

Clinical Evaluation of a Preservative Impregnated Sponge for Transport of Urine Samples for Microbiological Culture

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Abstract

Objective: To evaluate the ability of a preservative impregnated sponge to preserve the quality of urine specimens during transport, allowing for accurate quantitation and speciation in the microbiology laboratory.

Methods: 341 urines collected for culture were poured over a routine culture paddle (Starplex Dip N' Count). The preservative sponge (Uriswab, Copan Italia) was then dipped into the remaining urine to absorb the sample (approx. 5s). The culture paddle was incubated 18 to 24 h and read according to standard quantitation protocols. Urine from the sponge was cultured by squeezing the tube to express the urine; and with a 0.001 ml calibrated loop, the expressed urine was plated onto blood and MacConkey agar. The plates were incubated 18-24h and read according to standard quantitation protocols. Significant cultures were considered as those that contained urinary tract pathogens at amounts considered to reflect probable urinary infection.

Results: 320 of the cultures (94%) yielded equivalent results for quantitation and micro-organism isolated. There were 21 discrepant results between the two systems; 9 (2.6%) had potential pathogens isolated. Of these, 5 were the same organism with the culture paddle having a one log higher count; the remaining 4 did not grow from the sponge. One of these showed 100×10^6 CFU/L on the culture paddle. The remaining 12 discrepant results (3.5%) were not clinically significant: 8 of the 12 were lactobacilli that were not supported by the preservative sponge.

Conclusions: In this study, for detection of patients with a potentially significant urinary infection, the two systems agreed in 97.4% of cases. Differences in volume inoculated or sampling error might account for the quantitative variation observed in a few cultures. The preservative sponge appeared to reduce the growth of common contaminants such as lactobacilli and diphtheroids. The preservative sponge may offer a simple alternative transport of urine for microbial culture.

Introduction

Accurate quantitation of urine specimens sent for culture is essential to effective clinical treatment of urinary tract infections. Quantitation is important to determine the degree of bacterial contamination or infection of the urinary tract. Overgrowth of some bacterial species may mask the presence of a clinically significant pathogen.

Introduction

Traditionally, a urine sample is either poured over a culture media paddle and sent to the laboratory or the liquid sample is transported to the lab in a 100 mL screw cap container. Both of these methods have potential issues which affect the accuracy of urine culture quantitation. There are ongoing concerns about the accuracy of microbial counts on paddles and if they are inoculated improperly, quantitation is not possible. Urines sent to the laboratory in screw cap containers often leak during transport. Delays in transport can lead to overgrowth of bacterial species and incorrect quantitative results.

In an attempt to resolve some of the issues surrounding transport and microbial culture of urines, a novel transport device was discovered. (Figure 1.) This involves dipping a sponge impregnated with a bacterial preservative into the urine and then placing the sponge into a small vessel for transport. The sponge absorbs 1 – 1.2 mL of urine, can be transported to the laboratory without concern for leakage and can be plated directly using a quantitative urine culture loop onto appropriate media.

The objective of this study was to evaluate the ability of the preservative impregnated sponge to preserve the quantity and species of bacteria in urine during transport to the microbiology laboratory.

Materials and Methods

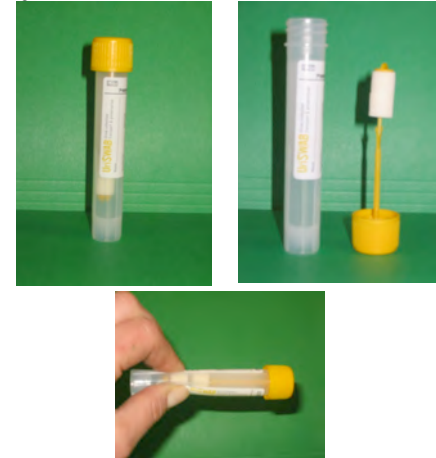
341 urines collected for culture were poured over a routine culture paddle (Starplex Dip N' Count). The preservative sponge (Uriswab, Copan Italia) was then dipped into the remaining urine to absorb the sample (approx. 5s). The culture paddle was incubated 18 to 24 h and read according to standard quantitation protocols. Urine from the sponge was cultured by squeezing the tube to express the urine; and with a 0.001 ml calibrated loop, the expressed urine was plated onto blood and MacConkey agar. The plates were incubated 18-24h at 35° and read according to standard quantitation protocols.

Significant cultures were considered as those that contained urinary tract pathogens at amounts considered to reflect probable urinary infection.

Equivalent cultures were considered as those cultures which yielded equal quantitation and identification of organisms with both culture methods.

Materials and Methods

Figure 1. Uriswab



Results

Table 1. Equivalent and Discrepant Results

Discrepant Results	Clinically Significant	9
	Not Clinically Significant	12
Equivalent Results	Clinically Significant	25
	Not Clinically Significant	12
	No Growth	185
	+/- 1 log Not Clinically Significant	98

• 320 of the cultures (94%) yielded equivalent results for quantitation and micro-organism isolated. (Table 1.)

• There were 21 discrepant results between the two systems; 9 (2.6%) had potential pathogens isolated. (Table 2.) Of these, 5 were the same organism with the culture paddle having a one log higher count; the remaining 4 did not grow from the sponge. One of these showed 100×10^6 CFU/L on the culture paddle. The remaining 12 discrepant results (3.5%) were not clinically significant: 8 of the 12 were lactobacilli that were not supported by the preservative sponge. (Table 3.)

Results

Table 2. Clinically Significant Discrepant Culture Results

Paddle Result (X 10 ⁶ CFU/L)	Sponge Results (X 10 ⁶ CFU/L)
10 Lactose Fermenting bacilli, 10 Gram negative bacilli	1 Lactose fermenting bacilli
10 <i>E. coli</i> , 10 mixed growth	1 colony
>100 Lactose fermenting bacilli	No growth
10 <i>Enterococcus</i> sp.	No growth
10 <i>E. coli</i>	No growth
10 coliforms	No growth
10 <i>E. coli</i>	1 <i>E. coli</i>
100 <i>E. coli</i>	1 <i>E. coli</i>
10 Gram negative bacilli	1 coliforms

Table 3. Clinically Insignificant Discrepant Results

Number of Incidents	Paddle Result (X 10 ⁶ CFU/L)	Sponge Results (X 10 ⁶ CFU/L)
2	10 Lactobacillus species	No growth
3	100 Lactobacillus species, 10 Mixed Growth	1 Mixed Growth
3	100 Lactobacillus species	No growth
2	10 Diphtheroids	No growth
1	10 Mixed Growth	No growth
1	No Growth	1 Mixed Growth

Conclusions

• In this study, for detection of patients with a potentially significant urinary infection, the two systems agreed in 97.4% of cases.

• Differences in volume inoculated or sampling error might account for the quantitative variation observed in a few cultures.

• The preservative sponge appeared to reduce the growth of common contaminants such as lactobacilli and diphtheroids.

• The preservative sponge may offer a simple alternative method for the transport of urine for microbial culture.