Urine Cultures - Specimen Collection and Transport

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Clinical Laboratory Science Program
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Specimen Collection
• For each specimen type
  – Why or why not use this specimen for culture
  • Is this specimen acceptable for processing?
    – Method of collection
    – Risk of contamination

Clean-Catch Midstream Urine
• Why use it?
  – Easiest to collect
  – Noninvasive
  – Results generally accurate if patient is properly instructed in collection method
  – First morning specimen preferred as it is the most concentrated and will yield the most accurate colony counts

Clean-Catch Midstream Urine
• Method
  – Patient instruction is essential
  – Risk of contamination, must properly cleanse and collect specimen
  – Refer to procedure manual or textbook
• Risk of contamination
  – Minimal if proper collection procedure followed closely

Why is it important to properly instruct the patient in how to collect a clean-catch midstream urine?
Because of the risk of contamination – if patient does not properly cleanse external area before collection and catch only midstream, contamination is probable and specimen will not reflect an accurate colony count

Catheterized Urine - Straight
• Why use it?
  – Has less urethral contamination than clean-catch midstream urine
  – Somewhat invasive, but relatively simple procedure
  – Used most often when patient unable to collect a clean-catch midstream urine
Catheterized Urine - Straight

- **Method**
  - Requires trained staff to perform collection
  - Refer to procedure manual or textbook

- **Risk of contamination**
  - Urine will have less urethral contamination than clean-catch midstream urine
  - Catheter can introduce bacteria into the bladder as it passes through urethra

When is it appropriate to collect a straight catheterized urine?

- When the patient is unable to collect a clean-catch midstream urine (i.e. pediatric or elderly patient)

Catheterized Urine - Indwelling

- **Why use it?**
  - Patient already has catheter in place
  - Catheter is often the source of infection
  - Use only when patient is ill

- **Method**
  - Do not collect urine from collection bag
  - Use scrupulous aseptic technique
  - Refer to procedure manual or textbook

- **Risk of contamination**
  - Urine will have less urethral contamination than clean-catch midstream urine
  - Must be freshly voided urine, not what has been in collection bag

Suprapubic Aspiration Urine

- **Why use it?**
  - Definitive method for collecting uncontaminated specimens
  - Very invasive
  - Used with pediatric patients or when interpretation of voided clean catch urine is difficult to interpret
  - Only collection method acceptable if culturing for anaerobic organisms
    - Urine in syringe is protected from air
    - Avoids urethra which is colonized with anaerobes

Why is it NOT appropriate to collect urine from an indwelling catheter collection bag?

- Urine has sat at room temperature for an extended period of time and any organisms present will proliferate giving falsely increased colony count
Suprapubic Aspiration Urine

• Method
  – Urine withdrawn through a percutaneously inserted needle into the bladder
  – Refer to procedure manual or textbook
• Risk of contamination
  – No contamination if aseptic procedure followed
  – Transient colonization of bladder can occur

If a suprapubic urine culture has a low colony count, should it be treated as contamination? Why or why not?

No! Growth of any kind in a suprapubic urine should be treated as a potential pathogen because the collection procedure utilizes sterile technique and urine in the bladder normally is sterile.

Random Voided Urine

• Why not use it?
  – Normal urogenital flora can easily contaminate the voided urine
  – Colony count would be increased due to contamination and not reflect what is in the bladder

24-Hour Urine Collection

• Why not use it?
  – Urine is an excellent culture media for bacteria
  – Contaminants and pathogens alike will proliferate as they sit in a 24-hour urine leading to erroneous culture results
    • I.e. higher than actual colony counts

What two specimen types must NEVER be used for a urine culture?

Random voided urine and a 24-hour urine

Specimen Handling & Transport

• Ideally, specimen should be transported to laboratory within 30 minutes of collection
• Container
  – Sterile, leak-proof container placed within a sealable, leak-proof, plastic bag with separate section for paperwork
  – Label with patient name, ID number, location, collection method, collection time
Specimen Handling & Transport

– Time & Temperature
– Culture must be setup within 2 hours after collection if kept at room temperature
– Specimen can be refrigerated at 4°C for up to 24 hours if there is a delay in setting up the culture
– Transport media
  • Use if there is a delay in transporting specimen to lab
  • Place specimen in transport medium; i.e., boric acid
  • Boric acid will maintain appropriate colony count for up to 24 hours at room temperature
  • Other transports available, check package inserts for correct procedure

What criteria must be adhered to when transporting to and receiving in the lab a urine specimen for culture?

Proper container, label, collection method, time between collection and culture setup, storage, and volume

Screening Procedures

• 60-80% of urine cultures received in the laboratory will be “no growth” or “growth of contaminants only”

• Urine dipstick:
  – Nitrite test: detect bacteria able to convert nitrate to nitrite
  – Leukocyte esterase test: detect WBC’s

What three tests are often used to screen urine for potential bacterial infection?

Nitrite and Leukocyte esterase on dipstick, and gram stain

Screening Procedures

• Gram stain
  – Easy, inexpensive, most sensitive, reliable
  – Method
    • One drop uncentrifuged urine on slide, dry, stain, evaluate
  – Results
    • One organism per oil immersion field correlates with 105 cfu/ml; PMN quantitation not reliable
  – Most labs do not do gram stains on urine
    • Due to high number of negative results, and
    • Too labor intensive with number of cultures done per day
Which screening test is the most sensitive?

Gram stain

References:


Review

• Urine collection methods
  – Why/why not use, method, risk of contamination
• Specimen handling and transport
  – Container, time, temperature, criteria for accepting specimen in lab
• Screening procedures
  – Nitrite, leukocyte esterase, gram stain