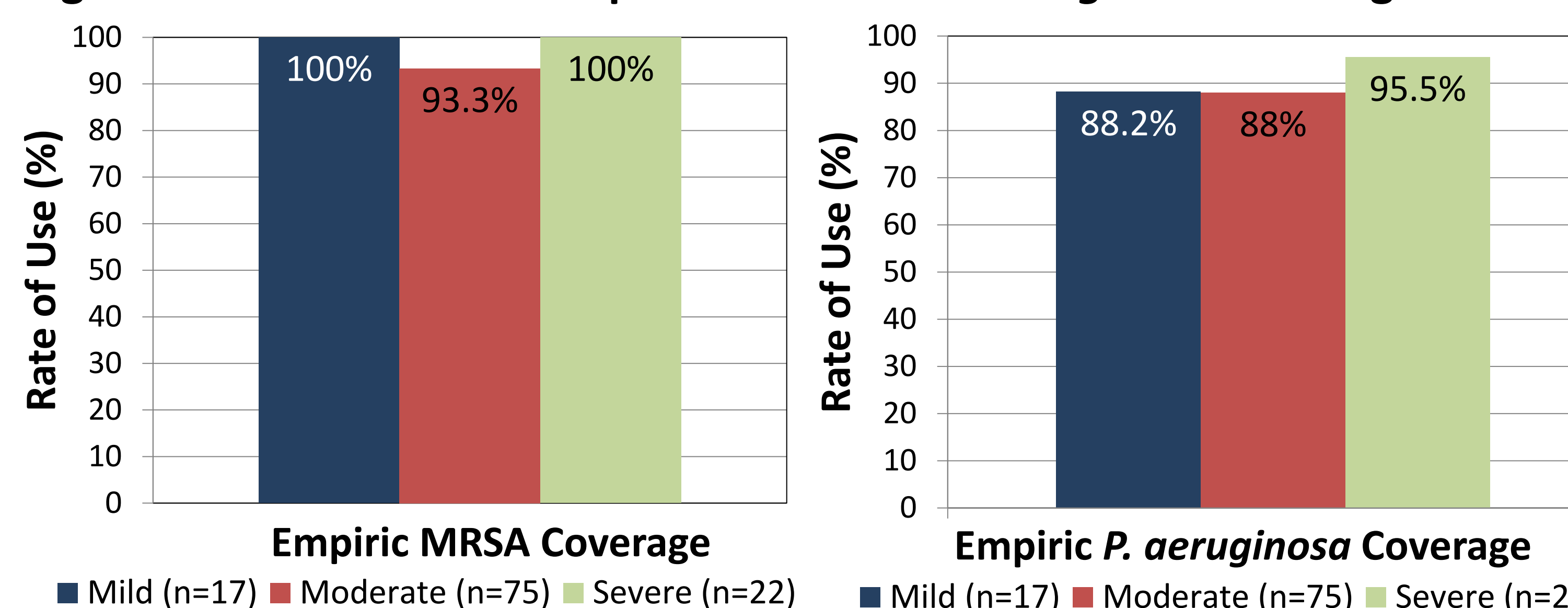
Characteristic	N
Age, years, mean (SD)	62 (+ 10.8)
Male, n (%)	81 (71)
Hemoglobin A1c% during index encounter, mean (SD)	9 (+ 2.2)

Table 3: Rate of Guideline-Compliant Empiric Antibiotic Regimens

Guideline-Compliant Empiric Regimen	IDSA Infection Severity			Total (n=114), n (%)
	Mild (n=17), n (%)	Moderate (n=75), n (%)	Severe (n=22), n (%)	
Yes	0 (0)	8 (10.67)	22 (100)	30 (26.3)
No	17 (100)	67 (89.3)	0 (0)	84 (73.7)

p = 0.0001

Figures 1 and 2: Rates of Empiric MRSA and *P. aeruginosa* Coverage



Results (cont.)

Figure 3: Duration of Therapy Per Patient (Days)

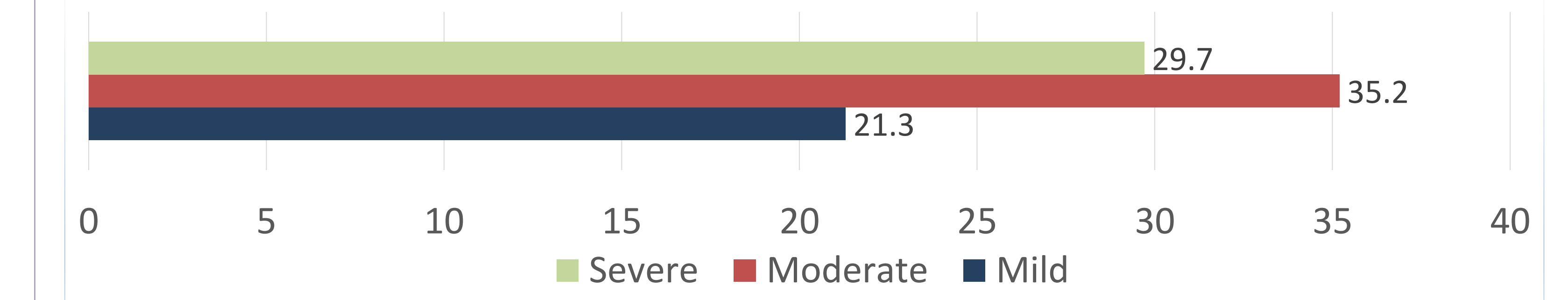
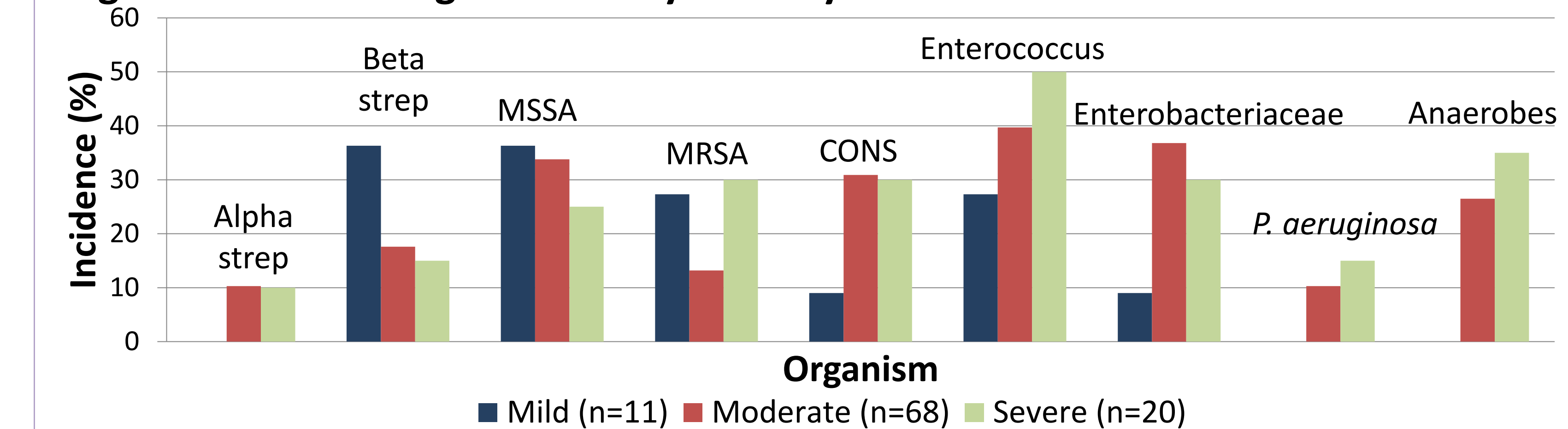


Table 4: Microbiologic Results in Full Population

Organism	Swab (n=39), n (%)	Deep tissue or surgical (n=60), n (%)	All cultures (n=99), n (%)
MSSA	15 (38.5)	17 (28.3)	32 (32.3)
MRSA	9 (23.1)	9 (15)	18 (18.2)
Coagulase-negative staphylococcus	11 (28.2)	17 (28.3)	28 (28.3)
Beta-streptococcus	7 (17.9)	12 (20)	19 (19.2)
Alpha-streptococcus	2 (5.1)	7 (11.7)	9 (9.1)
Enterococcus spp.	14 (35.8)	26 (43.3)	40 (40.4)
<i>P. aeruginosa</i>	6 (15.4)	4 (6.7)	10 (10.1)
Enterobacteriales	17 (43.6)	15 (25)	32 (32.3)
Anaerobes	2 (5.1)	23 (38.3)	25 (25.3)

Figure 4: Microbiologic Results by Severity of Infection



Conclusion

- This study confirms the overuse of broad-spectrum antibiotics in this population of patients with DFI, particularly *P. aeruginosa* coverage
- Other areas for improvement include culture collection method and timing (prefer deep tissues cultures taken prior to antibiotic initiation)
- Duration of therapy is generally consistent with consensus guideline recommendations based on severity of infection
- The microbiologic results of this study are concordant with previous studies, as *S. aureus* was the most common organism isolated and the rate of *P. aeruginosa* was around 10%⁴⁻⁵
- Facility-specific guidance has been created by focusing consensus guideline recommendations to fit the local need based on the results of this study

Disclosures

Authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

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