

# Multicenter retrospective cohort study of the clinical significance of *Staphylococcus lugdunensis* isolated from a single blood culture set

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## INTRODUCTION:

*Staphylococcus lugdunensis*, a coagulase negative *Staphylococcus* (CoNS) species, is a common skin contaminant with the potential to cause aggressive infection. Guidance surrounding treatment of *S. lugdunensis* bacteremia (SLB) is lacking, especially in the case of a single positive set of blood cultures.

Objective: To evaluate the significance of a single positive *S. lugdunensis* blood culture.

## METHODS :

- We performed a multicenter, retrospective observational cohort review of adult patients with SLB from at least one blood culture set within the University of Maryland Medical System from November 2015-November 2019.
- Objectives were to (1) describe baseline characteristics, (2) compare available criteria for evaluating clinical significance, and (3) evaluate the clinical outcomes among patients with SLB in 1 vs  $\geq 2$  positive blood culture sets.
- Descriptive statistics with Chi-squared and Mann-Whitney U tests were carried out.

## RESULTS:

- There were 5,548 CoNS-positive blood culture sets, 49 (0.88%) with *S. lugdunensis* comprising 36 adult patients (24 with 1 positive set and 12 with  $\geq 2$  positive sets).
- Patients with  $\geq 2$  positive sets were more likely to be on hemodialysis (HD) ( $p=0.029$ ) and to have an HD catheter present ( $p=0.10$ ) (Table 1).
- Thirty-five of the 36 patients fulfilled at least one of the following: systemic inflammatory response syndrome (SIRS), Souvenir criteria, or clinical criteria (infectious focus on imaging and/or second positive culture site) (Table 2).
- Twenty-eight (78%) patients were treated with antimicrobial therapy and/or central line removal. SIRS criteria were met more often among patients with 1 positive set ( $p=0.05$ ).
- Patients with  $\geq 2$  positive sets were more often treated with antibiotics for longer than 2 weeks ( $p=0.02$ ).
- The mean time of positive cultures to discharge was 11 days and was longer for patients with only one set of positive blood cultures (13 vs. 6 days), although this difference was not statistically significant ( $p=0.29$ ) (Table 3).

	n (%)			p-value
	Total (n=36)	Single set + (n=24)	$\geq 2$ set + (n=12)	
Female	14 (39)	7 (29)	7 (58)	0.15
Age (median, IQR <sup>a</sup> )	57.5 (25.3)	58 (28)	59 (18)	0.98
BMI <sup>b</sup> >24	25 (69)	15 (63)	10 (83)	0.27
<b>Comorbidities</b>				
Diabetes Mellitus	15 (42)	9 (38)	6 (50)	0.50
Hypertension	18 (50)	13 (54)	5 (42)	0.73
Hemodialysis	7 (19)	2 (8)	5 (42)	0.029*
Malignancy	7 (19)	4 (17)	3 (25)	0.66
Polymicrobial blood cultures	19 (53)	14 (58)	5 (42)	0.48
Indwelling prosthetic material	14 (39)	7 (29)	7 (58)	0.15
Joint	4 (11)	3 (13)	1 (8)	1.0
AICD/PM <sup>c</sup>	4 (11)	3 (13)	1 (8)	1.0
HD catheter <sup>d</sup>	4 (11)	1 (4)	3 (25)	0.10
Endovascular	2 (6)	0	2 (17)	0.11

P values were calculated using the Fisher Exact Test for categorical variables and the Mann-Whitney U test for continuous variables. \* significant at  $p \leq 0.10$ , <sup>a</sup> Interquartile range, <sup>b</sup> Body mass index, <sup>c</sup> Automatic implantable cardioverter defibrillator/pacemaker, <sup>d</sup> Hemodialysis

Table 2. Clinically significant *S. lugdunensis* bacteremia by criteria

	n (%)			p
	Total (n=36)	Single set + (n=24)	$\geq 2$ set + (n=12)	
SIRS <sup>a</sup> criteria	26 (72)	20 (83)	6 (50)	0.05
Souvenir criteria	31 (86)	20 (83)	11 (92)	0.65
Clinical criteria	12 (33)	7 (29)	5 (42)	0.48
Infection on imaging	8 (22)	6 (25)	2 (17)	0.69
2 <sup>nd</sup> culture site positive	6 (17)	2 (8)	4 (33)	0.15
Intervention applied <sup>b</sup>	28 (78)	17 (71)	11 (92)	0.22

P values were calculated using the Fisher Exact Test for categorical variables  
<sup>a</sup> Systemic inflammatory response syndrome  
<sup>b</sup> Antimicrobial therapy and/or central line removal

Table 3. Outcomes of those with treated *S. lugdunensis* in blood cultures

	n (%)			p
	Total (n=36)	Single set + (n=24)	$\geq 2$ set + (n=12)	
Antimicrobial Therapy	26 (72)	17 (71)	10 (83)	0.67
Duration of therapy >2 weeks	11 (31)	4 (17)	7 (58)	0.02*
LOS <sup>1</sup> (days) (mean/IQR <sup>2</sup> )	11 days (6.5)	13 days (8.3)	6 days (3.8)	0.29
<b>Disposition</b>				
Discharged from hospital	33 (92)	21 (88)	12 (100)	0.54
In hospital mortality	3 (8)	3 (13)	0	0.54

<sup>1</sup> Length of stay  
<sup>2</sup> Interquartile range

## CONCLUSIONS:

SLB was rare and occurred more frequently as a single set of positive blood cultures. Though limited by sample size, this study found similar patient characteristics, clinical significance and outcomes between patients with one set and those with  $\geq 2$  sets of blood cultures positive for *S. lugdunensis*. Given the potential severity of SLB, it seems prudent to treat *S. lugdunensis* in a single blood culture, but larger studies are needed.

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