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Arterial Hypertension and Covid-19

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ABSTRACT

Taking into account the number of victims of a new coronavirus infection caused by the SARS-CoV-2 virus (COVID-19), on March 11, 2020, the World Health Organization declared a pandemic. Since December 2019, when the first case of SARS was detected in China, the first data have appeared on the characteristics of the course of infection in patients with various diseases. In particular, there have been reports of a greater susceptibility to infection in individuals with cardiovascular disease and, in particular, arterial hypertension, and a significantly higher risk of adverse outcomes in this group of patients. We present an analysis of the currently available publications regarding coronavirus infection in people with arterial hypertension. The article touches upon the issues of risks in patients with arterial hypertension against the background of coronavirus infection, including those associated with antihypertensive therapy (including blockers of the renin-angiotensin-aldosterone system), and approaches to the management of such patients.

At the time of writing this article, the official statistics of victims of coronavirus infection (COVID-19) is as follows: infected - 1093103, deaths - 58729, recovered - 228039 (https://www.worldometers.info/coronavirus/), – although a much higher number of infected people can be assumed, given that only a fraction of patients are diagnosed. From the beginning of December 2019, when the first case of SARS was detected in Wuhan (China) (the first official statement was published on December 31, 2019 [1]), until the end of March 2020, the number of infected people has been steadily increasing, which led to the declaration of a pandemic World Health Organization (WHO). The causative agent, a novel single-stranded RNA-containing betacoronavirus named SARS-CoV-2, belongs to the large Coronaviridae family, two members of which, SARS-CoV and MERS-CoV, have in the past caused outbreaks of cases of acute respiratory syndrome associated with high mortality [2].

COVID‑19 and hypertension. The first descriptions (table) of patients with coronavirus infection, as well as previous experience in managing patients infected with MERS-CoV [3], gave reason to discuss that the presence of concomitant diseases, including arterial hypertension (AH), is associated with an increased risk of adverse a pleasant outcome [4]. According to the results of a meta-analysis that combined data from 8 studies (46248 patients), the most common comorbidity was hypertension (17%), along with diabetes mellitus (DM) (8%), cardiovascular disease (CVD) (5%) and bronchopulmonary pathology. (2%) [1]. Similar conclusions were reached by the authors of another meta-analysis, which included 6 studies with a total number of patients 1527 (AH 17.1%; CVD

16.4%; DM 9.7%). At the same time, among patients with a severe course who required transfer to the intensive care unit (ICU), AH was recorded in 28.8% versus 14.1% among patients with a severe course observed in a regular ward. An almost threefold ratio was also established for CVD and DM [5]. F. Zhou et al published the results of a retrospective analysis of 191 cases of laboratory-confirmed coronavirus infection with a known outcome, registered in two specialized hospitals in Wuhan from December 29 to January 31, 2020 [4]. Hypertension was the most common comorbidity in patients in this sample, and deaths were more often recorded in individuals with concomitant diseases (AH 48% versus 23%, p = 0.0008; DM 31% versus 14%, p = 0, 0051; coronary heart disease (CHD) 24% versus 1%, p<0.0008). It should be noted that the deceased were significantly older than those who recovered (69 (63–76) versus 52 (45–58) years), which may in itself determine a greater number of comorbid conditions in the group of adverse outcomes. According to the results of one-way analysis, the presence of hypertension is associated with a threefold increase in the risk of death (RR 3.05, 95% confidence interval (95% CI) 1.57–5.92, p = 0.0010). However, this relationship did not persist in multivariate analysis: significant predictors of death included older age, a higher Sequential Organ Failure Assessment (SOFA) score, and a D-dimer level >1 μg/mL, but not the presence of hypertension. The data of other authors also testify to a more severe course of coronavirus infection in older people. According to the results of a retrospective analysis of 788 cases conducted by J. Lian et al., a severe condition was recorded in 16.2% of elderly patients versus 6% among younger patients (p < 0.001), and an extremely severe condition was recorded in 8.8 % and 0.8%, respectively (p < 0.001) [6]. The presence of comorbid conditions was expectedly higher in the subgroup of elderly people: AH 39% versus 11% (p < 0.001), DM 18% versus 5% (p < 0.001), CVD 4% vs. 0.8% (p = 0.005) and chronic illness lungs (COPD) 2.2% versus 0% (p = 0.005). Similar data are given by T. Chen et al. (n = 799): the deceased patients were older than those who recovered — 68 (62–77) vs. 51 (37–66) years; %) vs. 39 (24%)), CVD (16 (14%) proiv 7 (4%)) and cerebrovascular disease (CVD) (4 (4%) vs 0) [7]. At the same time, L. Wang et al. analyzed a sample of the elderly (mean age was 71 years) and concluded that even in this age group, age remained a significant factor in mortality, but AH was not among the predictors. unfavorable outcome. The presence of CVD (excluding hypertension) was associated with the risk of death regardless of other factors (relative risk (RR) 1.86, 95% CI 1.06–3.26, p = 0.031) and COPD (RR 2.24, 95% CI 1.12–4.50, p = 0.02) [8]. In the largest analysis, pooling data from 339 hospitals in China (n = 1509), the rate of reaching the composite endpoint (death, admission to the ICU, need for invasive ventilation (ALV)) increased with an increase in the number of comorbid conditions. : in the presence of one disease, it was 19.3% (RR 1.79, 95% CI 1.16–2.77) versus 4.5% among persons without concomitant pathology, and in the presence of two or more diseases it increased to 28.5% (RR 2.59, 95% CI 1.61–4.17). Even with taking into account the factor of age and smoking status in people with hypertension, the risk of an adverse outcome was 1.5 times higher (RR 1.58, 95% CI 1.07–2.32), which, however, was significantly less than the increased risk with the presence of COPD (RR 2.68, 95% CI 1.42–5.05), DM (RR 1.59, 95% CI 1.03–2.45) and cancer diseases (RR 3.50, 95% CI 1.60–7.64) [9]. Finally, G. Lippi et al. conducted a meta-analysis (13 articles) to assess the relationship between hypertension and the severity of infection caused by the SARS-CoV-2 virus. They concluded that the presence of hypertension, regardless of other factors, including age, is associated with a 2.5-fold risk of developing a severe course of COVID-19 infection, as well as with a comparable risk of death [8]. The question remains whether it is worth starting antihypertensive therapy with RAAS blockers during a pandemic in previously untreated patients with newly diagnosed hypertension. Currently, in the absence of other evidence, the decision should take into account the known beneficial cardiovascular effects of ACE inhibitors and ARBs, as well as their potential protective effect on the lungs, and be guided by general clinical recommendations, as experts from the Russian Society of Cardiology indicate (RKO) [16]. Of course, monitoring of blood pressure (BP) and dose adjustment of drugs are indicated in case of a pronounced decrease in blood pressure, which can be observed in patients with acute respiratory infections. Further studies are needed (experimental and clinical — observational and controlled with an assessment of outcomes and taking into account possible influencing factors, confounders), which will provide answers to

questions about the role of the RAAS and its blockade in the development of lesions in SARS-CoV-2 infection.

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