Gnoscience Group

Case Reports and Reviews: Open Access

Case Report| Vol 2 Iss 2

Anesthetic Management of a Case of Penetrating Aortic Ulcer With Active Bleeding During Acute Phase of Covid-19 Infection – A Case Report

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Received: November 11, 2021; **Accepted:** December 25, 2021; **Published:** December 30, 2021

Abstract

Acute respiratory failure and a systemic coagulopathy are critical aspects associated with the SARS-Cov-2 infection. A 78-year-old male, diagnosed with covid-19 presented with an aortic ulcer with active bleeding. The endovascular repair of the ruptured aortic ulcers was successfully performed using Valiant Captivia endoprosthesis. The procedure was successful, with no evidence of hemorrhage or thrombosis. SARS-Cov-2 infection can be defined as a microvascular injury syndrome with diffuse endothelial inflammation, a procoagulant state and formation of immunothrombosis. Severe systemic inflammatory response and hypoxia predispose to atherosclerotic plaque rupture and subsequent ulcer formation.

Keywords: ***Anesthesia in pandemics; Covid and bleeding; Aortic ulcer; and Covid-19.***

1. Introduction

SARS-CoV-2 infection has been linked to a wide variety of coagulation disorders. There is evidence that the virus is capable of producing direct endothelial invasion [1], and from there progression to endothelial injury is theoretically possible, as suggested in autopsy studies [1]. In addition, several prothrombotic phenomena have been identified in infected patients, such as hyperviscosity [1], elevation of factor VIII and fibrinogen, increased circulating prothrombotic factors and a byproduct of neutrophil death known as neutrophil extracellular trap [1]. Furthermore, disease severity may produce mobility restrictions, so the infected patients are likely to fulfill all the components of Virchow's triad. On the other hand, while less well-established, some studies have questioned the possible association between Covid-19 and hemorrhagic events, even though it is not clear whether such events are due to comorbidities or therapeutic interventions such as low molecular weight heparin. Some examples include spontaneous intra-abdominal hemorrhage with hemodynamic instability, gastrointestinal bleeding and intracranial hemorrhage [2]. In light of this information,

this report describes a patient with multiple comorbidities, affected by Covid-19, who developed an intrathoracic hemorrhage secondary to a penetrating aortic ulcer.

2. Case Report

A 78-year-old male, presented to the health service with cough and dyspnea, associated with ventilatory-dependent thoracic back pain, without fever. He had been previously diagnosed with arterial hypertension, non-dialytic chronic kidney disease, insulin-dependent diabetes and heart failure with preserved ejection fraction. Chest x-ray detected a large left pleural effusion. A drainage 1,500 ml of hematic liquid was performed. He was referred to intensive care due to worsening of his respiratory condition. Covid-19 testing was performed by nasopharyngeal swab and was positive for SARS-Cov-2 by polymerase chain reaction (PCR). On the same day he developed symptomatic bradycardia, managed with dobutamine infusion. Chest CT showed cardiomegaly, aortic and coronary atheromatosis, as well as an expansive mediastinal lesion. An aortic angiotomography showed a hematoma occupying the anterior mediastinum and extending to the apex of the left hemithorax, with an estimated volume of 180 ml, in close contact with the aortic arch, pulmonary artery trunk and left subclavian artery. One mural thrombus was seen in the distal segment of the aortic arch, lying about 7.5 cm from the left subclavian artery, having a thin neck of 2.5 mm. There was another one in the descending segment of the thoracic aorta, at the level of T9, with the neck measuring 3.0 mm, both compatible with thin neck atherosclerotic ulcers. The patient was admitted in the hemodynamics department for corrective intervention. Standard monitorization was performed. A left radial arterial catheter was installed for invasive blood pressure monitoring and a central venous access was placed in the left internal jugular vein. General anesthesia was induced in rapid sequence with etomidate 0,6mg/kg, fentanyl 5µg/kg and rocuronium 1,2mg/kg, maintaining cardiovascular stability. He was intubated and mechanically ventilated on FiO2 60% and 8 cm H2O positive end-expiratory pressure (PEEP). The endovascular repair of the ruptured aortic ulcers was successfully made using Valiant Captivia endoprosthesis 40x40x212 and 36x36x207 after the emergence of the subclavian artery and distal anchorage adjacent to the celiac trunk. Care was taken during the procedure to maintain immobility, normothermia, stable blood pressure and euvolemic state, in order to minimize the risk for contrast-induced kidney injury. During the entire time individual protection equipment was used, including face shields, protective goggles, N95 masks, double gloves, waterproof gown. No one in the anesthesia team developed respiratory symptoms within 14 days of the procedure.

3. Conclusion

Penetrating aortic ulcer is a complication of atheromatous plaque, that involves the entire intima layer of the aorta and advances into the middle layer and are considered a variant of classic aortic dissection. Ulcer of the thoracic aorta represents about 7,6% of acute aortic syndrome cases. History of smoking, systemic hypertension, high ASA score and severe atherosclerosis are the main risk factors. The diagnosis can be made by tomography [3].

Many mechanisms may explain the pathophysiology of multi-organ injury secondary to infection by SARS-CoV-2 and include direct viral toxicity, endothelial cell damage, thromboinflammation, dysregulation of the immune response and dysregulation of renin-angiotensin-aldosterone system (RAAS) [4]. The endotheliopathy occurs due to direct SARS-CoV2 infection, activation of the immune system and thromboinflammatory response [4]. Activated macrophages

secrete proinflammatory cytokines, which activate neutrophils that mediate the inflammatory response [1]. Endothelium damage leads to a procoagulant change of the vascular lumen and formation of immunothrombosis and organ injury [4]. In Covid-19, data showed platelet activation, elevation of Von Willebrand factor levels, presence of microthrombi which may explain the occurrence of arterial macrothrombosis, glycocalyx damage and decreased nitric oxide production [4].

SARS-CoV2 virus can also cause diffuse endothelial inflammation vasculitis followed by apoptosis and presents as a systemic inflammatory vascular disease. Findings suggest the virus can stimulate the deposition of immune complexes inside the vascular wall causing a severe inflammatory reaction [4]. Emerging evidence suggests that the severe systemic inflammatory response and hypoxia predispose to atherosclerotic plaque rupture and subsequent ulcer formation [4].

Surgical treatment of aortic ulcers is indicated in the presence of large ulcers, refractory pain, aortic dissection, hematoma of the aorta wall. The preferred therapy is the intervention with stent, to the detrimental of open surgical repair, when is possible [3].

In the anesthetic management of an aortic ulcer case, the anesthesiologist must be mainly concerned with the following aspects: guaranteeing immobility, which enhances patient capacity to withstand one to three hours of supine position; maintaining strict blood pressure control; performing adequate intravenous hydration, in order to reduce the risk of contrast-induced nephropathy; managing patient's coagulation function (performing and monitoring anticoagulation and its reversal); ordering successive laboratory exams; maintaining preparedness for massive transfusion protocol; preventing hypothermia [5].

To perform anesthesia in a patient with diagnosed or suspected SARS-Cov-2 infection, in addition to all measures listed above, it is mandatory that the anesthesiologist observes all institutional protocols to prevent staff and self-contamination. That includes the use of PPE (Personal Protection Equipment) and the choice of techniques which minimize aerosol dispersion in the operating room. General anesthesia should be induced with a rapid sequence intubation technique.

4. Declaration of Patient Consent

The authors certify that they have obtained all appropriate guardian consent forms. In the form, the guardians have given their consent the patient images and other clinical information to be reported in the journal. The guardians understand that patient name and initial will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

REFERENCES

1. Maier CL, Truong AD, Auld SC, et al. COVID-19-associated hyperviscosity: a link between inflammation and thrombophilia? Lancet. 2020;395(10239):1758–1759. [Online]. Available: https://doi.org/10.1016/S0140-6736(20)31209-5

2. Conti CB, Henchi S, Coppeta GP, et al. Bleeding in COVID-19 severe pneumonia: The other side of abnormal coagulation pattern? Eur. J. Intern. Med. 2020;77:147–149. [Online]. Available: https://doi.org/10.1016/j.ejim.2020.05.002
3. D'Annoville T, Ozdemir BA, Alric P, et al. Thoracic Endovascular Aortic Repair for Penetrating Aortic Ulcer: Literature Review. Ann. Thorac. Surg. 2016;101(6):2272–2278. [Online]. Available: https://doi.org/10.1016/j.athoracsur.2015.12.036
4. Iba T, Connors JM, and Levy JH. The coagulopathy, endotheliopathy, and vasculitis of COVID-19. Inflammation Research, 2020;69(12):1181–1189. [Online]. Available: https://doi.org/10.1007/s00011-020-01401-6
5. Cheruku S, Huang N, Meinhardt K, et al. Anesthetic management for endovascular repair of the thoracic aorta. Anesthesiology Clinics, 2019;37(4):593–607. [Online]. Available: https://doi.org/10.1016/j.anclin.2019.07.001

Citation: Delgado MA, Khouri DB, Corrêa TA, et al. Anesthetic management of a case of penetrating aortic ulcer with active bleeding during acute phase of COVID-19 infection – A case report. Case Rep Rev Open Access. 2021;2(2):126.