# URINALYSIS TEST

## INTRODUCTION

Analysis of urine is important as disturbance of normal physiological functions are often reflected in the urine. Analysis of urine can provide important clues as to what is going on elsewhere in the body and thus aid diagnosis. It can also assist in monitoring the disease process and efficacy of treatment.

## SAMPLE COLLECTION

A morning specimen is best. However, collection and storage of sample at home for room temperature for more than two hours will affect results. Therefore, it is better to collect fresh sample. Ask the patient to collect midstream sample. **Explanation to** the patient is important.

## PHYSICAL EXAMINATION

Before going for testing of urine one should do physical examination of urine.

### COLOUR

Take a clean glass jar and pour urine into it and place it on a table against light.
Note the colour—normally it is pale yellow or amber colour.

### APPEARANCE

After noting the colour, inspect the whole urine for the presence of sediments or suspended particles.

Normal urine is clear.

As a part of physical examination, specific gravity and reaction need not be tested at home.

## CHEMICAL EXAMINATION

Chemical examination includes routine test such as albumin and sugar and special tests such as tests for acetone, bile pigments and bile salts.

## SCIENTIFIC PRINCIPLES

- The urinary system consists of two kidneys, two ureters, the urinary bladder and the urethra. The kidneys are the glandular organs that secrete urine from the blood.
- The kidneys help to maintain the proper fluid and electrolyte balance in the body.
- Ureters convey the urine from the kidneys to the bladder.
- The bladder is a hollow muscular organ and serves as **a** reservoir for urine. It expels urine by contraction from the body through urethra.
- The urethra is a small tube about one-fourth inch in diameter and about one and one-

half inches long in female and eight or nine inches long in male.

- The bladder is lined with mucous membrane which continuous to the urethra, the ureters and the pelvis of the kidney.
- When about 300ml of urine is accumulated in the bladder, there is an urge to void it.
- The usual daily amount of urine excreted by a normal adult is 1200 to 1500 mL.
- The urine is retained in the bladder by an internal sphincter (the sphincter vesicae) which is located at the opening of the bladder into the urethra.
- In the female the urethral orifice is a vertical, slit like or irregularly avoid opening, 4 or 5 mm in diameter.
- It is located between the clitoris and the vaginal opening.
- The urge to void is due to sensory stimulation in the bladder itself caused by the pressure of urine, the chemical comp$^{0}$" sition of urine, or reflex stimulation.
- Urination in a healthy ad\|toV5 a veluftfery act. The bladder is emptied by contraction of its muscles.
- if an infection is present in the one part of urinary tract/ it jnay travel to another part because the mucous membrane is continuous from the urethra up to the pelvis of the kidney.
- The urinary tract gives favorable condition to multiply the Ig pucro-organisms, because the tract is dark moist and warm.
- Cystitis may occur due to highly concentrated urine or by irritating drugs used in the irrigation and instillation, by bacteria, by injury, or by obstruction of the flow of urine.
- Colon bacilli commonly cause the urinary infection.
- The staphylococci, the streptococci, the gonococci, the typhoid bacilli and the tubercle bacilli are:
- Responsible for bladder infection.
- Patients with typhoid fever excrete typhoid bacilli in the urine, so disinfect the urine of these patients.
- Bedpans are sterilized between patients by steam in bedpan sterilizers.
- Disinfect or wash the bedpans between uses by the same patient.
- Pascal's principle states that increase in pressure on any portion of a confined liquid is transmitted undiminished to all parts of the liquid. If a large quantity of urine collects in the bladder pressure on adjacent organs may cause pain.
- Heat is carried to organs and tissues adjacent to the bladder by conduction through tissues.
- The hot water bag may be applied over the lower abdomen or a warm solution poured over vulva to give warmth.
- Cold contracts tissue, so cool water should be used over the vulva or putting the hands in the cold water will help in contracting the bladder muscle to produce urination.
- Urine contains about 95 percent of water and 3.7 percent organic and 1.3 percent

inorganic wastes.

- The colour of the urine is due to urochrome. **A** brown colour of urine is due to an excess of bilirubin.
- The odour of fresh urine is faintly aromatic due to the presence of urinod.
- The specific gravity of urine is 1010 to 1025. It is measured by the urinometer.
- Reaction of the normal urine is slightly acidic pH below 7.

**PROCEDURE**

Dip the strip into the container of urine for time as per indicated on the strip container and compare the change of **colour of** reagent area of strips with the colour indicator chart on the strip container.

.

The routine urinalysis includes chemical testing for pH/ protein, glucose, ketones, occult blood, bilirubin, urobilinogen nitrite, leukocyte esterase, and strip test method for specific gravity. The urinalysis offered By laboratories depends on the type of dipstick that is used. Completion of urine chemistry using reagent test strips occurs in 2 minutes. Several brands $_0$f dipsticks are available worldwide.

A reagent strip, also called a dipstick, is a narrow strip of plastic with small pads attached to it. Each pad contains reagents for a different reaction, thus allowing for the simultaneous determination of several tests. The colors generated on each reagent pad vary according to the concentration of the analyte present. Colors generated by each pad are visually compared against a range of colors on brand specific colour charts. The manual method for using a reagent strip to test urine calls for dipping the entire strip into the specimen and withdrawing it in one continuous motion while removing excess urine by dragging across the edge of the specimen container. A critical requirement is that the reactions be read at the prescribed time after dipping and then compared closely with the colour chart provided by the manufacturer.

To obtain accurate and reliable results with the dipsticks, certain precautions must be taken to help maintain the reactivity of the reagents. The strips must not be exposed to moisture, direct sunlight, heat, or volatile substances; and they should be stored in their original containers.

The container should not be kept in the refrigerator nor exposed to temperatures over 30°C. Each vial or bottle contains a desiccant, but the strips should still not be exposed to moisture. Remove only the number of strips needed at the time of testing and then tightly close the container.

If the colour blocks on the strip do not resemble the negative blocks on the colour chart or if the expiration date on the container has past, discard the strips. Urine should be tested at room temperature. If the urine specimen has been refrigerated, it should be brought to room temperature before testing. The procedure for using the dipstick is as follows:

- Ask the patient to collect the midstream urine in a clean urine sample bottle.

- Wear gloves and take out the urine dipstick from the test kit..
- Completely dip the test areas of the strip in fresh, well mixed, uncentrifuged urine and remove immediately.
- Care should be taken not to touch the test areas. Remove the excess urine from the stick by touching the edge of the strip to the urine container. Follow the manufacturer's requirement for maintaining the reagent strip in either a horizontal or vertical position.
- At the correct times, compare the test areas with the corresponding colour charts on the container. The strip should be read in good lighting for accurate colour comparison.
- Record results as prescribed protocol. Several brands of urine chemistry dipsticks are compared in this text. The reagents used for these dipsticks vary according to manufacturer. The reagents for each parameter measured by these manufacturers along with their sensitivities are listed in tables that appear with the discussion of each parameter. Although examples of each parameter's colour reactions are also included, they portray the results obtained by only one manufacturer. Chemical reaction colors vary slightly as do the timing of the reactions.

**Urine analysis**

**INTERPRETATION OF RESULTS**:

| | |
|---|---|
| Blue liquid with no deposit | Absence of sugar |
| Green liquid without deposit | 1% |
| Green liquid with yellow deposit | 2% |
| Colourless liquid with orange deposit | 3% |
| Brick red | Above 5% |

These tests can be carried by using strips available **in** the market. When it is planned to use strips, spirit lamp **and** matchbox is not required in the articles.

**. AFTER CARE**

- After completion of procedure discard urine, clean the test tube..
- Hand washing before and after completion of procedure is important..

Record **the** results in your book and in **a** book **maintained** by the patient