



Bacteremia and Cellulitis Secondary to Co-Infection with *Myroides spp.* and *Providencia stuartii*: A Case Report



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Background

- Myroides spp.* are non-motile, aerobic, gram-negative bacilli that are traditionally opportunistic pathogens¹.
- P. stuartii* is a urease-producing, gram-negative bacillus².
- Myroides* infections have been reported 60 times to date. Only 15 of which involve cellulitis with 6 also progressing to bacteremia³.
- Myroides* has not been isolated with *P. stuartii* in a patient with bacteremia and cellulitis.
- This is a novel presentation of 2 multi-drug resistant bacteria, causing a severe presentation of bacteremia and cellulitis.

Case Presentation

Subjective

- A 75-year-old white male presented with cellulitis and nonhealing ulcers of the right lower extremity.
- HPI: 9 days prior to presentation, the patient suffered a laceration to the right lower extremity from a broken wheelchair part. This laceration was repaired by primary intention. 3 days prior to presentation, the patient noticed increased redness, swelling, drainage from the wound.
- PMH: PVD, T2DM, tobacco smoking, atrial fibrillation, diastolic heart failure, COPD, sleep apnea, BPH.
- Allergies: amoxicillin, penicillin.

Objective

- Patient was acutely confused and ill-appearing.
- 2 large ulcers on tibia with large draining blisters and surrounding erythema, tender to palpation

Assessment

- CT showed diffuse subcutaneous edema with cutaneous cyst formation and no evidence of underlying abscess.
- WBC count 11,800 with 89% neutrophils

Plan

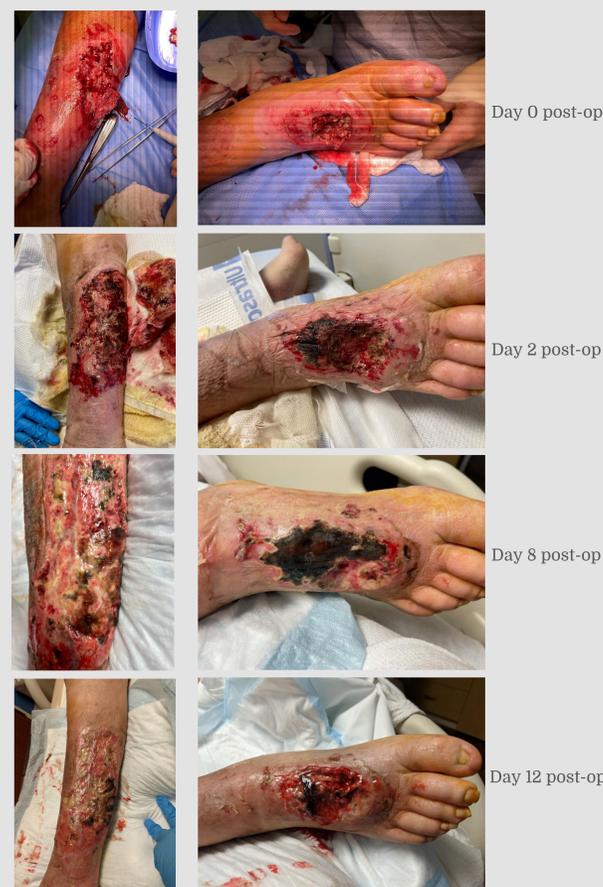
- Non-surgical wound care and treatment with vancomycin, cefepime, and metronidazole.



Upon Presentation

Case Progression

- Following susceptibilities report (Table 1), ABX therapy was changed to extended-infusion meropenem 500mg IV Q6h on day 3 of hospitalization.
- WBC count increased (34.6) by day 5 and R LE tissues continued deteriorating rapidly.
- The patient underwent surgical wound debridement of the R medial leg and R dorsal foot, revealing no infectious involvement of the underlying muscle or bone.
- Day 1 post-op, WBC count dropped significantly (24.7) and continued trending downward as meropenem course was extended and wet-to-dry dressing changes were done.
- Wound healing remained poor, likely secondary to co-morbid conditions such as T2DM, PVD, and tobacco smoking and patient was being considered for amputation, which was refused.
- On day 24, *Stenotrophomonas maltophilia* was isolated from the wound sites, but was deemed a surface contamination, therefore not requiring treatment.



Case Resolution

- The patient underwent a second surgical wound debridement of the same area with Kerecis graft placement.
- Meropenem was stopped on day of discharge and patient was discharged without antibiotics.
- Compared to pre-graft healing, there was obvious healthy granulation tissue and improved perfusion.
- The patient is still undergoing wound care post-graft placement but is healing well.



Table 1. Drug Susceptibilities and MIC's of Isolated Species

	<i>Myroides spp.</i>	<i>P. stuartii</i>
Ampicillin	NT	R*
Amp-Sulb	NT	I (16)
Pip-Tazo	I (16)	S (≤4)
Cefazolin	NT	R (≥64)
Cefoxitin	NT	S (≤4)
Ceftriaxone	I (32)	S (≤1)
Ceftazidime	NT	NT
Cefepime	I (16)	S (≤1)
Meropenem	S (2)	NT
Aztreonam	NT	NT
Gentamicin	R (≥16)	R*
Tobramycin	R (≥16)	R*
Amikacin	NT	S (≤2)
Ciprofloxacin	I (2)	S (≤0.25)
Levofloxacin	NT	NT
Tetracycline	NT	R (≥16)
Minocycline	S (≤1)	NT
TMP-SMX	S (40)	S (≤20)

S = Susceptible; I = Intermediate; R = Resistant; NT = Not Tested
*MIC not reported

Discussion

- Given that *Myroides spp.* shows resistance to many broad-spectrum antibiotics used to treat cellulitis and bacteremia, such as 4th generation cephalosporins, susceptibility testing is important for finding effective antibiotic therapy⁴.
- The resistance of *Myroides spp.* to beta-lactams (including extended-spectrum cephalosporins and beta-lactamase inhibitors) is due to the production of chromosome-encoded metallo-beta-lactamases⁴.
- Myroides spp.* is most commonly sensitive to treatment with meropenem, ciprofloxacin, or a combination of both^{3,5}.
- Providencia spp.* may initially be susceptible to 3rd generation cephalosporins, however following exposure to beta-lactams, resistance is induced by either induction or selection of derepressed mutants expressing AmpC B-lactamase⁶.
- P. stuartii* can also be adequately targeted with meropenem⁶.
- In this case, the patient was initially treated empirically with broad-spectrum ABX covering gram-positives, gram-negatives, and anaerobes.
- After isolating *Myroides spp.*, meropenem was initiated and empiric improvement led to discontinuation on day 31 (day of discharge). Extended duration due to ongoing tissue necrosis.

Conclusions

- This unusual co-infection led to an extremely severe bacteremia as well as local tissue disruption, leading to a prolonged, 32-day hospital course.
- If left untreated, the highly resistant *Myroides spp.* has been shown to cause severe morbidity and mortality.
- Though the cellulitis and bacteremia were successfully treated in this patient, it is imperative that providers remain vigilant to this rare, but life-threatening pathogen.

References

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