GENERAL OBJECTIVES

Students must distinguish between normal and pathological situations in relation to the Renal System and Male Genital Apparatus. On the pathological side, students must recognize the signs and symptoms that identify specific diseases or nosological entities, using them to focus the general diagnostic process.

For each entity students must know the corresponding causes (etiopathology), production mechanisms (pathology), alterations produced in normal functioning (physiopathology), structural lesions (morphopathy), clinical manifestations (signs and symptoms), examinations required for diagnosis (basic and complementary), differential diagnosis, prognosis, prophylaxis (prevention) and treatment. Given that the Renal System is involved in a large number of hydroelectrolytic alterations, changes in the acid-base balance and arterial hypertension, the course will also cover topics related to such alterations and pathologies.

To be able to recognize all of these traits in the patient, students must know how to compile a directed clinical history, decide upon the appropriateness of different tests and prioritize according to profitability, availability, contraindication and cost. In terms of treatment, students must identify urgency, chronicity and terminal or irreversible situations. For the latter two, it is necessary to know the limitations of palliative or symptomatic treatment. Similarly, students must identify procedures that should be referred to specialists and those that display criteria for urgent treatment and/or hospital admission or require an instrumental or surgical approach.

SPECIFIC OBJECTIVES

A. At the end of the training process, students must be able to identify the principal problems of the Renal System and Male Genital Apparatus, specifically in:

1. Dehydrations
2. Edema
3. Proteinuria
4. Oliguria-anuria-polyuria, nocturia
5. Renal insufficiency
6. Hematuria
7. Pneumaturia and fecaluria
8. Hematospermia and urethrorrhagia
9. Miction disorders
10. Urinary infection
11. Sepsis of urological origin
12. Nephritic lumbar-renal-colic pain
13. Vesicular-urethral-perineal-tenesmic pain
14. Testicular pain-inflammation-tumor
15. Enuresis and incontinence
16. Acute and chronic urine retention
17. Erection and ejaculation disorders
18. Infertility
19. Genito-urinary lesions and trauma
20. Incidental urogenital masses
21. Arterial hypertension

B. Students must know the theoretical bases of diagnostic methods used in relation to the Renal System and Male Genital Apparatus, specifically in:

1. Physical examination: hemodynamic and cardiopulmonary assessment, state of hydration, abdominal palpation and external genitals. Skin. Neurological evaluation
3. Urine analysis: proteinuria, sediment, culture, mineral calculation and cytology
4. Renal function: glomerular filtrate, renal plasma flow, urinary acidification, concentration-dilution of urine
5. General laboratory data: ionogram and osmolality, calcium, phosphorus and magnesium, acid-base balance. Hematological parameters and proteinogram. Immunological parameters: complement system and markers of systemic disease
6. Hormonal data: Suprarenal, renin-angiotensin-aldosterone axis, thyroidal and parathyroidal, hypophyseal and gonadal
7. Radiological examination: Simple X-ray, pyelography, cystourethrography, angiography
8. Ecography, eco-Doppler, CAT and MR applied to study of the renal system and male genital apparatus
9. Isotopic examination: renogram, renal gammagraphy and angiogammagraphy. Isotopic study of renal function
10. Endourology: cystoscopy and other endoscopic examinations
11. Renal biopsy: methodology, indications and interpretation of results
12. Urogenital biopsy: methodology, indications and interpretation of results
13. Measurement of arterial tension: vascular murmurs, oscillometry
14. The back of the eye: examination and assessment
15. Tumor markers
16. Urodynamic study
17. Penile function
18. Genital laboratory analysis: seminogram, cariotype and cytogenetics

Students will be expected to have acquired basic knowledge of the identification of problems and certain diagnostic methods as prerequisites for this subject, covered in the course on "General Semiology and Clinical Propedeutics".

C. Students must know the diagnosis and medico-surgical therapeutics of the principal diseases of the Renal System and Male Genital Apparatus, specifically in:

1. Changes in body hydration
2. Changes in extracellular osmolarity: natremia
3. Changes in kalemia
4. Metabolic changes in the acid-base balance
5. Changes in phospho-calcium metabolism
6. Acute renal insufficiency
7. Immunopathology of glomerulonephritis
8. Nephrotic syndrome
9. Acute and chronic glomerulonephritis
10. Chronic renal insufficiency: physiopathology, clinical aspects, treatment and dialysis
11. Use of drugs in renal insufficiency. Nephrotoxicity
12. Secondary and systemic disease nephropathies
13. Interstitial nephropathies and pyelonephritis
14. Parenchymatous vascular nephropathies
15. Pathology of the large renal vessels
16. Tubulopathies
17. Renal cystic diseases
18. Hereditary renal diseases
19. Urinary infection
20. Specific infections of the urogenital apparatus: tuberculosis and parasitosis
22. Cystitis
23. Urinary obstruction
24. Renoureteral anomalies: embryology and congenital anomalies
25. Vesicoureteral reflux
26. Urethral affections
27. Affections of the penis
28. Affections of the testicles, epididymis and scrotum: inflammations and tumors
29. Renal lithiasis
30. Renal tumors
31. Vesicular and urothelial tumors
32. Affections of the prostate: inflammations and tumors
33. Urinary incontinence
34. Genitourinary trauma. Urinary fistulae
35. Urogenital iatrogeny
36. Kidney transplantation
37. Retroperitoneal pathology: inflammatory and tumor
38. Male infertility
39. Impotence, priapism and plastic induration of the cavernous bodies
40. Systemic arterial hypertension: physiopathology
41. Hypertension syndrome
42. Recognizing the causes of AHT: primary and secondary
43. Consequences of AHT. Accelerated AHT
44. Treatment of AHT, pharmacological bases. Hypertensive emergencies
45. AHT and renal disease. AHT and pregnancy

D) Students should have acquired the following skills:

- The ability to obtain a complete, directed anamnesis which includes the reason for the consultation and identification of the principal symptoms of the patient's current illness. Students should be able to recognize the illness individually or as part of a clinical syndrome that determines the diagnostic examinations required. Students should also be able to situate the process at hand in the context of family (hereditary conditions) and personal medical history (previous conditions or that coincide with the current disease). Students will know how to question patients about sexual dysfunctions and anomalies.

- The ability to use physical examination to recognize the most important signs of pathology of the urinary apparatus and the effects of dysfunction on the rest of the body. Students should be able to recognize the degree of hydration of the body (dehydration and edema) and the most common manifestations of changes in the composition of body fluids. Palpation of the abdomen, paying particular attention to masses in contact with the lumbar region and the presence of bladder globus. Lumbar fist percussion. Digital rectal examination in order to identify prostate changes. Assessment of the genital apparatus paying special attention to testicular changes. Accurate examination of the inguinal areas.

- Assessment of the volume and characteristics of discharged urine. Recognition of macroscopic hematuria. Inserting a bladder probe in male and female patients. Catheterization and calibration of pathways (probes and bougies).

- Correct determination of arterial pressure. Using different types of sphygmomanometer. Oscillometry.
• Evaluation of **laboratory data.** Evaluation of urine tests (proteinuria, urinary sediment and urine culture) and data that indicate renal dysfunction (urea nitrogen in the blood, serum creatinine, ionogram, acid-base balance, calcemia and phosphoremia). Interpretation of the results of renal function tests (endogenous creatinine clearance, concentration-dilution test, urine acidification capacity).

• Interpretation of **simple abdominal radiography** and the ability to recognize renal silhouettes and the presence of stones in the urinary tract.

• Interpretation of an **intravenous urography** and the ability to recognize the principal abnormalities (obstruction, dilation of pathways, extrinsic compressions, functional annulation...)

• Interpretation of **anatomopathological reports** relating to both primary renal illnesses and renal affection in systemic diseases. Students will also know how to assess tumor pathology of the kidney, urinary pathways, prostate and testicle.

• "Essential" interpretation of results and reports of the following specialized examinations:
  
  a) **Radiology of the genital apparatus:** deferens vesiculography.
  
  b) **Cystourethrographies** and variations.
  
  c) **Ecography:** renal, bladder, prostate and vesicular. Abdominal and transrectal ecography, eco-Doppler of renal vessels and testicles.
  
  
  e) **Renogram and renal and testicular gammagraphy.**
  
  f) **Urodynamics.**
  
  g) **Instrumental endoscopic examination:** endoscopic catheterization.
  
  h) **Biopsy of the kidney and urogenital apparatus.**
  
  i) **CAT, MR of the kidney and male genital apparatus.**
  
  j) **Urological surgery.**
  
  k) **Seminogram.**
  
  l) **Nocturnal penile tumescence test.**

**PROGRAMME**

**A) IDENTIFICATION OF PROBLEMS**

1. Electrolytic changes
   Identify the principal clinical manifestations associated with changes in the volume and composition of the extracellular medium (dehydration and edema) and the significance of variations in the concentration of sodium, potassium and the plasma acid-base balance. Orient the differential diagnosis of the principal etiologies. Identification of emergency situations and procedures to follow.

2. Oliguria, Anuria and Polyuria
   Recognize changes in urine volume and the relation with daily liquid intake. Distinguish physiological oliguria from other causes of oliguria. Identify anuria due to obstruction. Differentiate true polyuria from pollakiuria and nocturia.

3. Proteinuria and Hematuria
   Identify the presence of proteins in the urine and the normal limits (physiological proteinuria). Recognize the intermittent or permanent character of a proteinuria and its quantification in 24-hour urine (discrete, moderate or nephrotic proteinuria). Identify macroscopic hematuria and distinguish it from other causes of abnormal coloration of the urine. Identify the differential diagnosis between hematuria of renal origin and types originating other parts of the urinary system. Recognize microscopic hematuria and the data that support its origin in the nephron (dysmorphic red blood cells and hematic cylinders). Identify the correct etiological diagnosis of hematuria and distinguish the traumatic, inflammatory, tumor and secondary origin of hemostasis changes.
4. Renal edema. Nephrotic syndrome
Recognize edema of renal origin, establishing the differential diagnosis with other principal causes of generalized edema (cardiac, hepatic). Recognize the difference between renal edema associated with massive proteinuria and renal edema associated with a decrease in glomerular filtration. Identify nephrotic syndrome through its principal signs and symptoms (massive proteinuria, hypoalbuminemia, hyperlipemia and edema). Identify the most frequent complications of nephrotic syndrome (infections, thromboembolism and others). Determine the examinations required for a patient with nephrotic syndrome.

5. Renal insufficiency
Recognize the clinical symptoms of deficient renal function and the laboratory data that confirm the decrease of glomerular filtration. Distinguish between the acute or chronic character of renal insufficiency. Identify the differential diagnosis between acute renal insufficiency and cases of prerenal (functional), renal or postrenal (obstructive) origin. Establish the degree of severity of a chronic renal insufficiency and identify the presence of factors that accelerate its progression. Identify potentially lethal complications (hyperkalemia) and know the immediate procedure to follow. Recognize situations that require substitution treatment with dialysis.

6. Urinary infection
Recognize the signs and symptoms of infection of the urinary apparatus (dysuria, pollakiuria, urgent urination). Identify the symptoms of a specific localization of the infection (cystitis, prostatitis, pyelonephritis) and/or manifestations of systemic repercussion (fever, sepsis of urinary origin). Bacteriological criteria of urinary infection. Identify the risk factors for urinary infections. Distinguish between specific (tuberculosis and others) and non-specific infections.

Identify renal pain and identify the differential diagnosis of localized pain in the lumber region. Recognize the specific characteristics of typical and atypical nephrotic colic and its accompanying manifestations. Identify the different types of radiated pain originating in the urinary pathway according to the degree of obstruction.

8. Urination disorders
Recognize changes in the rhythm, quality and control of urination.

9. Acute urine retention and chronic urine retention
Urinary obstruction. Recognize the presence of an acute urine retention and differentiate it from a renal anuria or oliguria. Identify the correct differential diagnosis between the obstructive and non-obstructive causes of oligoanuria. Recognize the existence of a chronic urine retention and differentiate it from oliguria, pollakiuria and incontinence. Recognize the symptoms of an obstruction of the urinary system, both in its upper portion (kidney, ureter) and the lower urinary tract (bladder, urethra). Establish the degree of severity of the obstruction and know the factors that cause more serious consequences: Degree, duration and infection.

10. Urinary lithiasis
Recognize the presence of stones in the urinary pathway through either clinical symptomatology (suspicion) or the appropriate complementary studies: simple abdominal X-ray, ecography, intravenous urography. Identify the circumstances that aggravate lithiasic disease. Lithiasic disease: Obstruction and infection. Know the different types of stones and determine their etiological diagnoses.

11. Prostatism
Recognize the clinical symptoms of a clinical and progressive obstruction of the lower urinary tract. Identify the point at which prostatism develops through clinical procedures and complementary examinations. Notion of the epidemiological importance of prostatism.

12. Testicular pain
Know the importance of testicular pain as a potential medical emergency. Determine the differential diagnosis between pain due to torsion, inflammation and the presence of tumors.

13. Increase in testicular size
Determine the differential diagnosis between an increase in scrotal content without testicular participation (hydrocele, hernia) and an increase in testicular size due to inflammation, trauma or the presence of tumors.

14. Male infertility
Identify infertile patients by obtaining a correct clinical history. Determine the examinations required to identify the cause of infertility.

15. Impotentia coeundi
Use clinical histories to identify patients suffering from impotence and determine the differential diagnosis between cases with psychogenic and organic causes.
16. **Traumatic injuries and loss of continuity of the kidney and the urinary pathways**
Use clinical histories and physical examination to identify patients suspected of suffering a kidney or urinary tract complaint. Determine the examinations needed in order to narrow the diagnosis and assess its importance. Detect the urgency of treatment.

17. **Oncological risk factors in the renal system and male genitalia**
Know the principal epidemiological and genetic risk factors of developing a urothelial tumor, bladder tumor, testicular tumor and penile neoplasia.

18. **Arterial hypertension**
Correctly identify hypertension patients through appropriate physical examination. Distinguish the different grades and types of hypertension and the principal clinical manifestations of its effects on the organs. Recognize the principal cardiovascular risk factors associated with arterial hypertension. Determine the examinations required to identify its etiology. Use of appropriate antihypertensive drugs. Detect the urgency of antihypertensive treatment. Identify hypertensive crisis and know the immediate procedure to follow.

**B) DIAGNOSTIC METHODS**

1. **Physical examination**

2. **Urine analysis**

3. **Renal function tests**
Value of blood urea nitrogen (BUN) and serum creatinine concentrations as indices of renal function. Unrelated variations. Basis of renal clearance tests. Value of creatinine clearance and/or inulin clearance as measures of glomerular filtration. Basis of tests to measure renal concentration and dilution capacity. Tests to measure renal acidification capacity. Indications.

4. **Ionogram, acid-base balance and osmolarity**

5. **Hormonal determinations**
Interpretation of hormonal determinations related to both hydro-electric disorders and arterial hypertension (ADH, aldosterone, suprarenal hormones, renin). Male hormones.

6. **Tumor markers**
Specific (PSA) and non-specific markers. Diagnostic markers and evolution markers.

7. **Seminogram**
Indication of the seminogram. Normality criteria. Diagnostic aid.

8. **Urine cytology**
Bases of the cytological study of urinary sediment. Indications. Diagnostic precision.

9. **Ecography and eco-Doppler**

10. **Radiology of the genital apparatus**
Simple abdominal radiology and tomography without contrast injection. Current indications for intravenous urography and variants (IVU. Indications for renal arteriography and digital subtraction angiography (DIVAS). Cathography. Indications for computerized axial tomography (CAT) in renal conditions. Risks of using contrast me-
Diseases of the renal system and male genitalia

11. Ureterocystography and micturition cystourethrography
Methodology for contrast study of the common urinary tract. Indication and evaluation of results.

12. Translumbar percutaneous puncture and anterograde pyelography
Methodology of translumbar renal puncture. Indications and use as a procedure for study of the urinary tract in special cases.

13. Isotopic examinations

14. Telethermography

15. Endoscopic diagnostic procedures

16. Chevassu: Retrograde ureteropyelography
Concept of study of the upper urinary tract using retrograde contrast injection into the urinary pathway. Indications and interpretation of results.

17. Biopsy of the urogenital apparatus. Prostate biopsy
Indications and methodology for urogenital biopsy. Indications for cutaneous biopsy. Types, risk and sensitivity. Usefulness of biopsy.

18. Renal biopsy

19. Fine needle puncture-aspiration
Puncture-aspiration of masses in the renal system and male genital apparatus. Indications, risks and diagnostic possibilities.

20. Nocturnal penile tumescence test
Methodology for the study of the nocturnal penile tumescence test. Indications and interpretation of results.

21. Laparoscopy

C) DIAGNOSIS AND TREATMENT OF RENAL DISEASES

1. Changes in hydrosaline metabolism

2. Changes in potassium metabolism

3. Metabolic changes in the acid-base balance
Metabolic acidosis, types: with increased anion gap or hyperchloremia, etiology and differential diagnosis, treatment. Metabolic alkalosis, generating and maintenance factors. Etiology and differential diagnosis of its causes. Treatment.
4. Changes in phospho-calcium metabolism

5. Acute renal insufficiency

6. Glomerular nephropathies

7. Urinary and genital infection

8. Interstitial nephropathies

9. Tubulopathies

10. Congenital anomalies and cystic renal diseases
11. Urinary lithiasis

12. Vascular nephropathies

13. Chronic renal insufficiency

14. Use of drugs in Renal Insufficiency

15. Arterial hypertension

16. Renal tumors

17. Urothelial tumors: Upper urothelium, bladder and urethra

18. Prostate tumors

19. Testicular tumors

20. Physiopathology of urination

21. Urinary obstruction

22. Prostatism

23. Urological trauma

24. Renovascular pathology. Renovascular hypertension

25. Kidney transplantation

26. Male infertility and erection changes.

TEACHING STRUCTURE

UNIT RESPONSIBLE for teaching unit: Nephrology (N), Urology (U), Pathological Anatomy (PA), Radiology and Physical Medicine (RPM), Microbiology (M), Pharmacology (F).

Theory classes (80 students)

1. **Changes in sodium metabolism**: Physiopathology of the body compartments. Hyponatremia: etiological diagnosis, clinical manifestations and therapeutic schemes. Hypernatremia: etiological diagnosis, clinical manifestations and therapeutic schemes. (N)
5. **Acute renal insufficiency:** Classification, physiopathology, differential diagnosis. Clinical manifestations and therapeutic procedures. (N)
6. **Glomerulonephritis:** Basic pathogeny and classification. Acute glomerulonephritis: types, diagnostic and therapeutic scheme. (N)
7. **Primary chronic glomerulonephritis:** clinical and histological classification, diagnostic scheme and therapeutic bases. SnoN, MCGN, IgA Nephropathy, MGN. (N)
8. **Secondary Nephropathies:** SLE, Goodpasture Syndrome, Schönlein Henoch Syndrome, systemic cryoglobulinemia and vasculitis, renal manifestations, diagnostic criteria and therapeutic bases, (N).
9. **Interstitial and cystic nephropathies:** Polycystic kidney disease. (N)
10. **Chronic renal insufficiency:** Concept and physiopathology. Epidemiology. Clinical characteristics and analytical data. Therapeutic procedures.
11. **Arterial hypertension:** Epidemiology and classification. Basic physiopathology and visceral effects. Nephroangiosclerosis. (N)
12. **Arterial hypertension:** Diagnosis of secondary forms. Malignant AHT and hypertensive crisis. Therapeutic schemes. (N)
13. **Urological semiology.** (U)
14. **Urinary infection:** Acute pyelonephritis. (U)
15. **Urinary obstruction:** Hydronephrosis. (U)
16. **Urinary lithiasis.** (U)
17. **Benign prostate pathology.** (U)
18. **Prostate cancer.** (U)
19. **Epididymal and testicular pathology:** Testicular tumors. (U)
20. **Renal tumors.** (U)
21. **Urinary bladder tumors.** (U)
22. **Urological trauma.** (U)
23. **Kidney transplantation.** (U)
24. **Male infertility.** (U)
25. **Impotentia coeundi.** (U)

**Clinical seminars (25 students. From 8 am to 9 am.)**

   b) Clinical case: hypernatremia. Focus: diagnostic and treatment algorithm. (N)

   b) Clinical case: metabolic alkalosis. Focus: diagnostic algorithm and treatment determination exercise. (N)

   b) Clinical case: ARI due to toxicity. Focus: diagnosis and extrarenal involvement, other possibilities, ...
   (N)

   b) Clinical case: IgA GN. Focus: Differential diagnosis of proteinuria and hematuria. Indications for renal biopsy. (N)
b) Clinical case: kidney transplantation. Focus: conditions for kidney transplantation, basic surgical and pharmacological procedures. Possible medical complication. (N)

b) Clinical case: diabetic nephropathy. Focus: diabetes and renal conditions, amyloidosis, multiple myeloma. (N)

7.- a) Clinical case: essential AHT. Focus: Examination, risk factors and pharmacological treatment exercise.
b) Clinical case: secondary, renovascular AHT. Focus: Differential diagnosis of hypokalemia and AHT, primary hyperaldosteronism and hypercorticism. Treatment of renovascular AHT. (N)

8.- a) Closed clinical case I.
b) Closed clinical case II. (N)

9.- Neurogenic bladder dysfunctions. (U)

10.- Renal, ureteral and bladder anomalies. (U)

11.- Urological ecography. Prostate biopsy. (U)

12.- Urinary incontinence. (U)

13.- Urological emergencies. (U)

14.- Pathology of the urethra and penis. (U)

15.- Inflammatory and tumor retroperitoneal pathology. (U)

16.- Vesicoureteral reflux. (U)

**Seminars on related topics (40 students)**

1.- Pathological Anatomy: Basic lesions in renal biopsy, interpretation and clinical correlations. (PA)

2.- Pharmacology: Clinical use of diuretics. Mechanism of action, specific indications. Refractory edema. Diuretic associations. (F)

3.- Radiology: Pyelography, ecography, indications and basic interpretation. (RPM)

4.- CAT, MR and AngioMR: indications and basic interpretation. (RPM)

5.- Functional examinations: Renogram, renal gammagraphy, function and renal blood perfusion. Testicular examination. (RPM)

6.- Angiography, revascularization of the renal arteries. Angioplasty, stent and fibrinolysis. (RPM)

7.- Microbiology: Bacteriology of the urinary tract. Therapeutic guidelines. (RPM)

8.- Pharmacology: Drug management in renal Insufficiency. Nephrotoxicity. (F)

9.- Pathological Anatomy: Pathological anatomy of renal tumors, urinary pathways, prostate and testicle. (PA)

**LEARNING REQUIREMENTS, PRIOR KNOWLEDGE AND SELF LEARNING.**

Students will be expected to have acquired basic knowledge of the identification of problems and certain diagnostic methods as prerequisites for this subject, covered in the course on “General Semiology and Clinical
Diseases of the renal system and male genitalia

Propedeutics*. In any case, students will have acquired knowledge of the following specific areas in the first stage of the medical degree course.

1. Hydroelectrolytic homeostasis
2. Sodium metabolism
3. Renal regulation of water and salt
4. Physiopathology of edema
5. Potassium metabolism
6. Phospho-calcium metabolism
8. Hormonal effects on the kidney
9. The kidney as an endocrine organ
10. Embryology of the genitourinary apparatus
14. Mechanisms of action in diuretics
15. Mechanisms of action in antihypertensive drugs
16. Regulation of the immune response
17. Mediation of the immune response
18. Autoimmunity
19. Experimental glomerulonephritis
20. Transplantation immunology
21. Pharmacological immunodepression
22. Immunology laboratory techniques
23. The genetics of hereditary diseases
24. Endocrinology of the suprarenal glands
25. The hypothalmo-hypophyseal axis
26. The testicle as an endocrine organ
27. Physiology and pharmacology of the autonomic nervous system
28. Uropathogenic germs
29. Pulmonary and systemic tuberculosis
30. Oncogenesis