MEDICAL UNIVERSITY - PLEVEN
FACULTY OF MEDICINE

DISTANCE LEARNING CENTRE

DEPARTMENT OF "NEPHROLOGY, HEMATOLOGY AND GASTROENTEROLOGY"

PRACTICAL EXERCISES – THESES

FOR E- LEARNING IN NEPHROLOGY

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ACUTE PYELONEPHRITIS

1. DEFINITION.

Acute non-specific, most often bacterial inflammatory process of renal tubular interstitial structures and renal cavity system occurring with fever, waist pains and dysuria.

2. BRIEF ANALYSIS OF ACUTE PYELONEPHRITIS CLINICAL STAGES.

The students report in details the characteristic clinical manifestations of the disease. The assistant emphasises its:

1. Frequency rate – the second one in frequency rate after the acute lung inflammatory processes.
2. Sex – more often in female in childbirth age and men after 60 years of age.
3. Agents – bacteria, mycoplasma, viruses
   - *E. coli – 46%*
   - *Proteus spp. – 20%*
   - *Klebsiella spp. – 8%*
   - *Enterobacter spp. – 8%*
   - *Pseudomonas spp. – 6%*
   - *Enterococcus spp.– 6%*
   - *Staphylococcus spp.– 6%*
4. Predisposing factors -
   - *From micro-organisms*
   - *From the macro-organism*
   - *Local predisposing factors*

3. HANDLING OF A PATIENT HAVING ACUTE PYELONEPHRITIS.

Anamnesis:

The students ask comprehensive questions for the beginning of the disease, mainly about fever, pain syndrome and dysuria complaints (burning, stinging, and pain during urinating, often urinating a small amount). The assistant emphasises on the sudden commencement of the symptoms and lack of similar complaints in the past years. Anamnesis data are looked for infections in the mother for small girls up to the age of 3. The women are asked for pregnancy and often abortions occurred together with uric infections. The assistant and the students discuss comprehensively the pain syndrome. It is taken into consideration that in 80% of the cases

it is unilateral and in 20% - bilateral in the renal area. The nature and intensity of pain is discussed (from moderate to strong and constant, rarely colic-like). It is accented on the status of fever – above 38^{o}C in the afternoons and in the evenings frequently accompanied by fever. The general severe status of the patients with acute pyelonephritis is highlighted.

Physical examination:

The patient's face is red covered with cold sweat. It is pointed that the patient has difficulties to stand in upright positing or sitting, as he/she prefers to lie down. The patient's face in calculus pyelonephritis is distorted with pain and he is trying to find in vain such position of the body so that the pain is lessened. More frequently the pain is unilateral, diffuse but with maximum in the psoas-waist part as it passes to the groin.

For the cardio-vascular system it is found tachycardia above 100 beats/min and hypotension (RR < 100/70 mm/Hg).

During abdomen palpation it is found severe painfulness, mainly unilaterally, more rarely bilaterally with maximum painfulness in the affected kidney. In case that the painfulness is not so severe the assistant insists the students to palpate with bimanual palpation the kidneys and to try to find nephromegaly. The examination is over with assessment of *succussio renalis* comparative of both kidneys as the positive (the patient's reaction) and the negative results are compared. The limbs are without oedemas and other changes.

Tests:

- *Haematological tests* don't show any deviations in Hb > 110 g/l and the respective haematocrit and erythrocytes. There is an increase rate of leukocytes >10^9/l. Erythrocytes Sedimentation Rate is accelerated > 10/20 mm by Westergreen.
- *Biochemical tests* – the proteinogram is with characteristic increase of the α_2-globulins, gamma globulin and fibrinogen > 5-6,0 g/l.
- *The urine tests* are characteristic:
  - Urine pH is often alkaline > 8,0 especially in Proteus or E. coli with urease activity
  - Proteinuria is 1,0 to 2,0 g/24 h. It is tubular proteinuria for the account of increased microglobulins and mainly β_2-microglobulin.
  - The sediment is abundant in cells:

    + leukocytes – single or in groups more than 10 pc. Per vision field there is an abundance of leukocytes

    + erythrocytes – 5-10 pc. Per vision field, rarely macroscopic hematuria

    + plenty of bacteria in urine sediment
- *The microbiologic tests* show significant growth > 10^5 bacteria/ml urine

- ❖ *The ultrasound test* supposes accompanying and predisposing factors: anomalies, strictures, calculi and urine stasis. In case of a more severe clinical form of acute pyelonephritis it is especially valuable the assessment of the space around the kidneys for pararenal abscess. The assistant highlights the importance of parenchyma zone measuring (about 15 mm) for differential diagnosis of chronic nephropathy.
- ❖ *Venous urography* is not made during the disease acute stage.

4. DIAGNOSIS.

The students and the assistant together set up the syndromes, then they constitute working diagnosis. The following syndromes are considered:

1. Febrile-intoxication syndrome.
2. Pain syndrome – the characteristic of the pain syndrome is discussed again.
3. Urinary syndrome - dysuria – burning, pains during micturition, polakiuria.
4. Laboratory constellation:
    - Accelerated Erythrocytes Sedimentation Rate,
    - Leukocytosis with tendency to form segments and young forms (St and Young).
    - Significant bacteriuria

- ➢ Writing in Latin of a working diagnosis

5. DIFFERENTIAL DIAGNOSIS

The assistant pays special attention to the distinction from acute surgical abdomen, namely:

1. Acute appendicitis - muscle defence (clear urine)
2. Acute cholecystitis (normal urine)
3. Initial ovarian cysts (adnexitis).

Other diseases:

4. Nephrolithiasis – colic-like pain with the absence of febrile-intoxication syndrome
5. Cholelithiasis – colic-like pain irradiating to scapula to the right.

- ➢ The students write in Latin the differential diagnosis.

6. TREATMENT

1. The patient's regime is abed. It is suitable the more severe forms to be treated at nephrology ward or internal ward with specialist nephrologist.
2. Increased admission of liquids 2,0-2,5 l/daily (tea, yoghurt diluted with water, mineral water).

3. The food has to be liquid-gruel, rich in easily assimilated and nourishing proteins, no spices.
4. Medicamentous therapy:
    - Infusions of glucose-salt solutions and vitamins, in case of dehydration and high temperature. For example,
      + Ser. Glucosae fl. 5% - 500 ml
      + Vit. C 1 amp 5 ml – 10%
      + Vit. B1; B6 x 1 amp. S. i.v.
    - Antipyretics: *Amidophen tabl. 0,3 S. 3 x 1 tabl./daily*
    - An essential point in the medication of acute pyelonephritis is the **antibiotic therapy.** The chosen antibiotic should be:

    - *Bactericidal*
    - *With wide-range*
    - *Enough dose for at least 7 days*
    - *In conformity with the urine culture*
    - Antibiograms are made during the first month – each 10 days; the second month – at 15 days interval; from the third to the sixth months – once monthly.

      Penicillins; cefalosporins; aminoglycosides; new quinolones are most often used.

❖ Finally every student writes a prescription in Latin for therapy of acute pyelonephritis.