KEYWORDS URINALYSIS ● ASSESSMENT ● URINE

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PATIENT ASSESSMENT

PART 6 – URINALYSIS

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Urinalysis is a simple, cost-effective procedure that may be undertaken as part of a health assessment to identify a change in physiological status. It can reveal diseases that have gone unnoticed because they do not produce striking signs or symptoms, and may also be used in the ongoing management of conditions such as diabetes.

Urinalysis using reagent sticks should complement a basic assessment of urine volume and characteristics.

PROFESSIONAL RESPONSIBILITIES

This procedure should be undertaken only after approved training, supervised practice and competency assessment, and carried out in accordance with local policies and protocols.

BACKGROUND PHYSIOLOGY

The kidneys filter approximately 180L of plasma per day. The final volume of urine produced as a result of this process is approximately 1,000–1,500ml.

The processes of ultrafiltration, tubular reabsorption and tubular secretion ensure that vital substances such as glucose, amino acids and electrolytes are conserved as required, and that waste products such as urea, creatinine and surplus substances are excreted in the urine. Water is also conserved or excreted as required.

Normal characteristics of urine

Urine is a clear, straw-coloured fluid. The more concentrated the urine, the more yellow and darker it becomes (Dougherty and Lister, 2004). It may have no particular smell, or a slight aroma that may alter as a result of disease, concentration or time stored in the bladder. The pH of urine is slightly acidic (approximately 5–6).

The normal composition of urine includes: water, urea, creatinine, sodium, potassium, organic acids, protein, small traces of glucose and protein, and cellular components.

URINE SPECIMENS

Urine samples should be collected using 'clean-catch' midstream sampling, which ensures that any bacteria present in the urethra are washed away in the first portion of urine (Higgins, 2000).

Patients may need assistance or education to provide an optimal specimen. Catheter specimens of urine should be collected using an aseptic technique in order to avoid contamination.

Any urine for analysis should be as fresh as possible as ongoing bacterial multiplication can occur. Receivers used in collection should be sterile to avoid specimen contamination.

Basic analysis

Basic urinalysis should include observing the urine's colour and consistency. Any cloudiness or debris may indicate the presence of abnormal cells or disease.

The aroma of the urine should be noted. A slightly 'fishy' smell may indicate infective processes whereas a 'pear drop' aroma may indicate the presence of ketones. These properties should be considered with reference to clinical condition, urine output and fluid balance records over the past 24 hours.

Reagent sticks

Dipsticks are paper or plastic strips impregnated with chemicals. These are immersed in the urine sample and read against a reference guide to provide an indicator of the presence (or amount) of a certain substance.

Dipsticks are used in a preliminary patient assessment and can alert the practitioner to the presence of a wide variety of substances. A wide range of dipstick products are available on the market, which can be used to test various parameters.

A common range of tests form part of a general 'dipstick' urine analysis. These tests include:

- Blood/haemoglobin – the presence of which may indicate trauma;
- Erythrocytes – the presence of which may indicate bleeding in the genital-urinary tract, kidney stones or infection;
- White blood cells – the presence of which may indicate infection;
- pH – the acidity or alkalinity of urine;
- Glucose – may indicate hyperglycaemia;
- Ketones – may indicate keto-acidotic states or starvation;
- Protein – may indicate hypertension, kidney or heart dysfunction, or infection.

THE PROCEDURE

Ensure that you have the correct equipment – urine dipsticks, disposable gloves and apron, sterile receiver and disposable towel.

- Obtain informed consent for procedure;
- Provide any necessary patient education with regard to specimen collection;
- Check manufacturer's recommendations;
- Check product expiry date;
- Wash hands. Don gloves and apron;
- Collect a midstream urine sample or catheter specimen from the patient using a sterile receiver and in accordance with organisational policy (Figs 1 and 2);
- Remove reagent dipstick and immediately replace cap;
- Immerse the dipstick into urine, then remove (the duration that the dipstick remains in the urine is governed by manufacturer's recommendations) (Fig 3);
- Wait for appropriate length of time;
- Wipe the edge of the strip against the rim of the vessel in order to remove any excess urine (Fig 4). Dab the long edge and then the back of the test strip on an absorbent surface such as a paper towel;
- Hold dipstick at a slight angle. This prevents pad-to-pad contamination;
- Read the reagent pads against the reference guide (Fig 5);
- Dispose of urine and dipstick as with organisational policy;
- Remove gloves and apron. Wash hands;
- Document results (Fig 6). ■

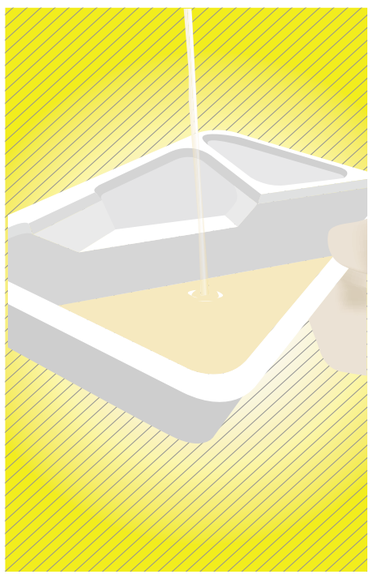

Fig 1. Collect a midstream specimen of urine using a sterile receiver

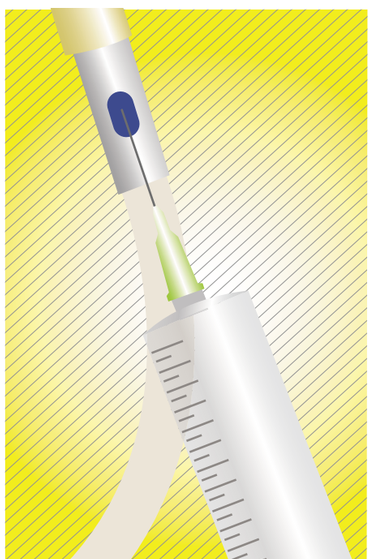

Fig 2. Collect a catheter specimen of urine using aseptic technique

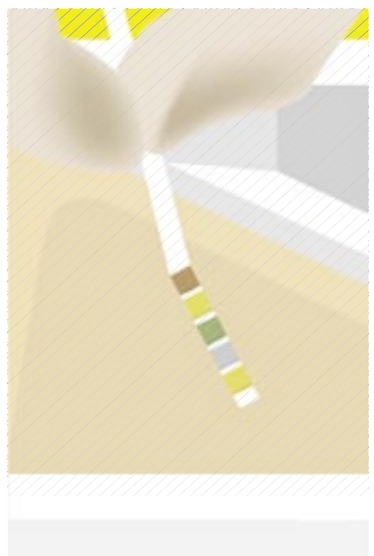

Fig 3. Immerse the dipstick in urine, remove

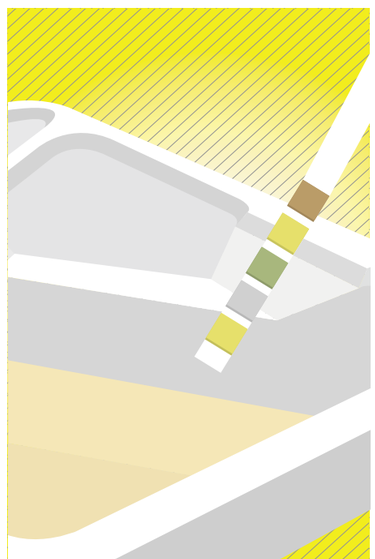

Fig 4. Wipe the edge of the dipstick against vessel edge

Fig 5. Read the dipstick against the reference guide

Fig 6. Document the results, report as necessary

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Higgins, C. (2000) Microbiology testing. In: *Understanding Laboratory Investigations.* Oxford: Blackwell Science.