



Significance of *Staphylococcus epidermidis* in Urine Cultures at Michigan Medicine

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ABSTRACT

Following a procedure change to reporting pure and numerous urogenital flora organisms in urine cultures, *Staphylococcus epidermidis* (*S. epi*) was by far the most reported. To determine the significance of *S. epi* in these cultures an investigation was conducted to determine correlation with other lab values that indicate infection, as well as urinary catheterization as *S. epi* is known to colonize medical devices via biofilms. A review of the medical record was performed and it was determined that patients whose urine cultures grew pure >100,000 cfu/mL *S. epi* had higher mean microscopic urine white blood cell counts, more positive leukocyte esterase, and were more likely to be catheterized than patients with negative urine cultures.

INTRODUCTION

In 2021 a case was reported to the microbiology laboratory of a renal biopsy culture growing *S. epi* following several negative urine cultures. A review of the urine cultures revealed significant growth of *S. epi*, however they were reported as normal flora per standard procedures for clean catch urines. It was later revealed that the source was a straight urinary catheter – a sterile source in which *S. epidermidis* would have been reported. To prevent this situation from reoccurring, the laboratory's procedure for reporting clean catch urines was amended to include any urogenital flora organism if pure and >100,000 cfu/mL. In the following year, a large majority of cases in which the new procedure was invoked involved pure >100,000 cfu/mL *S. epi*. The frequency of isolation raises the question of how often the new procedure has been reporting the organism in what is truly catheterized urine. Furthermore, the question of significance vs contamination is relevant as *S. epi* is one of the most common skin contaminants in clinical specimens, however it is known to cause medical-device-associated infections.

METHODS

- A list of clean catch urine culture accessions growing >100,000 cfu/mL *S. epi* between 5/26/2022 and 11/25/2022 was assembled in lab information system.
- A list of randomly selected negative urines reported as "no growth" or "normal urogenital flora present" was assembled to serve as a control.
- A list of randomly selected urines growing >100,000 cfu/mL *Escherichia coli* was also gathered for comparison as the prototypical uropathogen.
- A review of the medical record was conducted for recorded signs of urinary catheter use on or immediately before the date of sample collection, as well as for urinalysis data for signs of infection.

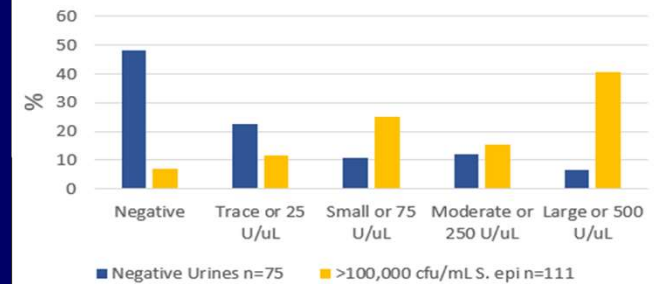
CONCLUSIONS

- The procedure change to reporting pure >100,000 cfu/mL flora organisms succeeded in reporting *S. epi* when it was significant
- Correlation of pure >100,000 cfu/mL *S. epi* growth with positive leukocyte esterase and high urine microscopic white cell counts supports its significance in these cultures.
- A significant amount of urines designated as clean catch were likely catheterized urines, meaning the *S. epi* would not have been reported before the procedure change.
- As a result of the large amount of catheterized urines ordered as clean catch found in this study, a mandatory "site" field was added when ordering urine cultures requiring the ordering provider to free-text a method of collection.

RESULTS

	Mean Microscopic Urine WBC Count		% Likely Catheterized
>100,000 cfu/mL <i>S. epi</i>	254.3 wbc/hpf	>100,000 cfu/mL <i>S. epi</i>	36%
No growth or Normal flora Present	26.5 wbc/hpf	No growth or Normal Flora Present	5.3%

Leukocyte Esterase



Urine culture growing pure >100,000 cfu/mL *S. epidermidis* at 20 hours on BAP, incubated on BD Kiestra.