Challenge M243-1

November 2024

Urine: >100x 10^6 CFU/L *Staphylococcus saprophyticus*

HISTORY

A simulated urine sample collected from a 24 year old female with dysuria was sent to category A laboratories.

Participants were expected to isolate and report >100x 10^6 CFU/L *Staphylococcus saprophyticus*

CMPT QA/QC/STATISTICS

All simulated urine samples are produced at CMPT according to CMPT internal protocols. The sample contained a pure culture of *Staphylococcus saprophyticus*.

The samples are assessed for homogeneity and stability using in-house quality control methods and random selection of samples before and during production, and post sample delivery. The number of random samples selected is 15% of the total production batch.

The challenge sample lot was confirmed to be homogeneous and stable for 14 days.

Organism identification was confirmed by a reference laboratory.

All challenge components have in-house assigned values based on the most clinically appropriate result; the most clinically appropriate result is determined by expert committee evaluation. No further statistical analysis is performed on the results beyond that described under "Suitability for grading."

SURVEY RESULTS

Reference laboratories

Colony count: 12/12 (100%) labs reported ≥10 or ≥100 x 10^6 cfu/L, 1 lab indicated it does not normally process this type of sample.

Identification: 12/12 (100%) labs reported *Staphylococcus saphrophyticus*, 1 lab indicated it does not normally process this type of sample.

MAIN EDUCATIONAL POINTS from M243-1

1. *Staphylococcus saprophyticus* is a common cause of uncomplicated urinary tract infections, principally in young sexually active females.
2. In routine diagnostic laboratories, novobiocin (5ug) is generally a distinguishing test used to base the identification of *S. saprophyticus*.

Participants

Colony count: 48/48 (100%) reporting labs reported ≥10 or ≥100 x 10^6 cfu/L, 2 labs indicated they do not normally process this type of sample, one participant did not report results (Table 1).

Identification: 47/48 (98%) reporting labs reported *Staphylococcus saphrophyticus*, 1 lab reported coagulase negative staphylococcus; 2 labs indicated they do not normally process this type of sample, one participant did not report results (Table 2).

Suitability for Grading

A challenge is considered suitable for grading if agreement is reached by 80 percent of selected reference group and at least 50 percent of the participants.

Organism identification was correctly performed by at least 80 percent of reference laboratories and greater than 50 percent of all laboratories and was thus, determined to be suitable for grading.

Grading

Maximum grade: 8

Reporting a colony count of 10->100 x 10^6 cfu/L was graded 4.

Reporting *Staphylococcus saprophyticus* was graded 4.

Table 1. Colony count results

Reported x 10^6 cfu/L	Total	Grade
≥100	43	4
≥10-100	5	4
no report	1	0
sample not normally processed	2	ungraded
Total	**51**	

COMMENTS ON RESULTS

Laboratories performed excellent on this challenge with 98% of labs reporting *S. saprophyticus* and receiving a grade of 4. One lab reported coagulase negative staphylococcus, refer, and received a grade of 4. One lab did not submit a report and received a grade of zero.

ISOLATION AND IDENTIFICATION

Urinary tract infections (UTI) caused by *S. saprophyticus* can present comparatively low numbers of colony-forming units ($\leq 10^5$ cfu/mL) in the bladder and voided urine therefore methods of chemical screening for bacteriuria may not always succeed in diagnosing UTI caused by *S. saprophyticus.*

Laboratory identification of *S. saprophyticus* is made on the basis of resistance to novobiocin, the absence of hemolysin, and lack of coagulase activity, and intense glossy, butyrous, and convex colonies.

S. saprophyticus is intrinsically resistant to novobiocin. Testing of novobiocin susceptibility is reported to be 100% sensitive and 96% specific (novobiocin resistance is uncommon in other clinically important species). [1,2] This test provides a simple and reliable screening method to differentiate the presence of *S. saprophyticus* from the presence of other coagulase-negative staphylococci in the urinary tract.

Diagnosis of UTI based on the combination of both leukocyte esterase and nitrites, will miss cases caused by *S. saprophyticus* as this organism does not reduce nitrate to nitrite. [3]

ANTIMICROBIAL SUSCEPTIBILITY

Therapy is usually effective with most urinary tract antimicrobial agents.

However, therapeutic failures have been reported with sulfonamides and nitrofurantoin, and the organism is uniformly resistant to nalidixic acid.[4]

CLINICAL RELEVANCE

S. saprophyticus is a common pathogen of urinary tract infections. The vast majority of infections occur in young sexually active women and symptoms are present in 70% to 85% of this population. [4]

Common symptoms of inflammation of the lower tract, such as hematuria and pyuria, are seen more often among patients with *S. saprophyticus* infections. Relapse is uncommon, but the infection may recur in 10% of the patients. [4,5]

Table 2. Identification results

Reported	Total	Grade
Staphylococcus saprophyticus	47	4
staphylocoque à coagulase negative, refer	1	4
no report	1	0
sample not normally processed	2	ungraded
Total	**51**	

REFERENCES

1. Mctaggart LA, Elliott TSJ. Is resistance to novobiocin a reliable test for confirmation of the identification of Staphylococcus saprophyticus? JMedMicrobiol. 1989;30(4):253-266. doi:10.1099/00222615-30-4-253

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4. Archer GL, Climo MW. Staphylococcus epidermidis and Other Coagulase -Negative Staphylococci. In: Mandell D Bennett, ed. Vol 2. 6th ed. Elsevier; 2005:2352.

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