



HYPERTENSION AND THE COVID-19 PANDEMIC – MEDICAL SERVICES ACCESS AND OVERCOMING DIFFICULTIES

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Abstract: Hypertension is a global burden with elevated medical costs, many complications, high morbidity and mortality rates. In the COVID-19 pandemic, HT had a devastating effect on the medical care facilities, physicians and patients. Access to medical services was hindered and the human and financial resources were oriented towards battling this disease, other diseases being disregarded, increasing the morbidity and mortality due to other causes. This manuscript aims at revealing the magnitude of this phenomena in HT-suffering patients from South-East of Romania. A questionnaire was applied on 440 HT patients via the PATI method - Paper and Pen Assisted Telephone Interviewing: from those suffering from COVID-19, the majority had difficulties in addressing medical care, in maintaining their blood pressure values at normal ranges and in acquiring their HT medication. Medical information access was also of prime importance during this period, open access publishing helping physicians in ensuring up-dated patient care.

INTRODUCTION

Cardiovascular disease is a complex pathology of various disorders (such as angina, myocardial infarction, hypertension etc.), which also represent a risk factor for developing heart pump malfunctions, closing a pathologic loop. The latter – hypertension (HT) is the main risk factor which can be prevented and the leading cause for mortality worldwide.

HT is defined as a systolic blood pressure of at least 140 mmHg and a diastolic one of at least 90 mmHg; the global prevalence of this disease was close to 32% in 2010, with a sure increase due to the environmental factors, diet, increased life expectancy and so on.(1,2) Also in 2010, HT was found guilty of: 9,4 million deaths, 162 million years of life lost, 50% of cardiac diseases, strokes and cardiac insufficiency, 13% of worldwide deaths and well over 40% of deaths in diabetic patients.(3-5) Six years later, in 2016, SEPHAR III study was conducted, revealing a staggering HT prevalence in the Romanian adult population of 45,1% (or of almost 7,4 million people).(2)

The beta-corona-virus-SARS-CoV-2 (ranked third as lethal potential) is responsible for the novel Corona Virus Disease from 2019 (COVID-19); developed in the setting of the aforementioned HT prevalence, it showed an important predilection for multiple organ dysfunction syndrome (MODS), especially involving the heart by binding to the angiotensin-converting enzyme-2 (ACE2) receptor (massively expressed on the cell surfaces of the heart).(6)

On March 3rd 2022, there were 376.229.546 COVID-19 confirmed cases, globally; from these, 5.681.828 were registered as deceased. In Romania, up until February 8th 2022, 2.455.048 cases were positively confirmed, with up to registered 61000 deaths.(7)

By correlating the aforementioned data, one can conclude that HT is the most frequent disease found not only in

Romania, but also worldwide. Its vast and devastating complications put an important weight on the socio-economic environment, making it necessary to find better methods for preventing and managing this disorder.

AIM

In this pandemic context, many patients with pre-existing illnesses have been restricted from or have had a hard time accessing medical help, demanding the completion of a study which reveals the true magnitude of this phenomena in the South-Eastern region of Romania.

MATERIALS AND METHODS

In order to bring this about successfully, the PATI method was used - Paper and Pen Assisted Telephone Interviewing, which represents a data collecting method based on a questionnaire (table no. 1) applied by telephone means to patients who are non-randomly selected.

Table no. 1. Applied questionnaire

	Questions	Answers
1.	Have you been positively diagnosed with SARS-CoV-2?	Yes No
2.	Did you encounter difficulties in maintaining your blood pressure within normal values since the beginning of the SARS-CoV-2 pandemic?	Yes No
3.	Did you encounter difficulties in accessing your family doctor in this SARS-CoV-2 pandemic context?	Yes No
4.	Did you encounter difficulties in acquiring your antihypertensive medication?	Yes No
5.	Did you address the emergency or ambulatory medical services during this SARS-CoV-2 pandemic?	Yes No

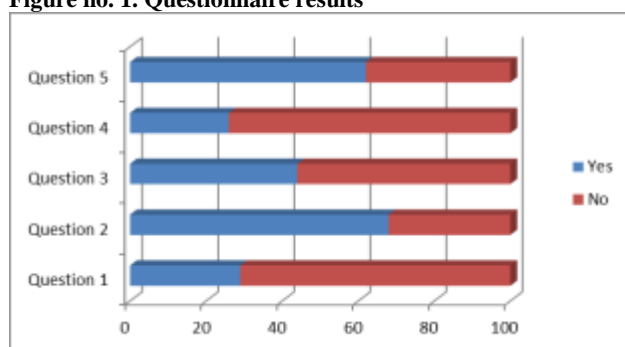
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RESULTS

The study group was made up of 440 patients, with a slightly male predominance (54% males versus 46% females). A percentage of 58% of patients came from the urban environment, while 42% were from the rural area. Most patients (38%) were in the 51-65 years of age-group, followed by 31% in between 36 and 50 years, 25% of patients with ages from 65 to 80, and lastly, 6% of patients were in the 20 to 35 years of age group.

Most patients suffering from HT were not diagnosed with SARS-CoV-2 infection (71% negative, versus 29% positive), but, from those suffering from COVID-19, an overwhelming majority had trouble maintaining their blood pressure in the normal ranges. Family doctor primary medical care service availability was hindered, more than half of the patients (56%) having difficulties in regards to access; thus being said, most of them did not have troubles in acquiring antihypertensive medication (74%), but this fact could be explained by the high percentage of patients who addressed the emergency services or the ambulatory ones (62%) (figure no. 1).

Figure no. 1. Questionnaire results



DISCUSSIONS

HT is a “quiet pandemic”, a global burden in regards to its high prevalence, elevated medical costs and overall complications which consequently registers high morbidity and mortality rates. The COVID-19 global pandemic, which had its debut in 2019, comes as a supplementary strain on the already burdened healthcare system.(8) Even since the first months of the pandemic, the patients’ overall cardiovascular risk profile has worsened either due to the restricted medical care, due to an altered patient compliance or even due to the patients suffering from COVID-19.(9) A study from 2021 included a number of 153 COVID-19 patients and their blood pressure was measured at the start and in the post-COVID-19 period; both systolic and diastolic blood pressures were higher in the latter, and, more strikingly, new HT cases were registered, suggesting that COVID-19 might be a cause for HT onset.(10) In the same year, Tadic et al have reported that HT represents an important risk factor for adverse outcomes in patients suffering from COVID-19; also, HT is an important factor (but not an independent one) in predicting advanced pneumonia stages (in patients younger than 65 and in those suffering from diabetes), hospitalization, intensive care unit admission, and higher death rates (in association with diabetes).(11)

COVID-19 can determine the development of respiratory and cardiovascular complications (such as a hypercoagulative state), being strongly linked to the renin-angiotensin-aldosterone system (RAAS) which is involved in blood pressure control. Angiotensin-converting enzyme (ACE-2) receptors are targets for the SARS-CoV-2 virus; they are found in many organs (liver, kidney, lungs, stomach, brain and lymph nodes), COVID-19 having important extra-pulmonary involvement. This allows us to see another facet of the HT-

COVID-19 influence (regarding the use of antihypertensive drugs), with a main focus on the renin-angiotensin-aldosterone system inhibitors (RAAS inhibitors); their use could influence COVID-19’s natural course of infection, possibly having a mechanistic scenario. HT and antihypertensive drugs have the ability to increase the expression of trans-membranary ACE-2 receptors; these are the virus’ entry target, making infectivity easier.(12,13) Either the withdrawal or the change in RAAS inhibitors, might have some uncertain beneficial effects, but there is certainty in the fact that it will have a lot of disadvantages like cardiac function deterioration, uncontrolled hypertension, and renal function impairment, with more complications than the COVID-19 itself. At the same time, ACE-2 level increase might exert a protective effect due to the ACE-2-angiotensin 1-7/Mas pathway effects: anti-inflammatory and antithrombotic.(12-14) HT is a factor which influences the SARS-CoV-2 viral clearance in a negative way. In 2020, Chen et al found that the elderly, male patients and those with factors associated to ACE-2 (HT, diabetes, cardiovascular diseases) had worse outcomes.(15)

A patient-based study from New York reported HT as being the most prevalent comorbidity in those suffering from COVID-19; another study from New Orleans revealed that up to almost 74% of COVID-19 patients also had HT. Higher hospitalization rates were recorded in those COVID-19 patients with HT, obesity, diabetes and in the black population. This global phenomenon revealed that HT, the male sex and old age were risk factors indicating a worse prognosis in patients suffering from this disease. COVID-19 and HT were found in cases requiring intensive care unit admission; HT and obesity are also indicators for elevated mortality rates (not only in SARS-CoV-2 infected patients, but also in other viral diseases).(13)

The COVID-19 pandemic had an important influence on the outpatient medical care and overall health care services. A study from 2021 by Zhou et al reported on the accessibility of medical facilities and resources in Wuhan, underlying a potential for tension development due to the significant differences in regards to the service areas and the potential burdening across all medical facilities. Their results revealed that medical facility accessibility was far greater in the city centre than at the periphery; also, some city districts had more medical facilities than others (these being consequently overloaded).(16)

Access to medical information (such as the results of clinical studies) was also of prime importance during this period, open access publishing helping physicians in ensuring up-dated patient care.(17,18) In order to stop or at least slow down the spread of SARS-CoV-2 infection, access to medical care was unfortunately restricted, with cancellation or postponing of vaccinations (for children under 12 years), medical procedures, tests and intended or ongoing therapies. Telemedicine is a form of remote medical care and a practical solution which patients have addressed successfully, improving their quality of life through ease of primary care accessibility.(18,19) Ng et al (2021) reported on the use of telemedicine (which is designed to surpass access barriers and reach ill patients with more efficiency and is also cost effectively); this is an alternative to classical face-to-face medical consult, to which patients have adhered positively.(20,21) Although patients are open to this method of obtaining the supportive care that they need (all the while minimizing their exposure to other ill patients), barriers still exist: patients may not be aware of the existence of telemedicine or they might not know how to access/use it; patients may not want to use telemedicine during these stressful times, being more comfortable with something they already know and have

gone through (the classical doctor's appointment); or patients may not want to benefit from another doctor's support and choose to see only the physician that they are already used to.(21) Thus being said, the long-term impact of such medical care restrictions is hard to quantify, but detrimental consequences will most certainly come by.

The psychological impact of the "conscious" SARS-CoV-2 pandemic can aggravate some pre-existing diseases (including HT). Literature data supports this statement, higher mortality rates being registered among those suffering from COVID-19 and HT (as opposed to those non-HT). Clinical studies concentrated on SARS and the Middle East respiratory syndrome, have revealed that HT constitutes a risk factor for higher mortality rates in infected patients. The link between severe forms of COVID-19 and HT might reside in a cytokine imbalance, the patient's health status deteriorating rapidly during the so-called "cytokine storms" – elevated levels of IL-6, IL-7, TNF- α or granulocyte-macrophage colony-stimulating factor, cytokines which are also involved in HT development. COVID-19-HT patients registered worse disease progression and adverse outcomes, needing additional medical supervision. Such patients might present this worsened outcome due to the fact that most HT patients are elderly ones, with higher risk for complications, more frequent severe symptoms, higher intensive care unit admissions and worsened laboratory tests results.(22)

As it was already stated, COVID-19 registered higher death rates in patients suffering from HT – a chronic disease with multiple associated comorbidities. When COVID-19 appeared, much of the human and financial resources were oriented towards battling this disease, while other diseases (chronic ones) were disregarded, with important increases in the morbidity and mortality due to other various causes. As such, COVID-19 high death rates were registered in patient suffering from various chronic diseases, not only from HT.

CONCLUSIONS

As the COVID-19 pandemic spread across the globe, all medical resources (facilities, physicians) were re-oriented towards battling it, with major disadvantages for the patients who already suffered from chronic illnesses, such as HT. COVID-19 associated with HT registered higher death rates than each disease taken alone. Patients suffering from HT had difficulties in obtaining the necessary medication, in regulating their arterial blood pressure values, and in addressing medical centres such as their family doctor, emergency or ambulatory services. It is with certainty that the association between COVID-19 and HT leads to a worsened outcome for the patient.

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