



Inflammation and infection

Catastrophic retroperitoneal hemorrhage in COVID-19 patients under anticoagulant prophylaxis

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ABSTRACT

COVID-19 patients are at high risk for both capillary micro thrombi and large vessel thrombosis. Anticoagulant administration in COVID-19 patients, especially in ICU setting, is recommended by some researchers. However, clinical guidelines don't yet recommend anticoagulation therapies in therapeutic doses in these patients.

In this article, we try to introduce a less known complication of heparin application in COVID-19 patients. Retroperitoneal hemorrhage when involves the psoas muscle might be deadly because of the large volume of bleeding before causing any significant alarm. It is very important to be careful in diagnosing and managing this complication.

Introduction

Since its outbreak, COVID-19 has shown many different manifestations. One of the hallmarks of the disease is micro thrombosis that can lead to pulmonary thromboembolism and then respiratory failure.¹ Micro thrombosis has even resulted in cerebrovascular incidence in some patients of COVID-19.²

In some studies the efficacy of anticoagulant agents to decrease these complications has been investigated and some researchers believe that heparin or other anticoagulant agents should be administered for COVID-19 patients. Despite limited evidence, heparin and other anticoagulant agents are being prescribed in COVID-19 patients in many intensive care units all over the world.³ But is it really safe?

The use of heparin, particularly in therapeutic dosing, is associated with bleeding tendency and sometimes leads to catastrophic events. In this study we present a case of retroperitoneal hemorrhage after

administration of heparin in COVID-19 patients. To our knowledge, this is a rare complication of the heparin and there are few if any reports in the medical literature.

Case presentation

A 65-year-old man with past medical history of diabetes mellitus and hypertension referred to hospital with fever and dyspnea. The PCR test for COVID-19 was positive and the patient was hospitalized and transferred to the ICU because of severe respiratory distress. Laboratory data on admission included: hemoglobin 12.3 g/dl (13 g/dl-18g/dl), white blood cell count of 10,000(4300-10800), platelet count of 260,000 (150.000-450,0000), D-dimer of 670 ng/ml (<250 ng/ml) and oxygen saturation of 82%. Physical examination on admission revealed decreased breath sounds on the base of lungs bilaterally. Blood pressure of 150/100 mm hg, pulse rate of 95/min, temperature of 38°C and

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respiratory rate of 22/min were reported on admission.

Considering D-dimer level and the past medical history of DM and HTN, we started intravenous heparin with the dosage of 5000 u/6hr. Two days later, the patient started to complain about right flank pain and in ultrasonography and subsequently CT scan of abdomen a large retroperitoneal hemorrhage on psoas muscle was detected (Fig. 1). We discontinued heparin and the patient was under close observation in ICU. We commenced volume resuscitation and conservative measures. After one week of conservative treatment, the symptoms relieved and the size of retroperitoneal hematoma reduced.

The patient was discharged from the hospital and followed by abdominopelvic CT scan with intravenous contrast three months later. After three months, the hematoma was quit totally absorbed and we didn't find any evidence of abscess formation or tumoral mass in the follow up CT.

Discussion

In this article, we report spontaneous retroperitoneal hemorrhage in a COVID-19 patient. Although the exact etiology of this complication is not clear, we didn't find any culprit but heparin.

Spontaneous retroperitoneal hemorrhage has been reported as a complication of anticoagulant therapy.⁴ However, to our knowledge these reports are sporadic and additionally there isn't any evidence in COVID-19 patients.

Retroperitoneal hemorrhage specially when involves the psoas muscle might be deadly because of the large volume of bleeding before causing any significant alarm.⁴ The first sign of this serious complication in our patient was a mild flank pain. It is very important to be careful and vigilant in diagnosing and managing this hazardous complication. Additionally, heparin application in therapeutic doses might be hazardous in COVID-19 patients and we believe that it should be administered with excessive caution.

COVID-19 patients are at high risk for both capillary micro thrombi and large vessel thrombosis. In some autopsies the rate of deep vein thrombosis in these patients has been as high as 50% and it is estimated that coagulopathy associated with COVID-19 causes 25% of mortality in these patients. Based on these facts, anticoagulant administration in COVID-19 patients, especially in ICU setting, is recommended by some researchers. However, clinical guidelines don't yet recommend heparin or other anticoagulation therapies in therapeutic doses in these patients.⁵

There are also some data on the antiviral and anti-inflammatory properties of unfractionated heparin. These properties can have some beneficial impacts in COVID-19 patients. The antiviral mechanism of heparin has been investigated in the treatment of other viruses like SARS-COV. However, this therapeutic effect of heparin has not yet been approved by FDA.

Considering all these data, we suppose that heparin application in COVID-19 patients is not safe and should be administered prudently. Retroperitoneal hemorrhage consisting the psoas muscle is a life threatening complication of heparin application and may occur quietly without remarkable signs and symptoms. Retroperitoneal space and psoas muscle can contain a large volume of blood without causing significant alarming signs and sometimes the first significant presentation



Fig. 1. Hematoma in right retroperitoneal space was demonstrated in CT scan of abdomen and pelvic without contrast.

is hypovolemic shock. When administering heparin in therapeutic doses, we should examine the patient and specially the vital sign and hemoglobin level regularly and be vigilant about any subtle change.

Conclusion

Heparin and anticoagulants may cause severe hemorrhagic complications in COVID-19 patients. So, therapeutic doses in these patients should be administered carefully and these patients should be monitored closely by vital sign and hemoglobin level.

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