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Clinical Diagnostics in Patients with Cerebral Infarction Due To Covid-19

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Abstract

The Corona Virus Disease 19 (COVID-19) outbreak is a deadly disease of concern to the world, including Indonesia. Reported cases of death show a high number with more than 3800 deaths reported. This disease can induce Cytokine Storm Syndrome (CSS) and interfere with the Blood-Brain Barrier (BBB), causing coagulopathy and hypoxia, which in turn lead to cerebral edema in the brain. This research uses a case study approach, with a detailed examination of one event. In this case, cerebral infarction was caused by COVID-19 as evidenced by laboratory results in the presence of symptoms of inflammation, CSF, sepsis, and coagulopathy. These symptoms can result in cerebral infarction and hypercoagulability. therapeutic interventions are carried out in reducing inflammation, reducing cerebral edema, and preventing secondary infection. COVID-19 in this case can have a deleterious effect on patients with cerebral infarction. Proper treatment is needed to give better results.

Keywords: *Diagnostics, Cerebral infarction, Corona Virus Disease 19 (COVID-19)*

Introduction

The Corona 19 Virus Outbreak (COVID-19) is of global concern and has had a deadly impact on society (Ahmad & Rathore, 2020; Ellul, et al., 2020), including Indonesia. More than 3800 cases of death were reported in Indonesia (Covid Task Force, 2020)[1]. This epidemic certainly has an impact on every aspect of people's life, including the economy, health, and psychology (WHO, 2020). Covid-19 can be transmitted through direct contact or by human-to-human saliva droplets (Ahmad & Rathore, 2020; Wang, Wang, Ye, & Liu, 2020). In his research revealed that this plague can spread to the brain through the olfactory epithelium. In the brain, this outbreak can induce Cytokine Storm Syndrome (CSS) and severely disrupt the Blood-Brain Barrier (BBB), resulting in hypoxia and coagulopathy. The result of this process causes cerebral edema (Ahmad & Rathore, 2020; Chen, et al., 2020; Nordvig, et al., 2020). Symptoms that arise from this outbreak are dizziness, headache, decreased level of consciousness, and seizures (Chen, et al., 2020; Whittaker, Anson, & Harky, 2020)[2]. Cerebral infarction is reported as a result of cerebrovascular complications of COVID-19 and tends to occur in individual sufferers with comorbidities such as diabetes, hypertension, dyslipidemia, and vascular disease. Also, coagulopathy is associated with inflammation, with endothelial and platelet activation, dehydration, and cardiac embolism which is the cause of stroke[3].

Coronavirus Case

The 68-year-old man came to the hospital with a weak body condition 1 day before admission. Three days before admission, the client experienced fever, headache, decreased appetite, and shortness of breath. Six days before entering, the patient attended the funeral procession of his relative, who was suspected of being infected with the COVID-19 virus. The client denied not consuming coffee and smoking. His vital signs are 210/107 (blood pressure), 100 (pulse), 10 (respiration rate), and 37 (temperature). Physical examination results reported a decrease in Glasgow Coma Scale (GCS) with global aphasia (E4M5Vx). The client also did not show neck stiffness, middle left facial palsy, and a positive Babinsky sign. Head CT scan showed brain infarction in the right hemisphere. The laboratory test results reported leukocytosis (13400 / µL), positive SARS-CoV-2 IgM antibody, and positive SARS-CoV-2 IgG antibody. Chest CT scan also revealed atypical bilateral

pneumonia with bilateral pleural effusions. The client was initially treated with citicoline, clopidogrel, aspilet, azithromycin, acetaminophen, ceftriaxone, zinc, vitamin B, dan vitamin C[4].

The client on the first day his condition worsened. The client has a decreased level of consciousness, accompanied by fever and seizures. Blood pressure 196/137 with temperature 38.5[5]. The GCS decreases to E1M2V1 and neck stiffness occurs. Hypertonicity was observed in all extremities. Laboratory studies showed leukocytosis (18700 / µL), increased D-dimer (11.8 µg / mL), increased lactate (4.0 mmol / L), increased ferritin (<1200 ng / mL), increased quantitative C-Reactive Protein (308.2 mg / L)), increased procalcitonin (4.82 ng / mL), and respiratory alkalosis (pH 7.542)[6]. Polymerase Chain Reaction (PCR) from nasopharyngeal swab was positive (Cycle threshold (Ct) 38.62)[7]. Aspilet and clopidogrel were discontinued, and treatment for meningitis was started. Ampicillin, dexamethasone, phenytoin, and levofloxacin were added to the regimen. On the fifth day was given amlodipine and telmisartan, while phenytoin was replaced with levetiracetam.

After entering the sixth day, the client's condition improved. The client can open his eyes spontaneously and follow instructions, although it is still difficult to speak. The client does not feel headaches, fever, and tightness. Her blood pressure dropped to 152/102 with GCS E4M6V4. You can still feel the stiff neck. On day 10, the client was fully conscious (GCS E4M6V5) and transferred from the COVID-19 special intensive care unit to the neurology high care unit, then transferred to the general neurology ward, and finally discharged[8].

Method

This research uses a case study approach. According to Bogdan and Biklen (1982), a case study is a detailed examination of one setting or one subject, or one particular event. Placing the research subject as a case or a way of looking at the research subject as a 'case'.

A case is something that is seen as different from what generally happens, both positively and negatively. Performed in real-life conditions, examining the subject in conditions related to the context. Involves multiple data sources. In conducting case studies, researchers can stand on a certain theoretical point of view.

Result and Discussion

The brain infarction discussed in this study can be linked to the COVID-19 outbreak, which is transmitted through direct contact with other individuals through saliva droplets from patients who have contracted the outbreak. At first, the client contracted the COVID-19 outbreak as evidenced by the results of serological tests (positive SARS-CoV-2 IgM and IgG antibodies). Clients who are diagnosed with COVID-19 are known through their PCR test results (positive from a nasopharyngeal swab).

Gullian et al., (2020) reported that cases of simultaneous cerebral infarction were found in several arterial areas in COVID-19 clients, with symptoms of an increase in the number of white blood cells, fibrinogen, D-dimers, lactate dehydrogenase, CRP, and ferritin. Brain Magnetic Resonance Imaging (MRI) shows ischemic lesions involving the posterior cerebral artery (PCA), and superior cerebellar artery (SCA), middle cerebral artery (MCA). Clients included in this study reported similar laboratory findings (leukocytosis, elevated levels of ferritin, lactate), and elevated levels of CRP, which indicate inflammation, particularly CSF. Manolis et al., (2020) suggested that D-dimer was proposed as an important key in clinical practice. They also describe viral coagulopathy involving macrovascular and microvascular structures, hypercoagulable states, thrombosis/thromboembolism, and fibrinolytic disorders. The client's D-dimer in this study has increased.

Procalcitonin (an indicator of sepsis) also shows an increase and is suspected to be the cause of worsening the client's condition. All of the factors described above can lead to hypercoagulability and cerebral infarction. The therapeutic regimen was immediately changed to a meningitis regimen to prevent secondary infection, reduce cerebral edema, and reduce inflammation. MRI and spinal tap were not performed in this study due to the limitations of the procedure and the client's health condition. On the first day, the client's condition worsened, then started to improve after 7 days, and was finally allowed to go home on the 20th day with a minimal deficit. This condition gets better because of the reduction in the inflammatory process.

Conclusion

COVID-19 in this case can have a devastating effect on patients with cerebral infarction. Proper treatment is needed to give better results.

Ethical Clearance: No ethical approval is needed.

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Conflict of Interest: Nil

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