Drug Therapy and Vascular Devices Used By Patients Hospitalized For COVID-19: A Descriptive Study

Helena Ferraz Gomes,[1*], Bruna Maiara Ferreira Barreto Pires [2], Priscila Cristina Da Silva Thiengo Andrade [1], Antonio Marcos Tosoli Gomes [1], Norma Valéria Dantas De Oliveira Souza [1], Eloá Carneiro Carvalho[3], Thais Mayerhofer Kubota [4], Cristiene Faria [4], Dayana Carvalho Leite [4], André Herdy Afonso Alves De Lima [4],José Augusto Messias [4], Monique Barreto Santana [4], Denilson Campos De Albuquerque[5], Denize Cristina Oliveira [6], Mauricio Cupello Peixoto [7], Pedro de Jesus Silva[8], Lilian Prates Belem Behring [8], Carolina Cabral Pereira Da Costa [1], Magno Conceição Das Merces [9], Luana Ferreira De Almeida[1], Vanessa Galdino De Paula[1], Morena Peres Bittencourt[10], Brenda Gratielle Oliveira[11], Vitoria Rocha Dos Santos[11], Ellen Marcia Peres[1*]

[1]Department of Medical-Surgical Nursing; State University of Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil

[2]Department of Nursing Fundamentals; Fluminense Federal University, Niterói, Rio de Janeiro, Brazil

[3]Department of Public Health nursing; State University of Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil

[4]Pedro Ernesto University Hospital, Rio de Janeiro, Rio de Janeiro, Brazil

[5]Medicine Faculty, State University of Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazi

[6]Department of Nursing Fundamentals; State University of Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil

[7]University of Grande Rio - UNIGRANRIO, Rio de Janeiro, Brazil

[8]Ministery of Health, Regional Nursing Council, Rio de Janeiro, Brazil

[9]Department of Life Sciences, State University of Bahia, Salvador, Bahia, Brazil

[10]Federal Hospital of State Servants

[11]Nursing' Students of the State University of Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil

Review Article

Abstract

Background: COVID-19 is a worldwide health problem, and your treatment is based on the symptoms presented, with oxygen supply, use of antibiotics, antivirals and/or corticosteroids.

Purpose: To describe drug therapy and types of vascular access adopted in the treatment of patients with COVID-19 and admitted to the clinical wards of a university hospital, a referential institution for COVID-19 in Rio de Janeiro, Brazil.

Methods: Descriptive, retrospective documentary study with a quantitative approach. The sample consisted of 243 electronic medical records from hospitalized patients with a laboratory-confirmed diagnosis of COVID-19, between April and June 2020. The selection of participants took place by intentional non-probabilistic sampling.

Results: Peripheral venous access was the mostly applied in 83.5% of the patients. The mostly used classes of drugs were analgesics, (81.9%), followed by antiemetic's (70.4%), and antihypertensive (51.9%). For medications directed to COVID-19, azithromycin, oseltamivir, ceftriaxone, and hydroxychloroquine stands out with 67.5%, 58.8%, 50.2% and 27.2% respectively.

Conclusions: Patients treated with the medications described had good recovery from the clinical condition. Thus, studies based on randomized clinical trials are suggested to prove the efficacy of drug therapies, including their combination.

INTRODUCTION

COVID-19 is a disease caused by Coronavirus Type 2 (CoV-2) and it is developed through symptoms such as fever, cough, dyspnoea, which can worsen to Severe Acute Respiratory Syndrome (SARS-CoV-2). COVID-19 treatment is based on the symptoms presented, with oxygen supply, use of antibiotics, antivirals and/or corticosteroids, and others (Brazil, 2020).

In Brazil, supportive treatment is based on the degree of severity of signs and symptoms. Some protocols recommend drug association according to mild, moderate, or severe symptoms, whether considering hospitalization or not (Brazil, 2020).

Studies on the ideal drug therapy for treating patients with COVID-19 are incipient and lack of robust methodologies, such as clinical trials or systematic reviews. Therefore, the treatment of COVID-19 is presented under different approaches in the world, without a unique protocol. The choice of therapy will depend on each clinical case [1]. The Brazilian Ministry of Health (MS) advises early drug prescription for patients with COVID-19, guided according to manifestation of signs and symptoms. Therefore, patients with mild signs and symptoms (anosmia, agues, runny nose, diarrhoea, abdominal pain, fever, myalgia, cough, fatigue, and headache) are recommended to use chloroquine di phosphate and azithromycin between the 1st and 5th day of onset symptoms, or hydroxychloroquine sulphate combined with azithromycin from the 6th to the 14th day. After that period, symptomatic medications are prescribed. In cases of moderate signs and symptoms (persistent cough + persistent fever + presence of risk factor) hospitalization should be considered by using the same drug therapy as the patient with mild signs and symptoms, without specification after 14 days. In severe cases (Severe Acute Respiratory Syndrome with dyspnoea, O_2 saturation less than 95% in room air or labial cyanosis), hospitalization should be considered, and hydroxychloroquine sulphate and azithromycin are recommended (Brazil, 2020).

However, a systematic review points out that the evidence about the benefits and harms of chloroquine and hydroxychloroquine to treat COVID-19 is fragile and sometimes conflicting [2] This observation attests data from an observational, nonrandomized study with 1446 hospitalized patients, who pointed out that the administration of hydroxychloroquine was not associated with a marked reduction, nor increased composed outcome risk of intubation or death [3].

In addition to the aspects related to the drug therapy to be established and the different protocols worldwide, as well as the specifics of each service and the uniqueness of each patient, it is necessary to note the use of the several intravenous devices to carry out the established therapy since Infusion Therapy (IT) is an indispensable resource to administrate drugs and medicinal solutions through central or peripheral venous access (INS, 2018). Thus, within the complexity that involves the treatment of hospitalized patients by COVID-19, it is important to know the main intravenous devices versus the drug therapy implemented, which allows an assertive direction in the choice of a more qualified and risk-free assistance.

The objectives of this study are to describe drug therapy and types of vascular access adopted in the treatment of patients affected by COVID-19, who were admitted to the clinical wards of a university hospital, a reference in Rio de Janeiro, Brazil.

METHODS

Descriptive, retrospective, documentary study with a quantitative approach

This research was approved by the Research Ethics Committee under Opinion number 3.443.800. All ethical principles in the Declaration of Helsinki were respected. Data collection took place between April and June 2020, a period with a significant number of cases in the country, especially in the Southeast Region. The collection field was a university hospital in the state of Rio de Janeiro, Brazil, which is a reference medical institution in the care of patients with COVID-19, within the scope of the Health Care Network (Rede de Atenção à Saúde - RAS) of the Public Unified Health System of Brazil (Sistema Único de Saúde - SUS). To meeting the purpose as a referential institution for COVID-19, the hospital operation was restructured and started to receive patients suspected or confirmed with COVID-19, who needed hospitalization in clinical wards or intensive care units. The study sample consisted of 243 electronic medical records from hospitalized patients in clinical wards of the hospital, with a laboratory-confirmed diagnosis of COVID-19. The selection of participants took place by intentional non-probabilistic sampling, based on the following inclusion criteria: electronic medical records of patients with laboratory diagnosis of COVID-19. Exclusion criteria: electronic medical records with inconsistent and/or incomplete information. It should be noted that, during the study period, the sample represented 100% of the medical records of patients hospitalized with COVID-19 in three clinical wards, since there was no exclusion of medical records for inconsistent information or being incomplete. For data collection, a form was structured for online use, prepared by the researchers of the study, containing clinical and socio demographic variables of the patients as described below: age, sex, comorbidities, length of stay, type of venous access, and therapy used in the treatment of COVID-19. Subsequently, the data were tabulated in Microsoft Excel spread sheets and becomes a database, which was analysed from the perspective of descriptive statistics with relative and absolute frequency, and such data were presented in graphs.

RESULTS

Regarding the classes of general medicines, the drugs mostly taken were analgesics and antipyretics administered in 199 patients out of the 243 patients studied (81.9%), followed by antiemetic's in 171 patients (70.4%), antihypertensive drugs in 126 patients (51.9%), and other drugs (less than 10%). It is worth highlighting some signs and symptoms that justified the use of these medications, such as fever in 145 cases (59.7%), and others less prevalent such as headache, loss of taste, appetite and smell, fatigue, myalgia, general malaise, nausea, among others. Another data to be highlighted is the systemic arterial hypertension in 125 patients (51%) of the 243 studied ones. Finally, it is worth to note that the drugs taken by patients as described are part of the Institutional Protocol. Among the general medications mostly used by the studied patients, the following stand out: omeprazole in 108 (50.9%), fentanyl in 24 (11.3%), acetylsalicylic acid (ASA) in 24 (11.3%), midazolam in 19 (9%), lactulose in 17 (8.0%), Noradrenaline in 15 (7.1%), propofol in 13 (5.3%), rocuronic bromide in 13 (5.2%), among others, which corresponded to less than 5% of use. Of the 243 patients studied, 26 of them (10.7%) were intubated, thus justifying the use of sedatives and neuromuscular blockers. Of these 26, it was found that 13 patients (5.3%) died. Regarding the drug therapy aimed at the treatment of COVID-19, the following data are available: azithromycin was taken by 164 (67.5%) patients, 143 (58.8%) took oseltamivir, 122 (50.2%) took ceftriaxone, and 66 (27.2%) used hydroxychloroquine, combined with other medications used to prevent complications from COVID-19, namely: 51 (21.0%) patients used antithrombotic and 16 (6.6%) corticosteroids, and other drugs with less than 1%. Regarding the type of venous access used by the 243 patients with COVID-19 in this study, the figure 1 states the predominance of the peripheral modality. About the Central Venous Catheter (CVC), 100% of the patients in this study used this modality in the condition of short stay.

DISCUSSION

As for the general medications used, there was a predominance of the use of analgesics and antipyretics, which is causally related to the clinical conditions of patients such as fever, headache, and myalgia, among others. These medications are recommended for the symptomatic management of patients with COVID-19 (AMIB, 2020). Regarding antihypertensive drugs, it is noteworthy that 51% patients had Systemic Arterial Hypertension (SAH), a prevalent comorbidity in hospitalized patients with complications from COVID-19. In addition, SAH is comorbidity with a probability of increasing the relative risk of mortality 2 times when compared with patients who do not have it. Such condition is also associated with the increased risk of adverse events in patients with COVID-19. Thus, the need for blood pressure control through pharmacological measures is evident. As for the most-widely used general medications, such as midazolam, propanol, rocuronic bromide, and norepinephrine, these constitute a set of drugs used before and after or tracheal intubation in patients with COVID-19. The guidance manual for managing patients with COVID-19 indicates the association of propanol and fentanyl for sedation and analgesia, and rocuronium as a neuromuscular blocker (Brazil, 2020). The first combination is related to short duration procedures, such as quick waking up and to avoid residual action. The Brazilian Association of Intensive Care Medicine highlights these pharmacological inputs in their fast applicability in or tracheal intubation, for suspected and confirmed cases by COVID-19, also signalling other medications in the study (AMIB, 2020). Brazil (2020) also highlights the use of rocuronium bromide, a chemical substance capable of blocking neuromuscular signalling mediated by the competition of this substance with nicotinic cholinergic receptors in the motor plate (depolarizing action). This process provides muscle relaxation skeletal and, thus, facilitates endotracheal intubation. Regarding the treatment directed to COVID-19, the medications mostly taken were azithromycin and hydroxychloroquine, justified to a large extent by being recommended by the Ministry of Health in the treatment, according to signs and symptoms (Brazil, 2020). Azithromycin is an antimicrobial at macrolide class, which works by blocking the bacterium's protein synthesis, and has anti-inflammatory applications. Macrolides can reach high concentrations inside some cells such as phagocytes, which allow them to release the drug at the inflammatory site. In addition to this effect, immunomodulatory actions, such as decreased cytokine synthesis, reduced leukocyte mobility and they increased mucociliary clearance [4] In addition, other studies have demonstrated the action of azithromycin against RNA viruses [5,6]. A compound of the family of 4-hydroxychloroquines used in the treatment of inflammatory diseases, such as rheumatic arthritis and lupus erythematous, hydroxychloroquine has been widely highlighted in the treatment of COVID-19 since it has an important potential for interference with the binding of the virus receptor and immunomodulatory effects[7]. However, it is worth noting that a cohort study with 1438 hospitalized patients in the metropolitan area of New York found that hydroxychloroquine, azithromycin, or both, compared to treatment without any drugs, had no significant difference in in-hospital mortality [8]. Furthermore, another study reinforces the need to take precautions regarding the use of hydroxychloroquine, and that this drug used to treat COVID-19, individual immunological profiles must be evaluated[9]. A review study based on the COVID-19 Diagnostic and Treatment Guideline in China points out that chloroquine and hydroxychloroquine have in vitro inhibition of SARS-CoV-2, however, studies on their clinical efficacy and benefits of these drugs to overcome the risk of dysrhythmias remain inconclusive [10]In the context of medications for treating COVID-19, a retrospective study also highlights a series of cases with 138 patients hospitalized in Wuhan, China: most of them, 124 individuals, received antiviral therapy by oseltamivir (89.9%); 89 ones received moxifloxacin antibacterial therapy (64.4%); 34 received ceftriaxone (24.6%); 25 ones received azithromycin (18.1%); and 62 patients were treated with glucocorticoids (44.9%)[11]. The oseltamivir stands out and contains inputs that inhibit the neuraminidase of influenza viruses, Influenza type A and B [12].

Regarding the high use of antithrombolytics, their justification is established by the occurrence of thrombosis, one of the most common complications that lead patients with COVID-19 to death. Such a complication can be identified early by high D-dimer, SCI score (sepsis-induced coagulopathy) greater than or equal to 4, used in full anticoagulation [13]. Studies pointed

out that the severity of the disease is associated with changes in the coagulation process, with increased levels of D-dimer and fibrinogen, greater risk of thrombosis, especially of pulmonary embolism [14-16]. It is worth mentioning that recent publications have demonstrated the drug interaction of oseltamivir with warfarin, which leads to patients to an increase in the transaminase alanine aminotransferase and the International Normalized Index (INR). Liver damage has also been demonstrated [17]. It is inferred that the treatment of the patients in this study with isolated drugs, whether azithromycin alone, oseltamivir, ceftriaxone, had a positive impact on their recovery. Finally, it is noteworthy that well-succeeded medication management of patients affected by COVID-19 necessarily involves intravenous treatment. This process requires professionals involved in care, especially nurses, who know about types of vascular devices and its best indications according to the venous capital conditions of each one. Based on these premises, offering quality care will be possible, based on evidence and in a cost-effective, risk-free manner for patients. Although the association between azithromycin and oseltamivir has not been studied, it is concluded that patients treated with the medications described showed a good recovery of their clinical condition, with a low lethality rate (5.3%). Regarding the use of vascular devices for drug therapy, there was a predominance of peripheral catheters (in 203 patients), and when the central ones were used, 100% of them were short-term. In view of the above, randomized clinical trials are suggested and they can prove the effectiveness of azithromycin and/or oseltamivir, and new studies should be made on types of catheters more suitable for intravenous therapy of patients hospitalized with COVID-19.

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