

PARTICULARITIES OF INFECTIONS IN THE ELDERLY

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Abstract: Infections in the elderly are different from those of the immunocompetent adult through etiological aspects, atypical clinical presentations, discordant with the disease severity, but also in terms of the therapeutic approach in a patient with comorbidities, organ failure associated with senescence, under chronic treatment (polypharmacy). Increased susceptibility to infections of the elderly is driven by lower humoral and cellular immunity, physiological functions, immunosuppressive medication, immobilization etc. In this article, we present the etiological, clinical and treatment particularities of urinary tract infections, lung, joints, digestive, systemic and Central Nervous System infections in the elderly.

Cuvinte cheie: infecții-tablou clinic-tratament

Rezumat: Infecțiile la vârstnici, se diferențiază de cele ale adultului imunocompetent prin aspectele etiologice, tablouri clinice atipice, discordante cu severitatea bolii, dar și prin atitudinea terapeutică la un pacient cu comorbidități, insuficiențe de organ asociate senescenței, aflat în tratamentul cronic al acestora (polipragmazie). Susceptibilitatea crescută la infecții a vârstnicului este favorizată de scăderea imunității umorale și celulare, a funcțiilor fiziolegice, medicație imunosupresivă, imobilizare etc. În acest articol vom prezenta particularitățile etiologice, clinice și terapeutice ale infecțiilor urinare, pulmonare, articulare, digestive, menigocerebrale și sistemică la vârstnici.

The susceptibility to infections in the people over 65 years old is favoured by important changes in humoral and cell-mediated immunity, physiological functions, cardiovascular changes, pulmonary, endocrine, gastrointestinal, hematopoietic, ocular, musculoskeletal, deficiencies in the integrity of skin, urinary, neurological, taste, smell.

The changes in the cardiovascular system are associated to degenerative valvular lesions that can increase the emergence of infectious endocarditis, decreased capacity to release O₂, lower exercise tolerance, arrhythmias, branch blocks, arterial hypertension etc.

The changes in the digestive tract are associated to decreased enzyme secretion, intestinal motility disorders, swallowing disorders, changes in the intestinal flora, production of mucus, digestive surgery, diet changes, constipation.

In terms of hematopoiesis, there is a slowdown in bone marrow activity, in the production of red blood cells, megaloblastic anemia etc.

Ocular pathology: increased risk of infection by decreased synthesis of lysozyme, the blink reflex, secondary injuries after stroke, Bell paralysis, surgery, occurrence of age-specific eye disease: cataract, glaucoma, etc.

The most important risk factors for infections in the elderly, are presented in Table no.1

Among the drugs used for the conditions present in people over 65 years, we mention those who can act as immunosuppressive:

- Analgesics
- Antibiotics- responsible for immune-mediated neutropenia: penicillins, cephalosporins

- Anticonvulsant medications
- Antidepressant medications
- Antipsychotic medication, sedatives / hypnotics
- Antihypertensives
- Antithyroid
- Diuretics
- Antihistamines AntiH2
- Hypoglycaemic medication
- Nonsteroidal anti-inflammatory drugs NSAIDs, corticosteroids

Table no. 1. Risk factors for infections in the elderly

Decreased immunity	Humoral and cellular
Decreased physiological functions	Cough reflex, skin integrity, swallowing reflex, etc.
Chronic diseases associated	Chronic obstructive pulmonary disease (COPD), Alzheimer, diabetes, chronic renal failure, etc.
Institutionalization	Long term immobilization, social isolation
Polypharmacy	Immunosuppressant medication

The most common infections encountered in the elderly are: pneumonia, influenza, respiratory infections with syncytial virus, skin infections-herpes zoster, infection with methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin resistant *Enterococcus* (VRE), urinary tract infections, sepsis.

The diagnostic and treatment difficulties are

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CLINICAL ASPECTS

associated to the particularities of the field they evolve on, to atypical clinical aspects, antimicrobial pharmacokinetics alterations (see Table 2).

Table no. 2. Features of the elderly

Implant prostheses: valves, orthopaedic, stent etc.	Altered pharmacokinetics of antibiotics
Disorders of consciousness	Delayed diagnosis through atypical clinical presentation
Contact with health services	Injuries
Institutionalization	Genetic factors
Comorbidities	Malnutrition
Lack of febrile response	Decreased mobility

The **urinary tract infections** (UTI), increase by 1% with every decade of age, 20% of women and 10% of men over 65 years have bacteriuria, which in the absence of symptoms does not require antibiotics. In the institutionalized persons, important etiological changes occur, in terms of reduced incidence of *E. coli*, which is about one third of the cases, in favour of *Proteus*, *Klebsiella pneumoniae* (6 times more frequent than in the younger persons), *Pseudomonas aeruginosa*. In these cases, it is considered appropriate to start the therapy with antibiotics, as well as in the cases at risk for infections with multidrug resistance, for person recently treated with antibiotics, recently admitted to the hospital, people with repetitive urinary infections, cystostoma etc. Since the enterococcal and staphylococcal etiology of UTI cannot be excluded, the presence of Gram-stained at smear of Gram-positive organisms, requires the administration vancomycin until obtaining the results of isolated strain susceptibility to antibiotics. For generated Gram-positive bacilli UTI, the therapy can be initiated with the third-generation cephalosporin associated with an aminoglycoside, ticarcillin-clavulanate, or carbapenem in combination with an aminoglycoside. Prophylaxis for recurrent UTI can be made with cranberry juice, nitrofurantoin or estriol intravaginal in the postmenopausal women.

Community acquired pneumonia over 75 years is 50 times more often than at a younger age, with the risk of death in half of the cases. In terms of etiology, although the predominant etiology is *Str pneumoniae*, enteric Gram-negative bacilli, *H. influenzae*, *Staphylococcus aureus*, *Chlamydia pneumoniae*, *Respiratory syncytial virus*, influenza, with similar clinical presentation, rhinoviruses, metapneumovirus are more frequently involved. The clinical presentation runs with afebrile or feverish condition in the absence of cough, with changes of consciousness, less headache, myalgias, pleural pain.

The empirical treatment regarding the management of the community-acquired pneumonia involves third-generation cephalosporin, cefotaxime or ceftriaxone in combination with a macrolide or pneumococcal fluoroquinolones (moxifloxacin, levofloxacin, gemifloxacin, gatifloxacin). For the hospitalized patients, nosocomial pneumonia is suggested by the presence of the risk factors; therapy will be escalated and prevention should be considered (see Table no. 3).

Table no. 3. Nosocomial pneumonia

Risk Factors	Poor Nutrition Tracheal intubation Neuromuscular Disease
Therapy	Carbapenem + Aminoglycoside Fluoroquinolones PAH
Prophylaxis	pneumococcal vaccination Flu Vaccination

Tuberculosis in the elderly is twice as frequent compared to the general population, often by tuberculosis

reactivation through decreasing cellular immunity, favoured by poor nutrition, diabetes, chronic debilitating diseases, glucocorticoids. It is suggested by feverish, weight loss, lymphadenopathy, anorexia.

Sepsis in the elderly also evolves without fever, with mental status changes, marked asthenia, primary site of infection being most commonly the urinary tract (Gram-negative bacilli, enterococcus are etiologically predominant) and the abdominal system (Gram negative, anaerobic bacilli).

Infectious enteritis is favoured by achlorhydria, reduction of motility through chronic digestive diseases, antibiotics. The etiology is similar to that found territorially, regardless of age: *Salmonella*, *Shigella*, *Campylobacter jejuni*, *E. coli*, *Vibrio parahaemolyticus*, *Yersinia enterocolitica*, *Clostridium difficile*, noroviruses, rotaviruses, Cryptosporidium, *Candida*, *Microsporidia*, responsible for chronic diarrhoea.

Bacterial meningitis in the elderly is associated with a significant mortality rate of 37%, most commonly being caused by *Str. pneumoniae*, *Listeria*, Gram-negative bacilli, *Streptococcus agalactiae*. The clinical presentation is dominated by fever, weakness, impaired consciousness. The etiological treatment is associated to third generation cephalosporin, vancomycin for penicillin-resistant pneumococcal strains.

Septic arthritis: about 61% of cases are diagnosed in persons over 60 years, in association with rheumatoid arthritis, joint prostheses, degenerative diseases, chronic diseases (diabetes, cancer), chemotherapy or corticosteroid therapy, secondary to immunosuppression through the underlying disease. They are frequently associated with osteomyelitis, staphylococcal etiology or Gram negative; biologically, half of the cases are not accompanied by leukocytosis, the evolution is unpredictable in the absence of an adequate etiological therapy.

The therapy in the elderly should take into account the etiological particularities and those associated to changes in absorption, distribution, protein binding, metabolism, elimination of antibiotics, increased toxicity in the patients with renal or liver failure.

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