

COVID-19 and elderly people – a systematic review

COVID-19 i osoby starsze – przegląd literatury

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Abstract

COVID-19 is a disease caused by SARS-CoV-2 virus that quickly became a global pandemic, leading to a large number of deaths worldwide. A large amount of pro-inflammatory cytokines and lytic effects of the virus lead to tissue and organ damage and the development of the clinical manifestation of the disease. The clinical course of the disease may vary, from asymptomatic, through mildly symptomatic, to highly symptomatic patients developing ARDS. In laboratory tests of these patients, markers of inflammation and hypercoagulability dominate. Currently, there is no targeted treatment, and in preventing infections, isolation of patients and suspects, wearing masks, and maintaining social distance are effective. The elderly are more susceptible to severe complications, and death due to COVID-19 this is due to dysfunction of the immune system and often accompanying diseases that worsen the prognosis in the course of SARS-CoV-2 infection. *Geriatrics 2020; 14: 161-165.*

Keywords; COVID-19; SARS-CoV-2; coronavirus; infectious disease; elderly

Streszczenie

COVID-19 to choroba wywołana przez wirusa SARS-CoV-2, która szybko stała się globalną pandemią, prowadzącą do dużej liczby zgonów na całym świecie. Duża ilość cytokin prozapalnych i lityczne działanie wirusa prowadzi do uszkodzenia tkanek i narządów oraz rozwoju obrazu klinicznego choroby. Przebieg choroby może być różny, od pacjentów bezobjawowych, przez prezentujących łagodne objawy, do wysoce objawowych chorych z ARDS. W badaniach laboratoryjnych pacjentów z COVID-19 dominują markery stanu zapalnego i nadkrzepliwości. Obecnie brak jest ukierunkowanego leczenia, a w zapobieganiu infekcjom skuteczna jest izolacja chorych i osób podejrzanych o zakażenie, noszenie masek oraz utrzymywanie dystansu społecznego. Osoby starsze są bardziej podatne na ciężki przebieg, poważne powikłania oraz zgon z powodu COVID-19 wynika to z dysfunkcji układu odpornościowego i często towarzyszących chorób, które pogarszają rokowanie w przebiegu zakażenia SARS-CoV-2. *Geriatrics 2020; 14: 161-165.*

Słowa kluczowe: COVID-19; SARS-CoV-2; koronawirus; choroba zakaźna; osoby starsze

Introduction

At the end of 2019, the emergence of a new virus from the *Coronaviridae* family, later called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was observed in the city of Wuhan, China. The virus spread rapidly around the world, and the World Health Organization (WHO), in March 2020, announced coronavirus disease 2019 (COVID-19) as a global pandemic. As of November 19, 2020, the global deaths from COVID-19 were 1,357,656, and the total numbers of cases were 56,711,999. The actual number of cases and deaths may be higher due to the limited testing capacity in many parts of the world.

SARS-CoV-2 enters the cell using the angiotensin-converting enzyme 2 (ACE2) receptor on alveolar epithelial cells [1]. After getting into the cell, it stimulates the immune system to produce pro-inflammatory cytokines (including IL-6, IL-10, IL-2, and IFN- γ). A large amount of pro-inflammatory cytokines and lytic effects of the virus lead to tissue and organ damage and the development of the clinical manifestation of the disease. Each age group is susceptible to infection, but the first data show that the elderly are particularly vulnerable to infection, severe complications, and death [2].

The isolation of sick and suspected COVID-19 patients plays an important role in the prevention of

infections. Wearing masks and maintaining social distance contribute to limiting the spread of SARS-CoV-2 [3].

Most countries in the world represent an aging population, it is estimated that the global proportion of elderly individuals over 65 years old will increase from 11% in 2019 to 16% in 2050 [4]. That is why preventing the spread of COVID-19 among the elderly population and reducing the number of deaths can prove very important in overcoming the current epidemic [5].

The aim of this mini-review is a summary of the current information on the manifestation and the clinical course of COVID-19, as well as drawing attention to the particularly vulnerable group of patients, *id est*, the elderly, who are especially vulnerable to the severe course of SARS-CoV-2 infection, and complications.

Clinical manifestation

COVID-19 may present a varied clinical course, the patients may be asymptomatic or present mild symptoms (up to 80%), or be in a severe and critical condition [6].

The most common symptoms of SARS-CoV-2 infection are fever, dry cough, shortness of breath, myalgia, headache, and fatigue [7]. The loss of taste and smell is also a characteristic symptom of the disease [8]. Less common problems related to the digestive tract, such as diarrhea or vomiting, are also present [9]. Neumann-Podczaska et al. in their publication they point out the presence of anorexia in 8.4% of the elderly population [10]. It should also be noted that patients may present only one of the above-mentioned symptoms or be completely asymptomatic. Asymptomatic patients are a significant source of the spread of COVID-19 [9].

A number of complications may develop in the course of COVID-19, including hypoxemia, acute respiratory distress syndrome (ARDS), shock, renal failure, and acute cardiac injury [7], it is worth noting that renal failure is one of the most common complications [10].

Cardiac injury may manifest itself through cardiac arrhythmias, heart failure, myocarditis, pericarditis, or vasculitis [11]. SARS-CoV-2 enters myocardial cells and coronary vessels via ACEI receptors, leading to the development of inflammation, resulting in damage to the myocardium and coronary arteries [11].

Diagnostics

Laboratory tests

Laboratory tests in people with COVID-19 can show: lymphopenia, high C-reactive protein (CRP), high lactate dehydrogenase (LDH), decreased albumin, high erythrocyte sedimentation rate (ERC), high D-dimer, and high urea nitrogen [12]. Usually, the procalcitonin level is in the normal range. Deviations in albumin and LDH levels are associated with extrapulmonary organ injuries, eg liver injury [13]. Patients with COVID-19 develop a hypercoagulable state, which can be seen in laboratory tests, where we can observe longer prothrombin time (PT), longer activated partial thromboplastin time (APTT), and elevated D-dimer [12]. In the blood of COVID-19 patients, elevated levels of troponin may also appear, this is due to damage to the heart muscle in the course of the disease [11].

Radiology findings

The chest X-ray usually shows bilateral infiltrates but may be normal at the early stage of disease [14]. The CT scan of the chest shows greater sensitivity in the diagnosis of COVID-19 and most often presents the image of bilateral ground-glass opacities, with or without consolidation in posterior and peripheral lungs, sometimes pleural effusion can also be observed [10, 15]. Pan et al in their analysis showed the presence of pulmonary fibrosis in 17% of patients [16].

Treatment

There is currently no treatment targeting SARS-CoV-2 infection [7]. Treatment is essentially supportive and symptomatic. Patients with COVID-19 who are treated at home and have no breathing difficulties should be treated like in case of any other viral infection with, *inter alia*, non-steroidal anti-inflammatory drugs, plenty of fluids, and rest.

In hospitalized patients, the first-line drug is oxygen therapy, and if ARDS is developing, often mechanical ventilation. Additionally, Ramdesivir is a drug used in therapy in patients at an early stage who do not require mechanical ventilation [17].

Glucocorticosteroids, dexamethasone mainly, are used in the treatment of COVID-19 to decrease the patient's immune response, which may reduce the likelihood of developing ARDS, but treatment with these drugs has downsides, including delayed viral clearance and increased risk of secondary infections [18].

Antibiotics in patients with COVID-19 are used to prevent bacterial superinfections in the course of viral pneumonia caused by SARS-CoV-2 infection [7,13].

In the treatment of patients with COVID-19, low-molecular-weight heparin (LMWH) is also used which, apart from its anticoagulant properties, e.g. in the prevention of pulmonary embolism, also has an anti-inflammatory effect by inhibiting lymphocyte chemotaxis and leukocyte migration [19].

It is worth emphasize that many drugs and vaccines are currently been testing for their effectiveness in combating COVID-19, some research on vaccines and drugs for COVID-19 has entered the final phase. Besides, vaccination against influenza seems to be extremely important in the prevention of SARS-CoV-2 infection, and according to some specialists, also vaccination against pneumococci [20, 21].

Undoubtedly, all the ways of strengthening the immune system naturally, such as a healthy lifestyle, healthy eating, doing sports, avoiding stimulants, and quitting smoking are important.

Older people are more vulnerable

Elderly people are among the most vulnerable to severe complications in the course of COVID-19 [13]. Older people have a higher risk of dying from COVID-19 than younger people, an example of which is reports from France where people over 75 years of age accounted for 20% of SARS-CoV-2 infections while accounting for 79% of COVID-19 deaths [22]. With age, the level of naïve CD4 + and CD8 + T lymphocytes decreases, which is an indicator of immunosenescence of the immune system, and lowered levels of CD4 + and CD8 + T lymphocytes are associated with a more severe course of COVID-19 [23]. The decrease in the efficiency of the immune system seems to be a significant factor in deteriorating the prognosis in the elderly population.

With age, inflammatory processes in the body intensify, and some publications draw attention to significantly higher levels of CRP, LDH, D-dimer, urea nitrogen, and procalcitonin in older people than in younger patients [24] in the course of COVID-19.

Chronic diseases, such as hypertension, diabetes, COPD, coronary artery disease are significantly more frequent among the elderly population [25]. These diseases significantly worsen the prognosis of COVID-19 patients [26, 27].

Another factor that negatively affects the immunity of elderly patients is the relatively frequent protein

malnutrition resulting from eating meals with too low caloric balance [28].

The problem in clinical practice is often the fact that respiratory tract infections in elderly patients often develop an atypical course. Besides, it happens that due to neurocognitive disorders, it is difficult to collect the interview correctly, which postpones the diagnosis [22].

Notably, the isolation of the elderly during a pandemic may exacerbate mental health problems leading to the development of depression, weight loss, and disruptive behavior [29]. Psychological support in the outbreak is essential for them to cope with new circumstances [30].

Rapid and proper diagnosis and appropriate treatment of comorbidities in people at risk seem to be crucial in preventing the development of severe complications. A significant element in the clinical evaluation in these groups of patients is also the cyclical monitoring of blood pressure and glucose level [13, 31]. Numerous additional risk factors in the elderly certainly worsen the prognosis, and also complicate the diagnosis of COVID-19 and possible complications. Additionally, we must remember about all the other respiratory viral infections (e.g. influenza virus, parainfluenza virus, adenovirus), bacterial infections (e.g. *S. pneumoniae*), as well as infections with atypical organisms (e.g. mycoplasma, chlamydia, legionella) [14; 32], which may be an independent disease of a patient, or be a superinfection in SARS-COV-2 infection.

Summary

COVID-19 is a disease caused by SARS-CoV-2 that quickly became a global pandemic, leading to a large number of deaths worldwide. The clinical course of the disease may vary, from asymptomatic, through mildly symptomatic, to highly symptomatic patients developing ARDS. In laboratory tests of these patients, markers of inflammation and hypercoagulability dominate. Currently, there is no targeted treatment, and in preventing infections, isolation of patients and suspects, wearing masks, and maintaining social distance are effective. The elderly are more susceptible to severe complications, and death due to COVID-19 this is due to dysfunction of the immune system and often accompanying diseases that worsen the prognosis in the course of SARS-CoV-2 infection.

Conflict of interest
none

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