URINE DETAILED REPORT – COLLECTION AND EXAMINATION

LEARNING OBJECTIVES

At the end of lecture, the student should be able to understand:

• Precautions necessary to collect the urine sample for Urine detailed report examination
• Various components of urine analysis
• Importance of each of the components in relation to different disease states

PRECAUTIONS BEFORE COLLECTING THE URINE SAMPLE

• Do not eat foods that can color the urine, such as blackberries, beets, and rhubarb, before the test.
• Do not exercise strenuously before the test.
• If the female is menstruating or close to starting the menstrual period, then she should inform her health physician before the collection.
• Certain Medications need to be stopped before collecting the urine sample. These include vitamin B, phenazopyridine (Pyridium), rifampin, and phenytoin (Dilantin).

PRECAUTIONS DURING COLLECTING THE URINE SAMPLE

• Wash your hands to make sure they are clean before collecting the urine.
• If the collection cup has a lid, remove it carefully and set it down with the inner surface up. Do not touch the inside of the cup with your fingers.
• Clean the area around your genitals.
  — A man should retract the foreskin, if present, and clean the head of his penis with medicated towelettes or swabs.
  — A woman should spread open the genital folds of skin with one hand. Then use her other hand to clean the area around the urethra with medicated towelettes or swabs. She should wipe the area from front to back so bacteria from the anus is not wiped across the urethra.
PRECAUTIONS **DURING COLLECTING THE URINE SAMPLE**

- Begin urinating into the toilet or urinal. A woman should hold apart the genital folds of skin while she urinates.
- After the urine has flowed for several seconds, place the collection cup into the urine stream and collect about 2fl oz of this "midstream" urine without stopping your flow of urine.
- Do not touch the rim of the cup to your genital area. Do not get toilet paper, pubic hair, stool (feces), menstrual blood, or anything else in the urine sample.
- Finish urinating into the toilet or urinal.
- Carefully replace and tighten the lid on the cup then return it to the lab. If you are collecting the urine at home and cannot get it to the lab in an hour, refrigerate it.

**URINE DETAILED REPORT**

- Also called as Urine Analysis

A urinalysis tests the urine for color, clarity (clear or cloudy), odor, concentration, and pH (acidity or alkalinity). It also checks for abnormal levels of protein, sugar, and blood cells or other substances that, if found in the urine, may indicate an illness or disease somewhere in the body.

**WHEN URINE ANALYSIS IS REQUIRED?**

A person may have a urinalysis:
- As part of a routine physical exam.
- To screen for a disease or infection of the urinary tract. Symptoms that may cause a doctor to order a urine test include discolored or foul-smelling urine, pain during urination, difficulty urinating, flank pain, or fever.
- To monitor the treatment of certain conditions, such as diabetes, kidney stones, urinary tract infection, or some types of kidney or liver disease.
COMPONENTS OF URINE ANALYSIS

The following are the Components which are reported in a Urine Detailed Report / Urine Analysis Report:

- Color
- Odor
- Clarity
- Specific Gravity
- pH
- Proteins
- Glucose
- Nitrites
- Ketones
- Microscopic Analysis

COLOR OF URINE

Normal color: Pale to dark yellow (Depending on the state of hydration of body)

Abnormal states:
- Red: Blood in urine
- Orange: Drugs eg. Rifampicin
- Dark orange to brown: Jaundice, Gilbert syndrome (excess of Conjugated bilirubin)
- Pink: Consumption of beet
- Green: Consumption of Asparagus

ODOR OF URINE

Normal: Slightly NUTTY odor

Abnormal states:
- Sweet fruity odor: Uncontrolled diabetes
- Bad odor: Urinary tract infection
Maple Syrup like odor : Maple Syrup urine disease

**CLARITY OF URINE**

Normal : Clear / Transparent  
Abnormal : Turbid  
Causes :  
Urinary tract infection  
Pus cells  
Stones  
Blood etc

**SPECIFIC GRAVITY OF URINE**

Normal : 1.005 - 1.030  
Abnormal states :  
Very high Value : Indicates that the urine is very much concentrated which may be caused by loss of fluids from the body (diarrhea/vomiting/blood loss) or addition of other substances in the urine (proteins/ Glucose)  
Very Low Value : Indicates that the urine is very diluted either by increase in fluid intake or by the use of diuretics

**PH OF URINE**

Normal : 4.6 – 8  
Abnormal states :  
Basic urine : A diet high in citrus, vegetables, or dairy can increase urine pH. Drugs acetazolamide, potassium citrate, and sodium bicarbonate.  
Acidic urine : A diet high in meat or cranberries can decrease urine pH. Drugs ammonium chloride, chlorothiazide diuretics, and methenamine mandelate
PROTEINS IN URINE

Normal: No proteins  
Abnormal states:
• Protein in the urine may mean kidney damage, an infection, cancer, high blood pressure, diabetes, systemic lupus erythematosus (SLE), or glomerulonephritis is present.
• Protein in the urine may also mean that heart failure, leukemia, poison (lead or mercury poisoning), or preeclampsia (pregnancy) is present.

GLUCOSE IN URINE

Normal: No glucose Except in pregnancy  
Abnormal States:
Tox much glucose in the urine may be caused by uncontrolled diabetes, an adrenal gland problem, liver damage, brain injury, certain types of poisoning, and some types of kidney diseases.

NITRITES IN URINE

Normal: No Nitrites  
Abnormal States:
The presence of nitrites indicates the presence of coliform bacteria, which may indicate a sign of infection, but this should correlate with the patient symptoms.

KETONES IN URINE

Normal: No Ketones  
Abnormal Values:
• Ketones in the urine can mean uncontrolled diabetes, a very low-carbohydrate diet, starvation or eating disorders (such as anorexia nervosa or bulimia), alcoholism, or poisoning from drinking rubbing alcohol (isopropanol).
• Ketones are often found in the urine when a person does not eat (fasts) for > 18 hours.
• This may occur when a person is sick and cannot eat or vomits for several days.
Low levels of ketones are sometimes found in the urine of healthy pregnant women.

**MICROSCOPIC ANALYSIS OF URINE**

Normal:
- Red cells: None
- White blood cells: None
- Casts: None
- Bacteria/yeasts/squamous cells: none
- Crystals: None – very few

**MICROSCOPIC EXAMINATION OF URINE**

**Red Blood cells** are present in case of:
- Inflammation, damage or disease of kidneys, ureters, urethra or bladder.
- Strenous exercise can also lead to RBCs in urine.

**White Blood cells** are present in case of infections or different disease states of the urinary tract.

**MICROSCOPIC EXAMINATION OF URINE**

**Casts** are of different types and are present in different disease states such as:
- Red blood cell casts: Glomerulonephritis, Vasculitis, Malignant Hypertension
- White blood cell casts: Acute interstitial nephritis, Severe pyelonephritis, exudativeGlomerulonephritis
- Granular casts: Acute tubular necrosis
- **Bacteria**: Means a urinary tract infection
- **Yeast cells / parasites (trichomoniasis)**: means a urinary tract infection
- **Squamous cells**: means the sample is not pure as it is required and a new sample is needed. May also indicate that the squamous epithelium is being eroded in the urinary tract.
tract by either stones, infection, or any sort of inflammation)

**MICROSCOPIC EXAMINATION OF URINE**

Different types of crystals are seen in different disease states and may indicate presence of stones or any error in metabolism.

- **Calcium oxalate crystals**: Common
- **Struvite / Triple Phosphate crystals**: Are made of magnesium ammonium phosphate
- **Cystine crystals**

**DIFFERENT TYPES OF CRYSTALS IN URINE**

- Struvite Crystals
- Cystine Crystals
- Calcium oxalate crystals