Specimen Collection and Diagnostic Procedures

Diagnostic Testing –
Basic screening as part of a wellness check
Help confirm a diagnosis, monitor an illness, and provide information about
client’s response to treatment

Nurse’s Role:
Pretest
Client preparation
Assessment and data collection (ask if client is pregnant prior to x-ray)
NPO
Teaching

Intratet
Specimen collection and performing or assisting with certain diagnostic
testing
Labeling specimens, etc

Post-test
Compare previous and current results

Nursing Responsibilities
1. Provide client comfort, privacy, safety
   Nonjudgemental and sensitive re: sociocultural beliefs
2. Explain purpose and procedure for obtaining specimen
3. Use correct procedure to obtain specimen, ensure staff follows correct
   procedure
   Use nursing procedure manual and/or lab manual
4. Lab requisition – complete, be thorough
5. Transport specimen promptly
6. Report abnormal findings in a timely manner consistent with severity of
   abnormal results

Capillary Blood Glucose
When frequent test required or venipuncture not available
Less painful
Easily performed
Meters measure between 20 to 600 mg per dL
Capillary blood specimen obtained from side of finger (avoids nerve
endings and callouses)
Can use earlobe or forearm (with newer monitors)

Procedure
1. Assess for intactness or circulatory impairment of site
2. Question if client on anticoagulant therapy
3. Assess client’s self-care abilities
4. Wash hands (have client wash hands)
5. Place reagent strip on clean, dry paper towel – do not touch
6. Calibrate meter
7. Choose puncture site, may wrap finger in warm cloth for 30-60 secs or hold in dependent position massaging toward site
8. Clean site with alcohol and allow to dry completely
9. Pierce skin and wipe away first drop of blood (contains much serous fluid)
10. Apply blood to reagent strip
11. Ask client to apply pressure to puncture site
12. Test per manufacturer’s instructions

Stool Specimens

Occult Blood
1. To determine presence of occult (hidden) blood, “guaiac test”
   False positive
   Ingestion of red meat, raw vegetables or fruits, meds which irritate gastric mucosa – ASA, NSAIDS, steroids, iron, anticoagulants
   False negative
   Vitamin C

Other Stool Tests
2. Analyze for dietary products and digestive secretions (send to lab total volume of stool expelled at one time)
   Excessive fat – steatorrhea
3. Ova and parasites
   Usually test done on 3 specimens to confirm diagnosis
4. Bacteria and viruses
   Will be cultured so only small amount necessary

Procedure for Testing for Occult Blood
1. Assess if hemorrhoids present
2. Any interventions necessary? – diet
3. Determine amount of stool needed and whether should be sent to lab immediately
4. Give instructions to ambulatory patients
   a. Purpose of stool specimen and how to collect
   b. Provide with clean or sterile bedpan or bedside commode
   c. Don’t contaminate, void before collecting
   d. Don’t place toilet tissue with stool
   e. Notify nurse immediately after obtaining specimen
5. Cover bedpan to decrease odor and embarrassment
6. Wear gloves
7. Transfer stool to specimen container with tongue blades
   a. 2.5 cm or 1 inch specimen if formed, 15 to 30 mL if liquid
   b. Include visible pus, mucus, or blood
   c. For culture, dip swab into purulent material
d. Dispose swabs wrapped in paper towel

e. Cover specimen container and label

8. Occult blood – **blue color positive**

**Urine Specimen**

**Routine Urinalysis (UA) – clean voided adequate**
- Males void directly into container
- Females squat over toilet and void into container
- Usually done on first voided specimen of AM as more concentrated and more acidic pH
- Need approximately 120 mL
- Can test for specific gravity, pH, presence of abnormal constituents such as glucose, ketones, protein, occult blood

See Techniques Table 4.1, page 150

- Reagent – substances used in a chemical reaction to detect specific substance
- Avoid contamination of specimen from fecal material, toilet paper
- Clean outside of container if contaminated
- Label
- To lab immediately

**Clean-Catch or Midstream specimen**
- Used when urine culture is ordered to identify organisms causing UTI (Culture and Sensitivity “C&S”)
- Try to keep specimen as free from contamination as possible
- Must use sterile specimen container with lid
- Instruct client to wash genitalia with soap and water and dry thoroughly
- Female clients should cleanse with antiseptic towelette from front to back, males use circular motion starting at urinary meatus and distal end of penis
- Clients should start urine stream into toilet (ridding beginning stream of urine which may collect bacteria from distal urethra and urinary meatus)
- Place cup into the stream, collecting 30 to 60 mL

Variations:
- Insert sterile needle through drainage port on catheter tubing after clamping tubing for 30 minutes

**Timed Urine Specimen**
- Collection of all urine produced and voided over a specific period of time, usually from one to 24 hours
- Determine if collection container need preservative, should be stored on ice, etc.

**Post signs**
- Start collection period **discarding first specimen** (sometimes called “double voided specimen”), collect all specimens including the one concluding the time period.
If use more than one specimen container, number sequentially
If specimen is accidentally discarded, collection must start again from beginning.

Urine Testing
Urinometer – to measure specific gravity
   Fill cylinder ¾ full of urine
   Place urinometer in cylinder and spin
   Read at eye level, base of meniscus
Using reagent strip – multiple tests
   Use freshly voided specimen, many agencies require second-voided
   Compare color change

Sputum, Nose, and Throat Specimen
Sputum – differentiate from saliva, comes from lungs, bronchi, and trachea
   Can be tested for culture and sensitivity (identify specific organisms) or cytology studies to determine different cell types
   Test for presence of acid-fast bacillus looking for tuberculosis
   Often collected in AM, secretions have accumulated
   Sometimes use postural drainage
   Help post-op patient splint abdominal incision when obtaining specimen
   Usually need 5 to 10 mL
   High or semi-Fowler’s position best for obtaining specimen
   Deep inhalation, then cough

Nose and Throat
   Determine if client might be contagious
   Use sitting position for both
   Throat - Use tongue blade to depress tongue but be careful to avoid gag reflex
   Don’t touch inside of mouth with swab, swab tonsils, pharynx
   Place swab in tube and crush culture medium ampule
   Nasal – Ask client to blow nose
   Insert swab through nasal speculum along septum and floor of nose

Wound Drainage Specimen
Exudate –

Serous –

Purulent –

Sanguineous –
Serosanguineous –

Injury wounds most likely to be contaminated
Surgical infections most likely to appear 2 to 11 days post-op
Culture – determines presence of organisms, infection
Sensitivity – determines in antibiotic will be appropriate for particular type of infectious organism found
Determine if wound to be cleaned before obtaining specimen
Determine exactly which site specimen to be obtained from
Determine if specimen to be obtained for **aerobic or anaerobic** culture

**Visualization Procedures**

**Gastrointestinal Procedures**
   
   Anoscopy
   
   Proctoscopy
   
   Proctosigmoidoscopy
   
   Colonoscopy
   
   Barium swallow – client drinks barium, indirect visualization of upper GI tract and small bowel
   
   Barium enema – lower GI tract

**Urinary Procedures**
   
   KUB – kidneys, ureters, and bladder
   
   IVP – contrast medium given IV and X-rays taken of urinary tract structures
   
   Ultrasound – uses sound waves to visualize organs
   
   Cystoscopy – bladder, ureteral orifices, and urethra directly visualized using lighted instrument inserted through the urethra

**Cardiopulmonary Procedures**
   
   Electrocardiography – heart’s electrical activity, used to detect dysrhythmias and alterations
   
   Stress electrocardiography –
   
   Angiography –
   
   Echocardiogram –
Lung scan –

Laryngoscopy / bronchoscopy –

Computed Tomography – CT scan
Painless, noninvasive
Three-dimension images

Magnetic Resonance Imaging – MRI
Client placed in magnetic field
Cannot undergo if implanted metal devices – pacemaker, hip prosthesis, often role of nurse to question client
Claustrophobic clients may be very uncomfortable

Nuclear Imaging
Radioisotope given (targeted to specific organ) and image can show hot spots (increased function) and cold spots (decreased function)

Aspiration / Biopsy

Lumbar Puncture – spinal tap
Cerebrospinal fluid withdrawn through a needle from subarachnoid space of spinal canal between third and 5th lumbar vertebrae
Client positioned laterally with head bent and knees flexed on abdomen
CSF pressure can be read

Abdominal Paracentesis
Ascites –
Strict sterile technique
Insert trochar through small incision, withdraws trochar leaving cannula
Fluid removed, maximum of 1500 mL to avoid hypovolemic shock

Thoracentesis
To remove excess fluid from pleural cavity resulting from injury, infection, etc.

Bone Marrow Biopsy

Liver Biopsy