

Evolutionary particulars of COVID-19 in elderly patients

*Ana Popa, Anotolie Negara, Gabriela Soric, Ana Popescu

Scientific Laboratory of Gerontology, Geriatrics and Occupational Medicine
Nicolae Testemitanu State University of Medicine and Pharmacy
Chisinau, the Republic of Moldova

Authors' ORCID iDs, academic degrees and contributions are available at the end of the article

*Corresponding author: popaana2805@gmail.com

Manuscript received August 17, 2020; revised manuscript September 14, 2020; published online October 05, 2020

Abstract

Background: The new SARS-CoV-2 coronavirus affects a large number of people worldwide, and the elderly are particularly affected because of their vulnerability. Thus, the elderly patients and those with comorbidities have an increased risk of developing a severe disease and show an increased mortality rate. Although they may show mild symptoms of illness and low-grade fever in the early days, they may worsen clinically rapidly, requiring ongoing monitoring.

Material and methods: The prospective study was performed on a group of 96 patients (mean age 61.41 ± 3.42 years), with a predominance of men, hospitalized in the *Holy Trinity* Hospital of Chisinau who met the clinical case definition and were laboratory case-confirmed with COVID-19. Patients were clinically and paraclinically investigated according to the WHO Provisional National Clinical Protocol for COVID-19 infection reporting. The data were statistically processed by the Statistics 10 program.

Results: Of the 96 patients with COVID-19, 85 (88.54%) reported at least one had a comorbidity. The prevalence of comorbidities was the following: chronic coronary syndromes (40.1%), hypertension (39.7%), diabetes (16.04%), chronic obstructive pulmonary disease (17.3%), malignancy (13.04%), cerebrovascular disease (10.6%), chronic kidney disease (4.3%) and viral hepatitis B (1.8%). Severe cases of the disease were revealed – 58, medium severity – 38 cases. All critical cases resulting in death (7.29%) showed comorbidities with respiratory symptoms, as well as with the onset of acute respiratory failure.

Conclusions: The elderly, male gender and the presence of comorbidities in patients with COVID-19 determine the severe course of the disease and an increased mortality rate.

Key words: COVID-19, elderly, mortality.

Cite this article

Popa A, Negara A, Soric G, Popescu A. Evolutionary particulars of COVID-19 in elderly patients. *Mold Med J.* 2020;63(6):21-24. doi: 10.5281/zenodo.4028371.

Introduction

Coronavirus (COVID-19) is a respiratory tract infection caused by a newly emerging coronavirus, which was first identified in Wuhan, China, in December 2019. Genetic sequencing of this virus suggests that it is a beta-coronavirus closely related to SARS virus [1]. The complete clinical picture is not yet well defined, as the reported symptoms range from asymptomatic and mild to severe cases, such as acute respiratory distress syndrome, septic or septic shock, and polyorganic failure, including acute kidney damage and cardiac, with a high risk of mortality in the elderly [2-5]. The elderly, especially those with comorbidities, are a group at high risk of death. In addition, a recent multivariate analysis confirmed that advanced age is the cause of sequential organic failure [1, 2].

While most people with COVID-19 develop only a mild or uncomplicated form, about 14% develop a serious illness that requires hospitalization and oxygen therapy, and 5% require hospitalization in the intensive care unit [6]. Susceptibility is associated with age, sex, and comorbidities

[7, 8]. There are currently numerous studies on SARS-CoV-2 and COVID-19. This review provides a comprehensive introduction to this disease, including the structure of the genome and the SARS-CoV-2 receptor, epidemiology, clinical features, diagnosis, treatment, and prognosis of COVID-19. At present, research is needed to provide us with more information to understand this disease, to help limit the spread of the disease and to invent the vaccine and specific drugs [1].

COVID-19 infection begins as an infection of the local upper respiratory tract, which can spread to affect several organ systems with consequences that are only now understood. When it spreads, it might result in a multisystem disease associated with a high risk of death. The clinical picture accompanied by manifestations from other organs and systems of COVID-19 infection is caused by a combination of specific host defense responses with associated inflammatory activity and (micro) vascular involvement, with distinct coagulopathy and a strong propensity to develop thromboembolic complications [3, 8]. The purpose of this paper was

to evaluate the evolutionary features of SARS-VOC-2 infection in elderly patients.

Material and methods

The prospective study was performed on a group of 96 patients (mean age 61.41 ± 3.42 years), with a predominance of men (men 59.3% vs 40.7% women) hospitalized in the *Holy Trinity* Municipal Hospital who had met the clinical and laboratory case-confirmed definition of COVID-19. Patients were clinically and paraclinically investigated according to the WHO Provisional National Clinical Protocol for COVID-19 infection reporting. The data were statistically processed via the Statistics 10 program. The information was searched in PubMed, Springer, including the pages of the official websites of the European Geriatric Society, French, American and Italian National Geriatrics and Gerontology Societies, to identify scientific journals dedicated to COVID-19. Sources published between December 2019 and May 2020, in English and French, were selected, using the following keywords: "SARS CoV-2, COVID-19", "clinical characteristics of older adult CoV-2", "coronavirus impact", and "Elderly".

Results

According to the results of the studies, the elderly show similar symptoms of SARS-CoV-2 compared to the younger people. The first manifestations in geriatric patients, related to COVID-19 disease reported by Nguyenau S. et al. were the worsening of the general condition, the decreased mobility on the background of myalgias and the persistence of an overall weakness. Some clinical manifestations in the elderly, described by this group of authors may occur separately or may even be preceded by a few days the appearance of respiratory symptoms or fever [9].

Symptoms of COVID-19 initially start with fatigue, prolonged low-grade fever, myalgia, dry cough, and difficulty breathing, which then improve with early identification, initiation and administration of conservative treatment, or worsen and progress to dyspnea and productive cough. In several studies, it was found that the average time for the onset of dyspnea in different cohorts was 6 days after exposure. The most common complications that develop in COVID-19 are bilateral pneumonia that can progress to respiratory distress, sepsis and septic shock, acute kidney damage and others, such as acute heart damage (arrhythmias, heart failure, MI), coagulopathy, rhabdomyolysis, hyponatremia and acidosis. Complications are more severe than non-severe diseases [1, 8, 9].

The main underlying co-morbidities that complicate the course of COVID-19 by increasing the disease severity, use of mechanical ventilation as well as length of stay, thus exhibiting high risk of mortality include uncontrolled hypertension, diabetes, coronary heart disease, hepatitis B, cerebrovascular disease, chronic obstructive disease of the respiratory tract and other diseases, such as cancer, chronic kidney disease and immunodeficiency. Covid-19 has many

clinical features similar to SARS. Although the symptoms are characterized as nonspecific, they often resemble flu even more than the common cold. Predominant symptoms include fever, cough and myalgia. Diarrhea and nausea may precede fever and respiratory symptoms. The elderly men and those with comorbidities have the highest risk of severe form (huang, chen). The milder form can resolve without medical care or can progress to pneumonia and respiratory failure that requires hospitalization. Patients can progress rapidly to respiratory distress with polyorganic dysfunction and insufficiency. Leukopenia and lymphopenia are frequently detected [1, 10, 11].

The prospective study was performed on a group of 96 patients (mean age 61.41 ± 3.42 years), hospitalized within the *Holy Trinity* Municipal Hospital. Of the 96 patients with COVID-19, 85 (88.54%) were reported to have at least one comorbidity. The prevalence of specific comorbidities were the following: chronic coronary syndromes (40.1%), hypertension (39.7%), diabetes (16.04%), chronic obstructive pulmonary disease (17.3%), malignancy (13.04%), cerebrovascular disease (10.6%), chronic kidney disease (4.3%) and viral hepatitis B (1.8%) (fig. 1).

The stratification of patients according to the disease severity revealed severe cases in 58 patients (60.4%) of the studied subjects, medium severity – 38 (39.6%), whereas milder forms were not detected. Severe forms predominated in patients older than 65 years (mean age – 69.2 ± 4.42 years), compared with moderate forms (mean age – 53.6 ± 3.12 years). All the critical cases resulting in death were registered in older patients (average: 80.33 vs 55.64 years) that made up 7.29% of cases with present comorbidities, in whom the respiratory symptoms worsened within a week with the onset of insufficiency acute respiratory and rapid progression of the lung CT scan.

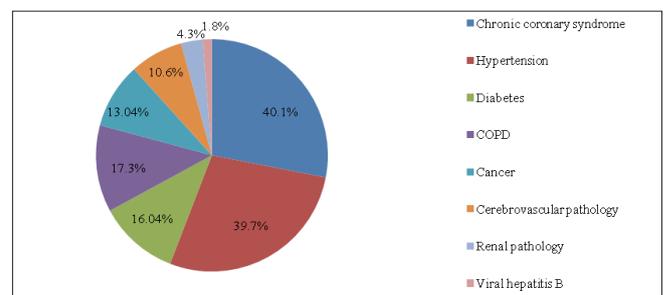


Fig. 1. Prevalence of comorbidities in patients included in the study

Independent predictors of high mortality are the elderly (age ≥ 70 years); the underlying co-morbidities, such as uncontrolled hypertension, diabetes and coronary heart disease, chronic obstructive pulmonary disease and malignancy; severe lymphopenia ($< 0.8 \times 10^9 / L$) and D-dimer ($> 1 \mu g / L$) were reported [10]. Other prognostic factors are elevated C-reactive protein, HDL, ALT, serum ferritin, IL-6 and high-sensitivity cardiac troponin.

Clinical manifestations of patients infected with SARS-

CoV-2 ranged from mild nonspecific symptoms to severe pneumonia with impaired organ function. Common symptoms were fever (98.6%), cough (81.8%), fatigue (69.6%), dyspnea (55.0%), myalgia (34.8%), sputum production (56.5%) and headaches (33.9%). Sore throat, rhinorrhea, chest pain, hemoptysis, conjunctival congestion, diarrhea, nausea and vomiting were uncommon [6, 12, 13]

The elderly are more sensitive to COVID-19 and have a significantly increased risk of morbidity and mortality [11]. Infections are often atypical, sometimes confusing. The factors that contribute to this are the physiological changes of aging; multiple age-related comorbid conditions, such as cardiovascular and pulmonary pathology, diabetes and dementia, as well as associated polypragmatism. Older adults living in care facilities have the highest risk due to chronic diseases and socio-economic impact. However, for all older adults, prevention is paramount [11].

Discussion

Timely recognition of the appropriate history of exposure and prompt recognition of symptoms will help to early identify these cases and better track contacts for early isolation. This will help reduce unwanted events and prevent the further spread of the infection; it will also help reduce COVID-19-related morbidity and mortality. Due to physiological changes in aging, immune function decreases and the prevalence of multi-morbidity increases, especially in the elderly, who have a significantly increased risk of COVID-19 [1]. Older adults are more susceptible to the infection itself and are more likely to suffer from the severe form of COVID-19 as well as its complications. Age changes can also complicate the diagnosis in the elderly category with often atypically respiratory viruses present. The average duration from the onset of symptoms to death is 11.5 days in people > 70 years vs 14 days in young people [5].

Coronaviruses are important pathogens in humans and animals that can cause diseases ranging from the common cold to more severe and even fatal respiratory infections. In the last two decades, two highly pathogenic human coronaviruses, the coronavirus responsible for severe acute respiratory syndrome (SARS-CoV) and the coronavirus responsible for respiratory syndrome in the Middle East (MERS-CoV), 12 have appeared as two separate events. They induced lower respiratory tract infections as well as extrapulmonary manifestations, leading to hundreds or thousands of cases with high mortality rates of up to 50% in some populations.

The comorbidities detected in the patients included in the study were hypertension, diabetes, cardiovascular pathology, cerebrovascular disease, chronic renal disease, COPD, CVD, diabetes mellitus, malignancy, which correlated with the severity of the disease and the increased mortality rate in elderly patients [14-16]. It is noteworthy that the 70-year-olds had a shorter time interval (11.5 days) between the first symptom and death than the younger subjects (20 days), suggesting that the disease progressed faster in older adults [17].

Conclusions

The situation of the COVID-19 pandemic, the world is facing now is one of the most important geriatric emergencies in 2020. The elderly are often asymptomatic or have atypical symptoms, often against an underlying physical and cognitive impairment, which are indicators of an unfavorable prognosis. The old age, male gender and presence of comorbidities in patients with COVID-19 determine the severe course of the disease and its increased mortality.

References

- Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* (London). 2020;395:497-506. doi: 10.1016/S0140-6736(20)30183-5.
- Epidemiology Working Group for NCIP Epidemic Response, Chinese Center for Disease Control and Prevention. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2020;41(2):145-151. doi: 10.3760/cma.j.issn.0254-6450.2020.02.003.
- Lai CC, Liu YH, Wang CY, et al. Asymptomatic carrier state, acute respiratory disease, and pneumonia due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): facts and myths. *J Microbiol Immunol Infect*. 2020 Jun;53(3):404-412. doi: 10.1016/j.jmii.2020.02.012.
- Yang X, Yu Y, Xu J, Shu H, Xia J, Liu H, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med*. 2020;8(5):475-481. doi: 10.1016/S2213-2600(20)30079-5.
- Wilson N, Kvalsvig A, Barnard LT, Baker MG. Case-fatality risk estimates for COVID-19 calculated by using a lag time for fatality. *Emerg Infect Dis*. 2020;26(6):1339-1441. doi: 10.3201/eid2606.200320.
- World Health Organization. Prise en charge clinique de l'infection respiratoire aiguë sévère (IRAS) en cas de suspicion de maladie à coronavirus 2019 (COVID-19) [Clinical management of severe acute respiratory infection when Middle East respiratory syndrome coronavirus (MERS-CoV) infection is suspected]. Geneva: WHO; 2019 [cited 2020 Jul 12]. Available from: <https://apps.who.int/iris/bitstream/handle/10665/331659/WHO-2019-nCoV-clinical-2020.4-fre.pdf>. French.
- Fehr AR, Channappanavar R, Perlman S. Middle East respiratory syndrome: emergence of a pathogenic human coronavirus. *Annu Rev Med*. 2017;68:387-99. doi: 10.1146/annurev-med-051215-031152.
- Adhikari S, Meng S, Wu Y, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. *Infect Dis Poverty*. 2020;9(1):29. doi: 10.1186/s40249-020-00646-x.
- Nguyen S, Major K, Cochet C, et al. Infection COVID-19 chez les personnes âgées en Suisse Romande. Un état des lieux entre croyances, convictions et certitudes [COVID-19 infection in the elderly in French-speaking Switzerland: an inventory of beliefs, convictions and certainties]. *Rev Med Suisse*. 2020;16(691-2):835-838. French.
- Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395(10223):507-513. doi: 10.1016/S0140-6736(20)30211-7.
- Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*. 2020;323(11):1061-1069. doi: 10.1001/jama.2020.1585.
- Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382(8):727-733. doi: 10.1056/NEJMoa2001017.
- Placais L, Richier Q. COVID-19: caractéristiques cliniques, biologiques et radiologiques chez l'adulte, la femme enceinte et l'enfant. Une mise au point au cœur de la pandémie [COVID-19: Clinical, biological and radiological characteristics in adults, infants and pregnant women. An up-to-date review at the heart of the pandemic]. *Rev Méd Interne*. 2020;41(5):308-318. doi: 10.1016/j.revmed.2020.04.004. French.

14. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective study. *Lancet*. 2020;395(10229):1054-1062. doi: 10.1016/S0140-6736(20)30566-3.
15. Wang L, Wenbo H, Xiaomei Y, et al. Coronavirus disease 2019 in elderly patients: Characteristics and prognostic factors based on 4-week follow-up. *J Infect*. 2020;80(6):639-645. doi: 10.1016/j.jinf.2020.03.019.
16. Chen H, Guo J, Wang C, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet*. 2020;395(10226):809-815. doi: 10.1016/S0140-6736(20)30360-3.
17. Sohrabi C, Alsafi Z, O'Neill N, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *Int J Surg*. 2020;76:71-76. doi: 10.1016/j.ijsu.2020.02.034.

Authors' ORCID iDs and academic degrees

Ana Popa, MD, PhD, Associate Professor – <https://orcid.org/0000-0002-8973-7310>.

Gabriela Soric, MD, PhD, Assistant Professor – <https://orcid.org/0000-0001-5314-2270>.

Ana Popa, MD, PhD Applicant – <https://orcid.org/0000-0003-2112-2165>.

Ana Popescu, MD, Assistant Professor – <https://orcid.org/0000-0002-2405-9125>.

Authors' contribution

GS conceptualized the study, designed the research and drafted the first manuscript; AP conducted the laboratory work and revised the manuscript critically; AN conducted the management work and revised the manuscript critically; AP collected and interpreted the data, and revised the manuscript critically; AP collected the data. All the authors revised and approved the final version of the manuscript.

Funding

This study was supported by *Nicolae Testemitanu* State University of Medicine and Pharmacy and Institute of Oncology. The trial was the authors' initiative. The authors are independent and take responsibility for the integrity of the data and accuracy of the data analysis.

Ethics approval and consent to participate

The research was approved by the Research Ethic Board of *Nicolae Testemitanu* State University of Medicine and Pharmacy (protocol No 51 of June 16, 2020)

Conflict of Interests

The authors have no conflict of interests to declare.

