



**MEDICAL UNIVERSITY - PLEVEN  
FACULTY OF MEDICINE**

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**DISTANCE LEARNING CENTRE**

**DEPARTMENT OF “NEPHROLOGY,  
HEMATOLOGY AND GASTROENTEROLOGY”**

# **PRACTICAL EXERCISES – THESES**

**FOR E- LEARNING IN NEPHROLOGY**

**ENGLISH MEDIUM COURSE OF TRAINING**

**SPECIALTY OF MEDICINE**

**ACADEMIC DEGREE: MASTER**

**PROFESSIONAL QUALIFICATION: DOCTOR OF MEDICINE**

**PREPARED BY DEPARTMENT OF NEPHROLOGY**

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# **ACUTE RENAL FAILURE**

## **A. Aim of the exercise.**

The students have to learn how to make the diagnosis of acute renal failure /ARF/ and how to manage the patient in this condition.

Definition: ARF is defined as a syndrome of abrupt and reversible decrease of renal function.

ARF is a subject of this topic because of:

1. ARF is commonly encountered condition in contemporary practice of the medicine.
2. ARF is associated with lot of complications and significant morbidity and mortality.
- 3.

## **B. Diagnostic approach**

### **I. Work with a patient.**

The students have to work with an appropriate patient in 45-minutes. This work includes:

#### **1 Anamnesis.**

- a. taking present history
- b. taking history of past disease
- c. history of coexisting disease.

#### **II. Physical examination of the patient.**

**III. Making some syndromes and working diagnosis on the base of approached data.**

#### **IV. Making the differential diagnosis of ARF.**

**V. The students' suggestions about suitable examinations, which will help them to prove or to refuse the diagnosis of the ARF.**

### **C. The students should have opinion about how to manage patient.**

**D. The resting part of the exercise contains discussion about ARF as general and as a present condition of the examined patient.**

#### **1. Anamnesis.**

The students report, what they have found by anamnesis.

1.1. **Conclusions about the importance of the present history:** Analysis for determination of the underlying disease state and the current clinical events is needed. To make the

correct diagnosis it is very important to ask patient carefully and thoroughly and answer the questions:

**a. Are there clinical features of the ARF?**

- oliguria - diuresis less than 500 ml/24h, or anuria - less than 100 ml/24h; polyuria - more than 2000 ml/24h etc.

**b. Anamnesis for absence of previous renal disease**

**c. Are there one or more causes, which might determine ARF e.g.**

**Causes for prerenal ARF** - Shock with different origin, traumatic and non-traumatic rhabdomyolysis following muscle injury; haemolysis, conditions of peritonitis, ileus, hepatorenal syndrome, etc.

**Renal causes of ARF**- Acute pyelonefritis with or without papillary necrosis; vascular injury as thrombosis of aorta or renal arteries or veins; use of nephrotoxins as antibiotic agents, radiographic contrast material, nonsteroidal anti-inflammatory agents, organic solvents and heavy metals, mushrooms, etc; signs of sepsis and some infectious diseases.

**Notice!** Most frequent causes of ARF in contemporary medicine are shock, sepsis, and nephrotoxins.

In few cases of ARF no specific identifiable causes are found.

**b. Signs of disease or conditions which may be confused with ARF:**

- Chronic renal failure
- Functional oliguria
- Obstructive uropathy

**c. If the patient is in condition of ARF which stage of ARF is?**

- Oliguric stage
- Polyuric stage
- Restored stage

d. **Are there any complications of ARF** as: conditions of hyperhydratation, features of diselectrolytemia, infections /as complications of the third stage/, disorders of gastrointestinal system /Anorexia, nousea, vomiting, upper-gastrointestinal bleeding, etc/, neurological complications, cardio-vascular complications, etc.

e. **Some other data about the patient** as underlying disease, age, etc. which are important some complications or bad development of ARF to be predicted.

**2. Physical examination of the patient.**

The students promote data as a result of their examination of the patient inspection of the patient/s/, which can be of value in determining diagnosis.

a. Presence or absence of prerenal or renal disorders or disease that can cause the ARF.

b. Signs of ARF and its complications.

c. Features of conditions that fall into differential diagnosis of ARF.

Careful and exhaustive physical examination is essential for making a correct diagnosis.

III. The students consolidate all symptoms, they have found out by anamnesis and inspection of the patient into syndromes, e. g.:

- A syndrome of renal injury

- A syndrome of cardiovascular impairment, etc

#### **Working diagnosis.**

After A. to C. steps the students should approach working diagnosis.

Diagnosis of ARF contains four main parts:

1. Condition/s/ or disease, which cause of ARF.

2. Acute renal failure.

3. Stage of acute renal failure.

4. Complications of the ARF.

The students must practice writing the diagnosis of ARF in Latin or English language.

#### **IV. Differential diagnosis.**

The students must know main feature of three others conditions, which are related with azoemia. They are:

1. Chronic renal failure.

2. Prerenal azoemia.

3. Obstructive uropathy.

#### **V. Laboratory and imaging examinations.**

##### **1. Blood examinations:**

- **Hb, Ht, Er** - can be normal or decline in different degree. It depends on main disease and the previous condition of the renal function.

- **Serum urea, creatinin and uric acid** - They are increased in different degree too. It depends on duration of the ARF. Serum urea increases with about 10 mmol/l/24h, and serum creatinin with 100µmol/l/day.

- **State of electrolytes** /K, Na Cl, Ca, P/. There are various possible combinations. They are in a correlation with the underlying disease and the present diuresis of the patient.

- **Acid base disturbance** - metabolic acidosis..

## 2. Urinalysis

- Oliguria, anuria, polyuria
- Proteiuria, urine's sediment

## 3. Functional examination of the kidneys

- Renal concentrating capacity shows isostenuria /a specific gravity weight of urine 1010/.
- Isotope renogram.

## 4. Imaging techniques

- **Ultrasonography** - Ultrasound examination have no contraindications.
- **Roentgen urography** is contraindicated.
- **Renal biopsy** may be considered when the cause of ARF remains unclear - no obvious cause of the ARF, suspicion of systemic disease, prolonged oligo-anuresis.

## C. Treatment of ARF.

**Every patient with ARF must be directed, examined and treated in a hospital - in clinic of Nephrology or of Internal medicine.**

The goal of the treatment of ARF is to restore normal homeostasis and to support it as long as the kidneys recover their anatomical structure and functions.

### 1. Medicamentous treatment.

1.1. **Etiologic therapy**- Purpose of this treatment is to eradicate cause of the ARF if it is possible. For example etiologic treatment is therapy of sepsis, shock, peritonitis, leptospirosis, etc.

1.2. **Pathogenic therapy** – Its aim is to keep human homeostasis in appropriate borders.

a. **Water balance**. – Patients with ARF must be supported in condition of normal fluid balance. Every patient may have a daily fluid intake in a different way – orally or intravenously. It depends on his/her general condition. The quantity of the water intake must be equal to urine output plus 500 ml /insensible water losses/, plus various daily fluid losses. When patient has high temperature it is necessary to be added 500ml/ 1°C over 37°C. Disturbance of electrolytes.

- **Hyperkalemia** –K more than 6 mmol/ml should be corrected to prevent cardiac arrhythmias. Rapid reduction may be achieved by:

#. Calcium gluconicum –

#. Intravenous infusion of solution of Glucose and Insulin.

#. Correction of metabolic acidosis.

## **2. Dialysis methods of treatment.**

Indications for dialysis:

### a. Clinical data.:

- Complications of cardiovascular system such as heart failure with or without pulmonary edema, arrhythmia, pericarditis, etc.

- Clinical features of hyperkalemia and its EKG - signs.

- Severe fluid overload.

### b. Laboratory data:

- Urea > 30mmol/ml

- Cr > 700µmol/ml

- K > 7mmol/ml

- pH < 7,1

### **Therapy in polyuric phase:**

1. Therapy of dehydration.
2. Therapy of hypokalemia and other disturbances of electrolyte balance.
3. Therapy of some inflammatory complications. Do not use nephrotoxic antibiotics.
4. Others.

The normal renal function can be recovered in 3 months to 2 years time.

## **E. Prognosis:**

**Mortality - 20- 30%.**