**LECTURE SYLLABUS**

**(General medicine)**

**Pathophysiology of the kidneys**

1. **INTRODUCTION**

General characteristics of renal diseases, relationship between structure and function

Nefron – basic morphological and functional unit of the kidneys.

Glomerular filtration and tubular resorption

Renal regulation of blood pressure (system renin – angiotensin)

1. **CATEGORIZATION OF RENAL DISEASES**

Prerenal disease - resulting from inadequate blood flow to the kidney

Intrarenal disease – disorders that result in damage to the nephron (directly rather than indirectly)

Postrenal disease – related to urinary tract obstruction

1. **ACUTE RENAL FAILURE (ARF)**

Characteristics: disorders of heterogeneous origin with rapid deterioration of renal function resulting in accumulation in the blood of nitrogenous wastes.

Etiology: hypovolemia, cardiovascular failure, extrarenal obstruction, intrarenal obstruction, bladder rupture, vascular diseases, glomerulonephritis, interstitial nephritis, postischemic, pigment-induced, poison-induced, pregnancy-related.

Pathogeny: initial injury, tubular necrosis, reversibility and irreversibility, theories (vascular, tubular).

Clinical manifestations:

Symptoms – objective, subjective

Laboratory findings in prerenal azotemia and tubular necrosis.

1. **CHRONIC RENAL FAILURE (CHRF)**

Characteristics: long-term insufficiency of progressive nature that causes additional deterioration of others tissues and organs.

Etiology: most common causes – diabetes mellitus, hypertension, glomerulonephritis Pathogeney: differences between acute and chronic type of renal failure;

Irreversible loss of nephrons, glomerular sclerosis, uremia

Uremia is characterized by the effect of: higher degree of azotemia,

Clinical manifestations:

Sodium balance and water volume status disturbances, potassium balance disturbance

(hyperkalemia), metabolic acidosis, mineral and bone abnormalities, cardiovascular and pulmonary abnormalities, hematologic abnormalities, neuromuscular abnormalities, gastrointestinal abnormalities, endocrine and metabolic abnormalities, dermatologic abnormalities.

1. **GLOMERULONEPHRITIS AND NEPHROTIC SYNDROME**

Characteristics: disorders with structural alterations of the glomerulus and with the followings: hematuria, proteinuria, reduced GFR, and hypertension.

Disorders are divided into five categories:

1) Acute glomerulonephritis

2) Rapidly progressive glomerulonephritis

3) Chronic glomerulonephritis

4) Nephrotic syndrome

5) Asymptomatic urinary abnormalities

Etiology: infectious diseases (pharyngeal or cutaneous) typically in acute glomerulonephritis not yet clear origin in chronic glomerulonephritis and nephrotic syndrome IgA nephropathy in asymptomatic urinary abnormalities.

Pathogeny: individual forms of glomerulonephritis and nephrotic syndrome probably represents a different degree of immune-mediated renal damage.

Clinical manifestations:

Hematuria, proteinuria, edema, hypertension, fall of GFR, a transient fall in serum complement and an elevation of titer of antibody to streptococcal antigens are typical signs in glomerulonephritis.

Nephrotic syndrome is characterized by decreased plasma oncotic pressures and by activated renin-angiotensin-aldosterone system, the sympathetic nervous system with signs of intravascular volume depletion, syncope, shock and ARF. Loss of other plasma proteins besides albumin causes: defect in bacterial opsonization, hypercoagulability, vitamin D deficiency, altered thyroid function.

1. **RENAL STONES**

Etiology: Idiopathic hypercalciuria, hyperuricosuria and hyperparathyreoidism, purine containing diet, defective amino acid transport, chronic urinary tract infection.

Pathogeny: alterations in dynamics of solubility in urine, nucleation and precipitation.

Clinical manifestations

Flank pain, hematuria and even ureteral obstruction.

Complications: hydronephrosis, infection, renal damage, hypertension (renin production by the obstructed kidney).

1. **SUBSTITUTION OF RENAL FUNCTION**

Hemodialysis

Peritoneal dialysis

Hemoperfusion

Plasmapheresis