

Renal function tests

Glomerular function

1. Filtration of water and small solutes (GFR)
2. Filtration barrier to macromolecules (proteinuria)
3. Continuity glomerular capillary wall (haematuria)

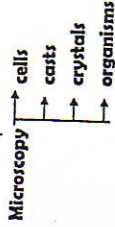
Tubular function:

1. Reabsorption defects of water or solutes
2. Secretion of solutes
3. Urinary concentration
4. Amonia excretion
5. Free water excretion

Renal function tests

Clinical evaluation of renal function

1. Glomerular function
2. Tubular function



- Red cells
- Polymorphonuclear cells
- Eosinophils
- Lymphocytes
- Tubular epithelial cells
- Oval fat bodies
- Casts
 - Hyaline
 - Red cell cast
 - Polymorphonuclear cell, cast, epithelial
 - Tubular cell cast
 - Eosinophil cast
 - Granular cell cast
 - Waxy cast
- Lipid drops
- Crystals
- Other
 - spermatozoa
 - mucous
 - threads
 - fibers
 - hair etc.

- 10 ml Urine in tube
- Centrifuge at 3000 rps for 3 to 5 minutes
- Supernatant into separate tube (9-9.5ml)
- Sediment mixed then pipetted onto slide
- Supernatant test - dipstick for protein, glucose, haemo pigments leucocytes nitrate, pH, Leucocyte esterase, Billirubin, urobilinogen and concentration (56)
- Consider sulfosalicylic acid for all proteins (SSA)

- Major noninvasive diagnostic tool
- Urine specimen should be examined within 30 to 60 minutes of voiding
- Midstream specimen in men
- Females - external genitalia must be cleaned to avoid contamination with vaginal secretions

renal disease patients

❖ Variety of different clinical presentations

❖ Extrarenal symptoms

❖ Asymptomatic

(1) Elevated plasma creatinine

(2) Abnormal urinalysis

(3) Abnormal GFR

RENAL DISEASE PRESENT:

1) DEGREE of renal dysfunction

2) Follow the COURSE of disease

(i) Improvement

(ii) Progression

(iii) Stable

* Most important factor = Is GFR changing or is it stable !!

CLEARANCE

- 1) Incomplete urine collection
- 2) Increasing creatinine secretion

MORE ACCURATE:

- Inulin
- Iothalamate
- DTPA
- EDTA
- Cystatin C

OVERVIEW OF RENAL FUNCTION

Stages of Chronic Kidney Disease†

Stage	Description	GFR (mL/min/1.73m ²)
1	Kidney damage with normal or ↑ GFR	≥90
2	Kidney damage with mild ↓ GFR	60-89
3	Moderate ↓ GFR	30-59
4	Severe ↓ GFR	15-29
5	Kidney failure	<15 (or dialysis)

Chronic kidney disease is defined as either kidney damage or GFR <60 mL/min/1.73 m² for 3 months. Kidney damage is defined as pathologic abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies.

RENAL FUNCTION TESTS:

EVALUATION OF THE GLOMERULAR FILTRATION RATE:

- ❖ Rough measure of the number of functioning nephrons.
- ❖ No exact correlation between loss of renal mass and loss of renal function.
- ❖ Kidneys adapt:

Compensatory hyperfiltration

SOME FUNCTIONS ❖ Decreased or absent

ALL FUNCTIONS ❖ Decreased or absent

Renal function tests

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References:
 Kid. Int 1990; 38: 167
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 J Hypertens 1999; 17: 309
 Am J Med 1962; 32: 65