

RETROSPECTIVE ANALYSIS OF GENDER-AGE STRUCTURE AND COMORBID PATHOLOGY OF PATIENTS WITH VIRAL AND BACTERIAL PNEUMONIA ASSOCIATED WITH COVID-19

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Background. In December 2019 first case of COVID-19 was first registered in Wuhan, Hubei province, China. This infectious disease primarily causes respiratory tract infection, but can also affect the other organs and systems.

Objective. In this study, the features of the gender-age structure and comorbid pathology of the patients with viral and bacterial pneumonia who were treated in inpatient department in the period from September to December 2020 are summarized.

Methods. The research was conducted in Ternopil Municipal Hospital No. 3, Ternopil, Ukraine. Clinical cases of 262 patients with viral and bacterial pneumonia associated with COVID-19 were studied retrospectively.

Results. Both men and women has been affected by this pathology in Ternopil region with the same frequency in contrast with the established fact that men are less resistant to infections than women. Most of the patients ranged in age from 51 to 70 years, however, a fair number of patients were over the age of 70 years. Concomitant pathology was diagnosed in 65.5% of the patients with coronavirus infection. Coronary heart disease (34.5%) is leading in the structure of comorbid conditions.

Conclusions. During the COVID-19 pandemic, timely diagnosis and medical care of the patients over 50 years of age is of great importance. The analysis of concomitant pathology proves that the people with cardiovascular pathology are in the increased risk group.

KEYWORDS: viral and bacterial pneumonia; COVID-19; age; comorbidity; cardiovascular system.

Introduction

More than 238 million people have been infected and nearly 5 million have died worldwide since the beginning of the coronavirus pandemic [1]. This infectious pathology has become not only a medical but also an economic and social problem for many countries including Ukraine [2, 3]. Nowadays, Ukraine, like the rest of the world, continues to fight COVID-19. Every day the officials of the Ministry of Health report the number of new cases of infection, the number of fatalities, of those who recovered, and of vaccinated people. Although, coronavirus infection, which has spread to the whole world, has not ruled out the possibility of contracting the other respiratory viral infections the attention to latter has decreased somewhat. Over the last decades, seasonal rises in the incidence of influenza and acute viral respiratory infections have been regularly registered in our country, the etiological struc-

ture of which included certain strains of coronaviruses along with parainfluenza viruses, rhinoviruses, RS viruses [4, 5].

Back in 2017, domestic and world researchers noted that coronaviruses cause epidemic outbreaks of varying intensity, the peak of which occurs during the period of maximum circulation of the influenza virus (December-January, March-April, sometimes October-November). The number of infected people among the susceptible individuals during the outbreaks can be quite significant which indicates high contagiousness of this pathogen. The duration of outbreaks varies on average from 1 to 3 months depending on the coronavirus strain, the number of susceptible individuals and their age. However, this relates to the best studied strains of human coronavirus: HCoV-229E, HCoVOC43, HCoV, and SARS-CoV [6].

The epidemiological analysis of the 2019–2020 season confirmed the validity of these statements regarding the current coronavirus COVID-19. However, the emergence of the

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second wave of the coronavirus pandemic, which began in August–September 2020, somewhat changed the epidemic stereotype. Nevertheless, the increase in the number of inpatients and severe cases of coronavirus infection in the period from February to March 2021 fits into the general peculiarities of the epidemiology of coronavirus infection. According to many researchers, the increased detection of patients with coronavirus infection in the summer months may be due to greater availability and number of tests [4, 6].

Methods

The research was conducted in Ternopil Municipal Hospital No.3, Ternopil, Ukraine. The clinical cases of 262 patients with viral and bacterial pneumonia associated with COVID-19 were retrospectively studied. These patients were treated in a specialized department from September to December 2020. This period had been chosen due to the epidemic data within Ukraine regarding the spread of COVID-19 infection during the epidemic season 2019–2020, which demonstrated the high contagiousness of the pathogen and the epidemic rise of the morbidity rate in the fall to spring seasons. Data related to age, sex, and concomitant pathology were processed. Data was collected and tabulated using MS Excel 2013, qualitative data was presented as percentages and proportions. The diagnosis of COVID-19 has been made by SARS clinical signs detectable by computer tomography for pneumonia and confirmed by polymerase chain reaction (PCR) tests [6,10]. The collection of the samples for PCR was performed at home or in a clinic.

Results

A total of 262 clinical cases of the patients with COVID-19 were retrospectively studied. Among patients of Ternopil Municipal Hospital No. 3, men and women were almost equally affected (50.4% and 49.6%, respectively). In terms of age, all patients were divided into 4 age groups: patients under 30 years, only

0.4%; inpatients aged from 31 to 50 years – 9.9%; patients aged from 51 to 70 years – 60.3%; and the elderly over the age of 70 – 29.4%. Their demographic details are presented in Table 1.

According to the results of processing of patients' medical records in Ternopil Municipal Hospital No. 3 concomitant pathology was diagnosed in 65.6 % of inpatients (172) with coronavirus infection. Ischemic heart disease in various manifestations (cardiosclerosis, angina pectoris, etc.) (34.9%) was leading in the structure of comorbid conditions. Hypertension of various severity (30.8%) was the second by frequency. Overall, cardiovascular pathology accounted for 44.6% of patients with COVID-19 associated viral and bacterial pneumonia. This pathology comorbid with type II DM occurred in 29.1% of patients.

As presented in Figure 1, the other comorbid conditions were much less common: chronic obstructive pulmonary disease – 3.5%, others – 2.3%.

Discussion

COVID-19 is characterized not only by seasonal differences, but also pronounced age differences [7, 8]. According to the Center for Public Health in Ukraine, the majority of patients with coronavirus infection were the elderly: the majority of patients were Ukrainians aged 30-59; 22% – people from 50 to 59 years; 21% – people from 30 to 39 years; 20% – people from 40 to 49 years.

Numerous studies of the characteristics of coronavirus infection indicate that it affects men more often than women [9]. This is due to a number of social, behavioral, physiological and genetic factors. According to the statistics, for example in China, where the new coronavirus began to spread around the world, mortality among men is more than twice as high as among women from this disease [10]. In the US two-thirds of the patients were male and this sex was associated with a higher risk of death [11]. Among patients of Ternopil Municipal Hospital No.3, men and women were affected

Table 1. Demographics of participants

Demographic details		N	%
Gender	Males	132	50.4
	Females	130	49.6
Age	Under 30 years	1	0.4
	31-50 years	26	9.9
	51-70 years	158	60.3
	Over 70 years	77	29.4

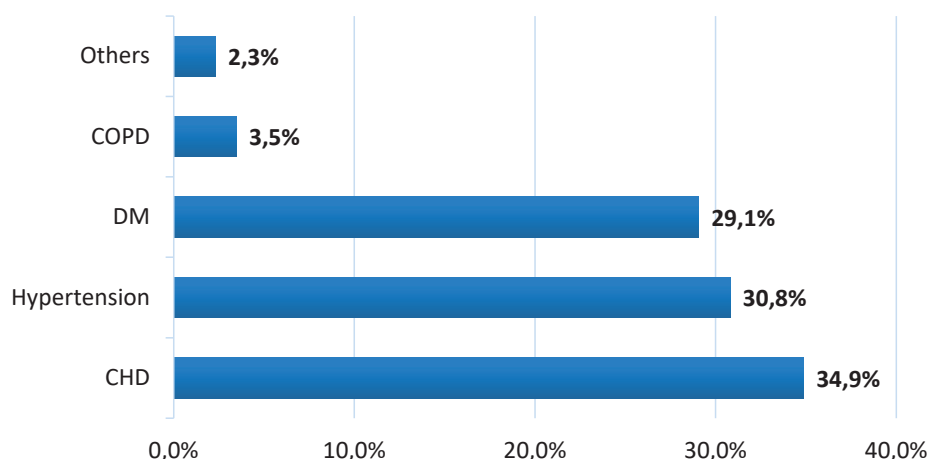


Fig. 1. Frequency of comorbid conditions in patients with COVID-19 treated in Ternopil Municipal Hospital No.3, Ternopil, Ukraine.

almost equally (50.4% and 49.6%, respectively), which does not align with the statistics of other countries [9, 10, 11].

According to Ternopil Regional State Administration, the age structure of the population at the end of 2019 was as follows: children under the age of 17 – 6.5%, young people under the age of 30 – 12.4%, people aged from 30 to 50 years – 32.9%, residents of the region aged 51-70 years – 33.5%, over 70 – 14.7%. Comparing the age structure of inpatients with viral and bacterial pneumonia associated with COVID-19 with the age structure of the population of the region as a whole it was established that the number of young people under the age of 30 was the lowest although this age group in Ternopil region is quite significant. This may be due to the features of the current COVID-19 pandemic that indicates mild severity in young people and a correspondingly low rate of hospitalization. On the other hand, the maximum percentage of patients was observed in the age group of 51-70 years old while in the age structure of the region's inhabitants such patients were about a third.

Analysis of clinical symptoms and severity of the disease proves a higher risk of disease in the elderly. In particular, people of age more than 50 years, especially with somatic chronic pathology, which usually complicates the course of coronavirus infection, have worse prognosis for recovery.

For comparison, we used data from the analysis of medical records of 578 French patients with coronary heart disease (CHD) [12]. According to the analysis of patients' medical records, concomitant pathology was diagnosed in 34.6% of French and 65.5% of Ukrainian

patients. Among the Ukrainian patients, cardiovascular pathology dominated that corresponds with the data of French clinics. However, the frequency of these diseases in Ternopil region was much higher. The incidence of DM in both countries is similar. Chronic obstructive pulmonary disease (COPD) was more common in France and in the structure of comorbid conditions of patients in Ternopil region its incidence was almost the same.

Conclusions

According to the results of the gender-age analysis of the morbidity rate of viral and bacterial pneumonia associated with COVID-19, the following conclusions have been drawn: this pathology in Ternopil region affects both men and women with the same frequency which does not align with the statistics of other countries; which claims that coronavirus infection affects men more often. By age, the maximum number of inpatients was between 51 and 70 years old. However, a fair amount of the patients, compare to the age structure of the region, was over 70 years old. This indicates a more severe course of COVID-19 in these age groups. Cardiovascular pathology: coronary heart disease and hypertension, dominated among the comorbid pathology in patients with pneumonia. DM was the second in frequency of comorbid pathologies. Thus, the risk group for development of complicated pneumonia with underlying COVID-19 comprise people over 50 years of age, equally men and women with chronic cardiovascular disease and DM.

Conflict of Interests

Authors declare no conflict of interest.

Author's Contributions

Romanyuk Lidiya B., Volch Iryna R. – conceptualization, methodology, formal analysis, writing – original draft, writing – reviewing and editing; *Romanyuk Lidiya B., Volch Iryna R.,*

Kravets Nataliia Y., Pyatkovskyy Taras I., Zahrychuk Oksana M. – data curation, writing – reviewing and editing; *Romanyuk Lidiya B., Zahrychuk Oksana M.* – investigation, formal analysis.

РЕТРОСПЕКТИВНИЙ АНАЛІЗ ГЕНДЕРНО-ВІКОВОЇ СТРУКТУРИ ТА КОМОРБІДНОЇ ПАТОЛОГІЇ У СТАЦІОНАРНИХ ПАЦІЄНТІВ, ХВОРИХ НА ВІРУСНО-БАКТЕРІАЛЬНУ ПНЕВМОНІЮ, АСОЦІЙОВАНУ ІЗ COVID-19

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ТЕРНОПІЛЬСЬКИЙ НАЦІОНАЛЬНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ ІМЕНІ І. Я. ГОРБАЧЕВСЬКОГО МОЗ УКРАЇНИ,
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Вступ. У грудні 2019 року перший випадок COVID-19 був вперше зареєстрований в Ухані, провінція Хубей, Китай. Це інфекційне захворювання в першу чергу викликає інфекцію дихальних шляхів, але може вражати й інші органи та системи.

Мета. У даному дослідженні узагальнено особливості гендерно-вікової структури пацієнтів та коморбідної патології з вірусною та бактеріальною пневмонією у стаціонарних хворих терапевтичного відділення, котрі перебували на лікуванні у період з вересня по грудень 2020 року.

Методи. Дослідження проводили в міській комунальній лікарні № 3 м. Тернополя. Ретроспективно досліджено історії хвороби 262 хворих на вірусно-бактеріальну пневмонію, асоційовану з COVID-19.

Результати. На Тернопіллі ця патологія з однаковою частотою уражає як чоловіків, так і жінок, на відміну від відомого факту, що чоловіки менш стійкі до інфекцій, ніж жінки. Більшість пацієнтів були у віці від 51 до 70 років, проте значна кількість пацієнтів була старше 70 років. У 65,6% хворих на коронавірусну інфекцію діагностовано супутню патологію. Провідне місце в структурі коморбідних станів займала ішемічна хвороба серця (34,9%).

Висновки. У період пандемії COVID-19 велике значення має своєчасна діагностика та надання кваліфікованої медичної допомоги пацієнтам у віці понад 50 років. Аналіз супутньої патології, дозволяє стверджувати, що групою підвищеного ризику є особи із патологією серцево-судинної системи.

КЛЮЧОВІ СЛОВА: вірусна та бактеріальна пневмонія; COVID-19; вік; супутні захворювання; серцево-судинна система.

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