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Variability and clinical impact of biofilm production in *Staphylococcus* spp. causing prosthetic joint infections.

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Poster 0515

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BACKGROUND

- *Staphylococcus* spp. are the most important cause of prosthetic joint infections (PJI).
- Despite adequate management and according with recommendations, many infections fail.
- Hypothesis: Differences in adherence and biofilm-forming capacity of *Staphylococcus* spp. causing PJI might be implicated in response to treatment. Clonal characterization could help identify clones with potential to spread.

OBJECTIVES

- We aim to study the biofilm-forming capacity of *Staphylococcus* spp. producing PJI, its role in the prognosis of these infections, and its clonality.

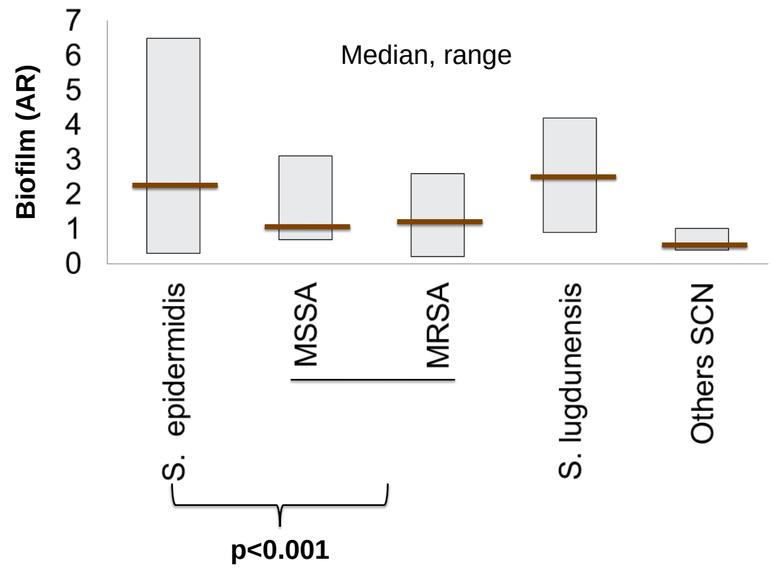
METHODS

- Isolates included: methicillin-susceptible *S. aureus* (MSSA), methicillin-resistant *S. aureus* (MRSA), and coagulase-negative *Staphylococus* (CNS) isolated from a prospectively followed cohort of patients with PJI between 2011-2014 in a tertiary hospital.
- PJI was defined by standard criteria, and categorized according Tsukayama classification.
- Patients with PJI were followed-up for at least 1 year after the medical and surgical management of the infection.
- Management was considered adequate if medical and surgical treatment are in accordance to published recommendations (Zimmerli 2004, IDSA 2014).
- Biofilm-forming capacity was assessed by a spectrophotometric assay on polystyrene plates according to Stepanovic et al, and expressed as the absorbance ratio (AR) with regard to biofilm-non producer *S. aureus* ATCC 29213.
- Clonality was studied by pulsed-field gel electrophoresis (PFGE) (macrorestriction chromosomal DNA with SmaI).

RESULTS

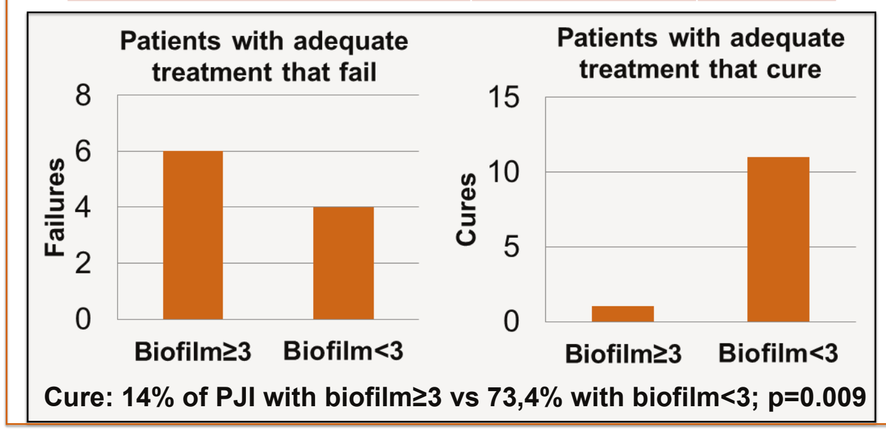
- 91 isolates from 55 episodes of PJI were studied: 51 *S. epidermidis*, 29 *S. aureus* (10 MRSA), 5 *S. lugdunensis*, 6 others CNS.
- Type of PJI: 25 acute post-surgical (<30 days), 20 chronic post-surgical, 5 hematogenous, 5 intraoperative positive cultures.

Biofilm-forming capacity



PJI produced by *S. epidermidis* (n=28)

Medical and surgical treatment	Cure, n (%)	p
Not adequate (n=6)	0	<0.02
Adequate (n=22)	12 (55.5)	

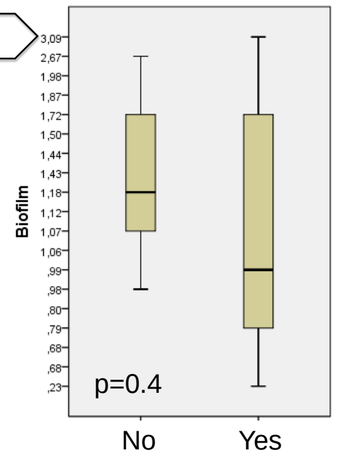


Cure: 14% of PJI with biofilm≥3 vs 73,4% with biofilm<3; p=0.009

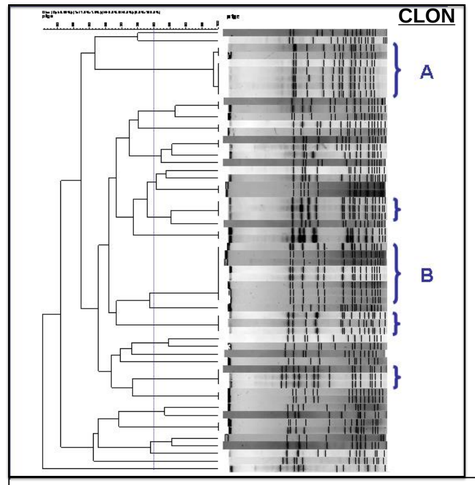
PJI produced by *S. aureus* (n=22)

Cure with adequate treatment

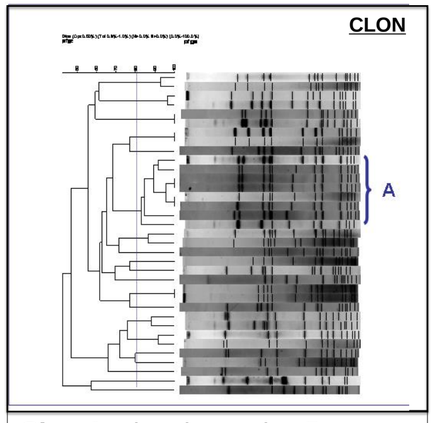
Medical and surgical treatment	Cure, n (%)	p
Not adequate (n=3)	0	<0.001
Adequate (n=19)	11 (58)	



S. epidermidis clonality



S. aureus clonality



Clon A: clonal complex 5.

Clon A: 4 patients operated in 2014 by the same surgeon. AR [mean (range)]: 3.7 (2.3-4.6).
Clon B: 4 patients operated between 2010-2011 without apparent epidemiological link. AR [mean (range)]: 4 (3.7-4.7).

CONCLUSIONS

- **In PJI-related isolates, *in vitro* biofilm production was significantly higher in *S. epidermidis* than in *S. aureus*, and higher AR was associated with worse prognosis.**
- **Two cluster of clonally related, high biofilm producing *S. epidermidis* were found suggesting an important role in the epidemiology of these infections.**

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