Toolkit to Guide Use of Reflex Urine Cultures-

Section III: Other aspects of diagnostic stewardship

RUC utilization is one strategy addressing the processing (analytic) component of urine culture diagnostic stewardship (Figure 1). In this final section, we discuss strategies for targeting other key components of urine culture diagnostic stewardship.

This section is organized in the following sub-sections:

1. Ordering (pre-analytic): Diagnostic stewardship algorithm
2. Collection (pre-analytic)
3. Reporting (post-analytic)

Ordering (pre-analytic)

In this sub-section, we introduce a diagnostic stewardship algorithm (Figure 3) to guide appropriate ordering of urine tests in a variety of clinical scenarios. This algorithm, based on current IDSA recommendations, emphasizes the importance of reducing inappropriate ordering of UA and urine cultures (Table 5).

<table>
<thead>
<tr>
<th>Table 5: Instances where UA or urine cultures should not be ordered²</th>
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<tbody>
<tr>
<td>• Do NOT order solely based on concerns regarding urine quality, such as change in the character of the urine (color, smell, sediments, turbidity)</td>
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<td>• Do NOT have standing orders for urine culture in the absence of an appropriate indication (e.g. as part of standard fever work up in ED)</td>
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<td>• Do NOT repeat urine culture to document clearance of bacteriuria in the presence of symptomatic improvement</td>
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<td>• In the absence of symptoms, screening urine cultures should NOT be ordered for:</td>
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<tr>
<td>o Non-pregnant women</td>
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<td>o Patients with diabetes</td>
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<tr>
<td>o Elderly patients or patients with stable delirium/dementia</td>
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<tr>
<td>o Patients with spinal cord injury</td>
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<tr>
<td>o Patients with an indwelling urinary catheter or who require chronic intermittent catheterization</td>
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<tr>
<td>o Renal transplant recipients</td>
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<td>o Prior to surgical procedures, except urologic procedures when breach in mucosa is anticipated</td>
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This algorithm also incorporates the evaluation of special populations, such as patients with indwelling catheters and patients who are unable to provide an accurate history.
Diagnostic Algorithm to Guide Urine Test Selection

Is the patient hemodynamically unstable OR febrile ≥100.4°F with high risk criteria below?
- Genitourinary (GU) obstruction or GU trauma or recent GU surgery <1 month
- Flank pain or tenderness
- Pregnant or Neutropenic (ANC<500)
- Renal transplant <1 year

YES

No indwelling urethral catheter:
- Order UA with reflex to culture (If patient is neutropenic (ANC<500) or your lab does not perform UA with reflex to culture, send for UA and culture)

Indwelling urethral catheter present:
- Order UA and urine culture (Consider changing urinary catheter in place for > 7 days prior to obtaining culture)

Continue to evaluate for other etiologies of sepsis or acute deterioration.

NO

Does the patient have clinical features suggestive of a UTI?

No indwelling urethral catheter:
- Dysuria, urinary urgency or frequency
- Suprapubic or flank pain
- Gross persistent hematuria

Indwelling urethral catheter present:
- New flank pain or tenderness
- Acute hematuria
- Fever and rigors (exclude other causes first)

YES or UNKNOWN

NO

Inappropriate indications for urine testing
- Discoloration, malodorous or cloudy urine
- To document clearance after treatment (unless symptoms persist)
- Pyuria or positive UA (WBCs, nitrite, bacteria) in patients without lower UTI symptoms.
- Asymptomatic patients (except pregnant women)
- Standing orders for urine testing (e.g. fever workup) in the absence of an appropriate indication
- Pre-operative screening (except endoscopic urologic procedures associated with mucosal trauma)
- Stable delirium or dementia

Abbreviations: ANC, Absolute Neutrophil Count; GU, Genitourinary; UA, Urinalysis; UTI, Urinary Tract Infection
*Unknown: When patient or caregiver cannot provide history, rule out other causes of infection first then proceed to urine testing.
Collection (pre-analytic)

One strategy for improving the collection (pre-analytic) stage and reducing contamination is optimization of urine collection techniques. In patients with short-term catheters, specimens should be obtained through the catheter port using aseptic technique or puncturing the catheter tubing with a needle and syringe in the absence of a port. Patients with indwelling catheters in place for more than two weeks (some institutions are moving to a cut-off of 72 hours or one week) should have the catheter replaced and a sample obtained from the new catheter to reduce the likelihood of a false-positive result due to colonization.\textsuperscript{14, 15} Other collection stage strategies include reducing transport time to the laboratory.

Reporting (post-analytic)

A common strategy targeting the reporting (post-analytic) stage involves framing diagnostic results to help providers accurately interpret the results. This includes additional text like “Growth of multiple organisms indicate likely contamination. Consider recollecting urine sample if clinically indicated”. Other reporting stewardship measures include selective reporting of antibiotic susceptibilities, where laboratories only display preferred antibiotic susceptibilities, or restricting culture results that may not be clinically relevant to avoid unnecessary treatment.