



Poster # 317

# Clinical Characteristics of a Military Trauma Cohort with *Stenotrophomonas maltophilia* Infection



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## Abstract

**Background:** *Stenotrophomonas maltophilia* is an emerging pathogen in critically ill trauma patients that has a unique resistance pattern often not covered by empiric antimicrobials. This study reveals the clinical epidemiology of patients with *S. maltophilia* isolates in a military trauma cohort.  
**Methods:** Patients enrolled in the Trauma Infectious Disease Outcomes Study (TIDOS) from 9/09 to 9/14 with *S. maltophilia* isolation confirmed by BD Phoenix™ (NMIC/ID 304) panels were included. Patient demographics, injury, and infection data prospectively obtained from admission to Landstuhl Regional Medical Center (LRMC) through transfer and hospital stay at 3 continental US (CONUS) sites were reviewed. Isolates were deemed infecting if they met criteria defined previously within the TIDOS cohort.  
**Results:** Of 2,699 patients, 65 patients with complete clinical data and *S. maltophilia* isolates were included. All injuries occurred in support of operations in Afghanistan. 63 (97%) had blast injuries of which 58 (92%) were from improvised explosive devices. Median age was 24 years (IQR 21,27) and 85% had an injury severity score >25. 32% had previously received broad-spectrum antimicrobials. Most isolates were from wounds (62%) or respiratory (26%), with the remaining from blood (8%), urine (2%), and other (2%). 60% of patients had associated infections of which 54% were skin and soft tissue infections, 10% osteomyelitis, 10% blood stream infections, 16% sepsis, and 10% pneumonia. Median time from injury to 1<sup>st</sup> isolation was 8 days (IQR 4,16) with a longer time to 1<sup>st</sup> isolation in patients with identified infection (p<0.01). 26 (40%) isolates were recovered at LRMC and 39 (60%) at CONUS sites. 40 patients with wound isolates had a median of 9 OR visits (IQR 4,14) after isolation and 85% had polymicrobial growth. Median duration of hospital stay was 73 days (IQR 37, 89). 6 patients died with median time from culture to death of 11 days (IQR 7,45).  
**Conclusions:** Patients in this military cohort with *S. maltophilia* isolation were severely injured, had prolonged hospitalizations, and required multiple OR visits. In this population, wounds are the most common source of *S. maltophilia* isolates, often in association with polymicrobial infections.

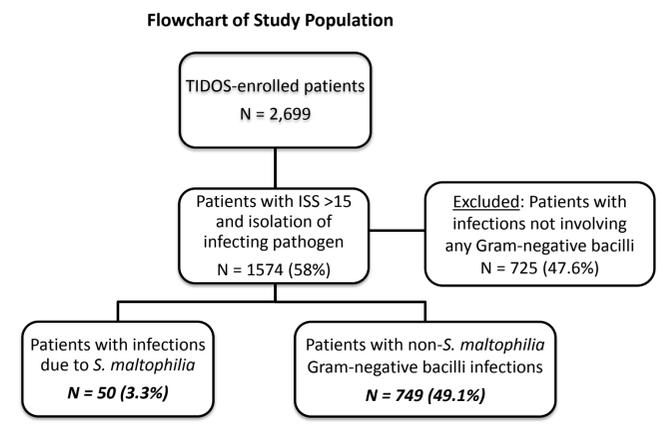
## Background

- *Stenotrophomonas maltophilia* has been shown to be a cause of ICU infections and is not covered with empiric antimicrobial regimens
- Multidrug-resistant organism colonization of evacuated US personnel from Iraq and Afghanistan in 2009 reached 13%
- *S. maltophilia* has previously been associated with colonization of combat wounds
- Risk factors for *S. maltophilia* infection have been assessed in ventilator-associated pneumonia cases, but not previously in wound infections
- We sought to identify clinical characteristics and outcomes associated with *S. maltophilia* infection in deployment-related injured personnel in Iraq and Afghanistan

## Methods

- Study population:**
- Data collected from the Trauma Infectious Disease Outcomes Study (TIDOS) from June 1, 2009 until September 1, 2014 was assessed
  - TIDOS eligibility criteria include active duty personnel or Department of Defense beneficiaries ≥18 years who are injured during deployment requiring evacuation to Landstuhl Regional Medical Center (LRMC) in Germany and ultimately transferring to a participating clinical site in the US
  - All patients with *S. maltophilia* isolates obtained during clinical workup for an infectious syndrome, injury severity score (ISS) >15, and discharged to participating US sites were included
  - Infection was defined per the TIDOS protocol as a combination of clinical findings, laboratory tests, clinical diagnosis, and/or initiation of directed antimicrobial therapy for ≥5 days
  - Matched patients with ISS >15 discharged to participating US sites with infection due to other Gram-negative organisms were used for comparison
  - Patient clinical, injury, and infection data were analyzed retrospectively
- Statistical Analysis:**
- Univariate analysis by  $\chi^2$  and Fisher's Exact Test for categorical variables
  - Continuous variables by Mann-Whitney U
  - Multivariate analysis for significant risk factors (p<0.05) from univariate analysis with logistic regression

## Results



## Results (cont.)

Clinical Characteristics of Military Trauma Patients with Infections due to *S. maltophilia* vs. Other Gram-Negative Bacilli

	Other Gram-negative Infection No (%) N=749	<i>S. maltophilia</i> Infection No (%) N=50	P-value
Branch of Service			0.248
Missing	5 (0.6)	0	
Air Force	18 (2.4)	0	
Army	462 (61.6)	26 (52.0)	
Marine	227 (30.3)	23 (46.0)	
Navy	27 (3.6)	1 (2.0)	
Other	10 (1.3)	0	
ICU Admission			0.166
Missing	5 (0.6)	0	
US ICU +/- LRMC ICU	551 (73.5)	43 (86.0)	
LRMC ICU Only	120 (16.0)	4 (8.0)	
No ICU	73 (9.7)	3 (6.0)	
Injury Severity Score			0.051
16 - 25	180 (24.0)	6 (12.0)	
> 25	569 (75.9)	44 (88.0)	
Blast Injury	586 (78.2)	50 (100.0)	<0.01
Blast Injury Type <sup>a</sup>			1.0
IED	530 (70.7)	46 (92.0)	
Non-IED	56 (7.4)	4 (8.0)	
Non-blast Injury Type <sup>a</sup>			n/c
GSW	88 (11.7)	0	
Other	70 (9.3)	0	
Pre-US Amputation	344 (25.2)	39 (78.0)	<0.01
Inpatient Ventilation			0.01
Missing	14 (1.9)	2 (4.0)	
LRMC Only	189 (25.2)	7 (14.0)	0.08
LRMC & US≤1WK	335 (44.7)	33 (66.0)	<0.01
LRMC & US>2WK	6 (0.8)	1 (2.0)	0.36
None	205 (27.4)	7 (14.0)	0.04
Infection Syndrome <sup>b</sup>			
SSTI	433 (57.8)	35 (70)	0.090
Pneumonia	264 (35.2)	11 (22)	0.056
BSI	207 (27.6)	7 (14)	0.040
Sepsis	64 (8.5)	8 (16)	0.119
Osteomyelitis	96 (12.8)	6 (12)	0.867
Days from injury to isolate recovery, median (IQR)	6 (3,12)	9.5 (6,17)	<0.01

BSI, bloodstream infections; ICU, intensive care unit; IED, improvised explosive device; IQR, interquartile range; GSW, gun shot wound; LRMC, Landstuhl Regional Medical Center; SSTI, skin and soft-tissue infections  
<sup>a</sup> injury mechanism is missing for 5 patients in the Other Gram-negative Infection group  
<sup>b</sup> Patients may have than one infection so the numbers may sum to more than the total

## Results (cont.)

- Overall Demographics and Injury Patterns:**
- 95 and 1744 infectious syndromes were identified in the *S. maltophilia* and other Gram-negative infection groups, respectively
  - Incidence density was 1.3 per 100 days (95% CI: 1.1, 1.6) for *S. maltophilia*
  - Skin and soft-tissue infections comprised the majority of infections in both groups
  - Median operating room visits within 2 weeks of infection was 6 (IQR: 5, 6) and 4 (IQR: 3, 6) for the *S. maltophilia* group and comparator group, respectively
  - Mechanical ventilation was employed in 34 (68%) *S. maltophilia* patients versus 341 (46%) patients of the comparator group

## Conclusions

- In this military population, patients with *S. maltophilia* infections are more likely to have blast injuries and less likely to be associated with bloodstream infections and pneumonia compared to other Gram-negative infections
- *S. maltophilia* infection was more likely to be found in patients with higher injury severity scores, requiring amputation prior to arrival in the US, mechanical ventilation, and later in the course of hospitalization

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