

12. Urinalysis and Body Fluid Collections

A. Introduction

1. Other body fluids may be analyzed in the clinical laboratory which do not involve collection by the phlebotomist, but may need to be delivered to the lab or appropriate laboratory department by the phlebotomist.
 - a. Gastric secretions obtain by gastric intubation.
 - b. CSF obtained through a spinal tap or lumbar puncture.
 - c. Synovial fluid extracted aseptically from a joint cavity.
 - d. Fluid aspirated from other body cavities:
 - 1) pleural - lung
 - 2) pericardial - heart
 - 3) peritoneal - abdominal cavity
 - e. Amniotic fluid bathes the fetus and is obtained from within the amniotic sac surrounding the fetus.
 - f. Seminal fluid which is composed of products formed in various male reproductive organs.
 - g. Chemical examination, cell counts, microscopic examination and microbiologic analysis are usually requested on these fluids.
 - h. Handle with extreme care as they are difficult to obtain and wear gloves since they may be extremely biohazardous.
2. Culture specimens collected on special sterile swabs and placed in a growth media may be submitted from a number of sites for analysis by the microbiology department and include:
 - a. sputum - fluid from the lung, may contain pus
 - b. throat/sinus drainage
 - c. throat cultures
 - d. wound cultures
 - e. ear or eye cultures
 - f. skin scrapings
 - g. feces
 - h. urine
 - i. vaginal or urethral cultures

- B. Urine collections is a very commonly ordered test which is performed to obtain information about the patient's general health and kidney function. This test is painless for the patient but requires correct collection technique. There are a variety of types of urine specimens, and you may be involved in instructing the patient on the correct method of collection.
1. **Midstream specimen** - commonly used for routine admission urinalysis.
 - a. Instruct the patient to void approximately one-half of the urine into the toilet.
 - b. Collect urine in the container until it is approximately half full.
 - c. Void the rest of the urine into the toilet.

 2. **Clean Catch Specimen** is used for microbiological analysis (C&S) to detect the presence or absence of infecting organisms as well as the preferred specimen for routine urinalysis.
 - a. The critical step in the collection of a clean catch urine is the cleaning. The genital area is full of bacterial which will overgrow potential pathogenic organisms if the area is not properly cleansed.

 - b. Give the patient cleansing towelettes and a container. Instruct the patient to use the towelettes to thoroughly cleanse the genital area prior to voiding.

 - c. After cleansing the patient should start voiding (women must hold the skin folds apart with their free hand to prevent contamination).

 - d. Collect the mid stream of the urine, taking care not to touch the container.

 - e. When the container is approximately half full, finish voiding into the toilet.

 3. **Twenty four Hour Urine Specimen** is needed when it is necessary to measure the exact amount of a urine chemical which will vary in concentration with daily activities such as exercise, meals and body metabolism. Patients must be explicitly instructed on the procedure. It is best to give both written and oral instructions to the patient.
 - a. The patient should be given a chemically clean wide-mouthed, properly labeled container for a 24-hour urine specimen which has a preservative in it. Warn the patient that the chemical added to the container is potentially toxic or corrosive and take care not to touch or spill it.

 - b. Instruct the patient to void and discard the first morning urine specimen. Write the exact time on the container. Collection continues for 24 hours.

 - c. A normal intake of fluids during the collection period is desirable unless otherwise indicated by the physician.

 - d. Some laboratory assays require special diet restrictions, and thus, these instructions should be given to the patient.

 - e. Collect **all** urine voided during the next 24 hours. Urine should be refrigerated or kept in a cool place throughout the collection period.

 - f. At exactly the same time the following morning, void completely and add this specimen to the container.

- g. Deliver the specimen to the lab as soon as possible the morning the collection is stopped.
- h. **Precautions:**
 - 1) Urinate first, before bowel movement.
 - 2) Do not add anything to urine.
 - 3) Discontinue meds, if possible, 48-72 hours prior to collection
 - 4) Keep urine cool.
 - 5) Give patient written instructions.

4. Laboratory testing of urine:

- a. The ***routine urinalysis (UA)*** includes the physical, chemical and microscopic examination of urine.
- b. ***Pregnancy test*** detects the substance human chorionic gonadotropin (HCG) which is produced by the placenta and is detectable approximately 10 days after conception.
- c. Screening for drugs of abuse.
- d. Creatinine clearance and blood urea nitrogen (BUN) are kidney function tests.
- e. Culture and sensitivity.

C. Other Body Fluids

1. Cerebrospinal Fluid (CSF)

- a. Obtained by the physician through a spinal tap or lumbar puncture.
- b. Three tubes are collected, the first usually contains blood and the other two are used for analysis- tube 1 chemistry, tube 2 microbiology, tube 3 hematology.
- c. Tests commonly performed on CSF include: total protein level, glucose level, cell count and microbiological analysis.
- d. CSF are always transported immediately and handled as a ***STAT*** in all departments.
- e. Deliver one tube to each department: chemistry, hematology and microbiology.

2. Fecal Specimens

- a. Collected in wide mouth container with tight fitting lid.
- b. Caution patient not to contaminate specimen with urine.
- c. ***Ova and Parasite (O&P)*** test is frequently ordered to confirm the present of parasites in a stool specimen, special collection containers may be sent home with the patient.
- d. Stool specimens may be cultured to identify enteric disease organisms such as Salmonella, Shigella, Staphylococcus aureus and viruses.
- e. ***Occult blood test*** is used to determine the presence of “hidden” blood in a patient’s stool which may be indicative of gastrointestinal (GI) bleeding or colorectal cancer.

3. Seminal Fluid
 - a. Semen is examined in the laboratory to:
 - 1) determine the effectiveness of vasectomy
 - 2) investigate the possibility of sexual criminal charges
 - 3) assess infertility.
 - b. The patient must be given specific instructions on collection in a tactful, discreet manner.
 - c. Containers must be clean and free of detergents, condoms can be used but must be washed free of spermicidal substances.
 - d. *The semen must be kept warm and delivered to the lab within 2 hours of collection.*
4. Amniotic Fluid
 - a. This is the fluid which bathes the fetus within the amniotic sac.
 - b. Physicians recommend that women who will be age 35 or older at the time of birth have a specimen collected at 16 weeks of gestation so genetic testing for birth defects can be identified.
 - c. In a problem pregnancy fluid may be collected during the last trimester to determine the maturity of the lungs.
 - d. The specimen must be protected from the light and transported and analyzed STAT.

D. Throat and Nasopharyngeal Culture Collections

1. Used to diagnose bacterial infections or detect carrier state in children and infants.
 - a. Kids/babies can't produce sputum.
 - b. Nasopharyngeal swab may be used to diagnose whooping cough, croup and pneumonia.
2. Throat cultures are done primarily for diagnosis of Strep throat.
3. Procedure:
 - a. Open the package the sterile swab is in but don't remove from container, just loosen.
 - b. Best to have a flashlight or well lit room to look at back of patient's throat.
 - c. Have patient open wide and look at back of throat for red areas with white patches or blood.
 - d. Swab area of throat with reddened areas and patches, place the swab back in the plastic sleeve, squeeze end of sleeve with swab to release media.
 - e. Label with patient information and deliver ASAP to microbiology department.
4. Nasopharyngeal swabs are inoculated by passing a special swab through the nose, into the nasopharynx, carefully rotated, then removed.

E. Skin Tests

1. At some sites phlebotomists may be trained to perform skin tests.
2. Skin tests are performed to determine if the patient has been exposed to a particular antigen and has made antibodies to the antigen.
3. Wide range of diseases may stimulate antibody production.
4. Used to aid in the diagnosis of allergies, tuberculosis (TB) and fungal infections.
5. Procedure:
 - a. Cleanse volar surface of arm
 - b. Use small tuberculin syringe with appropriate amount of testing agent (usually 0.1 ml of antigen) and a small needle.
 - c. Insert needle under skin surface at a 20 degree angle, pull back plunger, then depress slowly, a bubble will form under skin.
 - d. After removal of the needle DO NOT apply pressure to the site.
 - e. After appropriate time period, check and measure any area of redness and swelling at the sight.
 - f. The test is interpreted as “positive” or “negative” based on size of area.

F. Gastric Analysis and Hollander Test

1. Purpose is to determine gastric function in terms of stomach acid production.
2. ***The two methods differ in the substance used for stimulation***
 - a. Gastric analysis measures gastric acid secretion in response to *histamine or pentagastrin*.
 - b. Hollander uses *insulin* to stimulate gastric secretions.
3. Procedure:
 - a. A tube is inserted through the nose and into the stomach by the doctor.
 - b. Patient is given IV histamine or insulin.
 - c. Phlebotomist’s role is to assist and draw specimens as required.
 - d. Under no circumstances should the phlebotomist perform the procedure, responsible only for labeling gastric specimens and blood samples.

G. Sweat Chloride by Iontophoresis

1. This test is used to diagnose cystic fibrosis (CF).
 - a. Patient’s produce 2-5 times the normal amount of chloride in sweat.
 - b. This is a disorder of exocrine glands which cause changes in mucous production glands.
 - c. Primarily affect lungs, upper respiratory tract, liver and pancreas.

2. Test stimulates patient to sweat by applying pilocarpine hydrochloride to the skin and a very mild electric current to the site, usually the forearm or leg.
 - a. Sweat is collected on preweighed gauze pads, then weighed after sweat collection.
 - b. Gauze is put in cups with deionized water and allowed to equilibrate for 2-3 hours or overnight.
 - c. Chloride in solution is measured.
3. Newer methods have been developed.
 - a. Sweat produced by pilocarpine iontophoresis is collected in capillary tubes and analyzed for chloride.
 - b. Sodium chloride directly measured using an electrode specific for chloride.

H. Breath Analysis for Peptic Ulcers

1. *Helicobacter pylori* has been discovered to be a bacteria which may cause peptic ulcers.
2. Blood tests are available.
3. A breath test has been developed to diagnose and monitor peptic ulcers.
4. Phlebotomist may be required to assist in this test.