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Case Report

Rupture of the left rectus abdominis muscle due to COVID-19 related cough

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Abstract

Throughout the coronavirus disease 2019 pandemic, patients using oral anticoagulants for mechanical valve replacement and/or another clinical-pathological condition might have faced various clinical scenarios. Rectus sheath hematoma is one of the acute abdominal pain syndromes. This study presented a patient with developed anticoagulation-induced rectus sheath hematoma after mitral valve replacement.

Keywords: Abdominal Pain, Hematoma, Rectus Abdominis, Anticoagulants

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Introduction

The pandemic of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been a major threat to the health of both healthcare professionals and patients in our country since December 2019. However, underlying cardiovascular and other comorbid diseases are the most important risk factors for deaths caused by the coronavirus disease 2019 (COVID-19) (1, 2). In addition, some publications have reported abnormal coagulation parameters in many patients with severe COVID-19 infection (3). Therefore, various clinical scenarios may be encountered in patients using oral anticoagulants after mechanical valve replacement and/or for other vascular conditions.

Rectus sheath hematoma (RSH), as one of the acute abdominal pain syndromes, is an extremely rare clinical condition that usually occurs due to blunt abdominal trauma, anticoagulation therapy, or more rarely spontaneously without an underlying cause (4). The literature review revealed a mortality rate ranging from 4% to 25% (5).

This case reported the management of a patient with chronic renal failure, who was admitted to our clinic with the diagnosis of COVID-19 and developed anticoagulation-induced rectus sheath hematoma after mitral valve replacement 8 months ago.

Case

A 54-year-old female patient, who had undergone mitral valve replacement for severe mitral stenosis 8 months ago and was started on oral anticoagulants (5 mg warfarin daily), presented to the emergency room with shortness of breath, cough, loss of taste

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and smell, weakness, and joint pain. The patient had a history of stage 4 chronic renal failure, anemia of chronic disease, diabetes mellitus, cholecystectomy, and obesity. Additionally, she had no family history of a bleeding disorder. The patient had complaints that had started on the 3rd day after contact with a patient diagnosed with COVID-19.

Physical examination revealed a blood pressure of 90/60 mmHg, a heart rate of 84 beats/min, a respiratory rate of 24 bpm, an oxygen saturation of 65% at room air, and a body temperature of 37.4°C. Laboratory examinations showed a hemoglobin level of 8.6 g/dL, a platelet count of 144,000/μL, a white blood count of 2.5 K/μL, a c-reactive protein level of 7.97 mg/dL, a D-dimer level of 1,180, and an international normalized ratio (INR) of 3.45.

Other laboratory parameters were as follows: glucose, 235 mg/dL; sodium, 136 mmol/L; potassium, 4.35 mmol/L; blood urea nitrogen,83 mg/dL; creatinine, 5.44 mg/dL; albumin, 3.5 g/dL; aspartate aminotransferase, 226 IU/L; alanine aminotransferase, 71 IU/L; and alkaline phosphatase, 341 IU/L. Chest computed tomography (CT) showed a reticular pattern and ground-glass opacity in both lungs, consistent with COVID-19. The patient was hospitalized after collecting the reverse transcription polymerase chain reaction (RT-PCR) sample for COVID-19.

In the next step, the patient was commenced on favipiravir, hydroxychloroquine, nasal high-flow oxygen therapy, and nebulization, along with other medical treatments. On the 3rd day of treatment, the patient described pain in the left upper quadrant of the abdomen following an episode of severe coughing. She described a frank, constant sharp pain with an intensity of 10/10, which was not accompanied by dizziness, loss of consciousness, nausea, or vomiting.

There was a marked tenderness with guarding (défense musculaire) in the hypogastric region and the left upper quadrant of the abdomen. There was a fullness on palpation in the same area and no ecchymosis was detected.

A contrast-enhanced abdominal CT scan revealed a 10×10×6 cm hematoma in the left rectus muscle (Figures 1A and 1B) extending into the lower abdomen and extraperitoneal space, without active contrast extravasation. The purpose of not choosing ultrasonography (USG) as the first option was to minimize the contamination and interpersonal transmission of COVID-19.

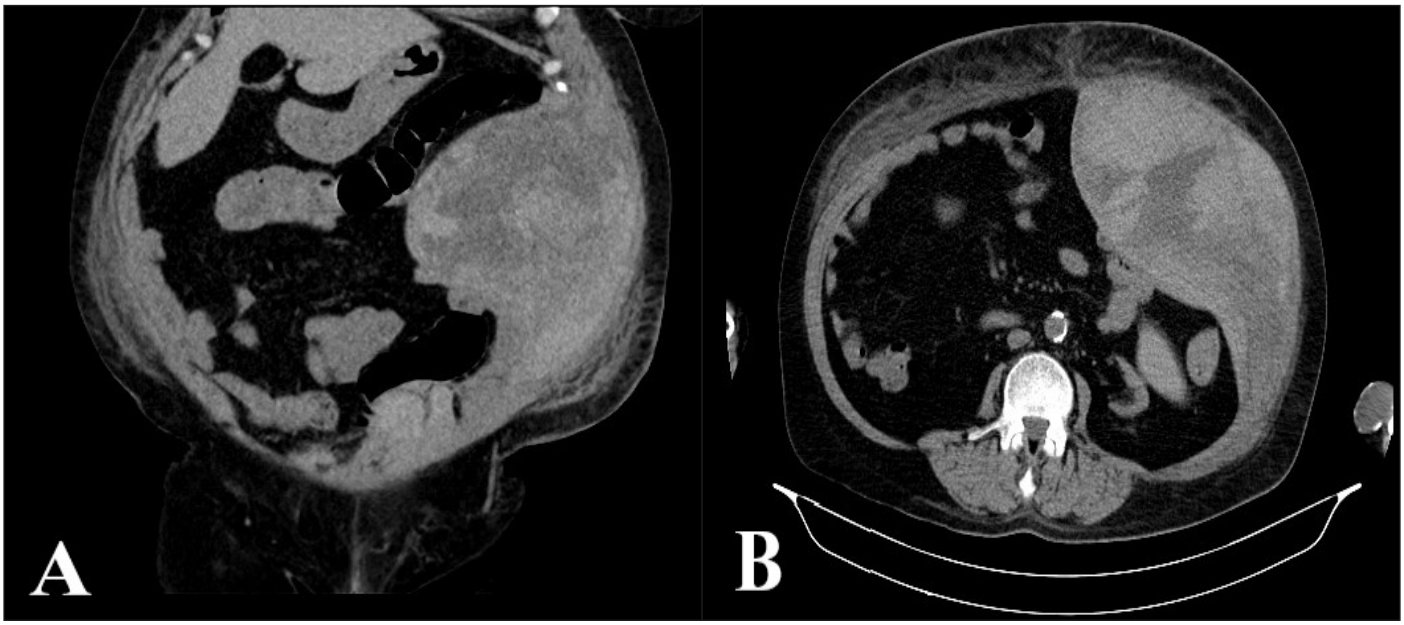


Figure 1. (A) Transverse computed tomography section and (B) coronal computed tomography section of the abdomen An intramuscular hemorrhage in the left rectus muscle, which measures at 10×10×6 cm and extends into the lower abdomen and extraperitoneal space without active contrast extravasation.

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After that the diagnosis was established, the use of warfarin was discontinued and low-molecular-weight heparin (LMWH) was commenced. Red blood cells, fresh frozen plasma, and thrombocytes were replaced based on close monitoring of vital signs and daily monitoring of complete blood count and coagulation factors. Pain control was achieved by the infusion of Contramal via the intravenous route. Subsequently, ice compression was applied to the hematoma area at regular intervals. No surgical intervention was required.

At the end of the one-month follow-up period, treatment for COVID-19 was completed, the result of the second RT-PCR study was negative, and findings on thoracic CT regressed. Once the hemoglobin levels were stable and the hematoma was regressed on abdominal CT, oral anticoagulant therapy was restarted and other medical treatments were arranged. After 5 days of follow-up, the patient was discharged after obtaining a stable course of hemodynamics, the absence of any signs of active bleeding, and the absence of any decrease in hemoglobin levels. In the 2nd of month follow-up after discharge, the patient's vital signs and blood parameters were within normal limits. The patient without any complaints was subjected to abdominal CT, which revealed complete resorption of the hematoma (Figure 2).

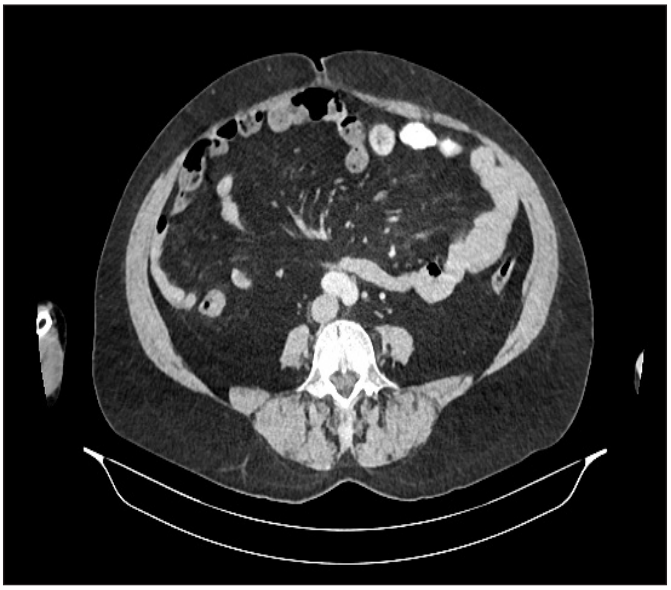


Figure 2. Transverse computed tomography section of the abdomen after 3 months showing the fully resorbed hematoma

Discussion

Throughout the COVID-19 pandemic, patients using oral anticoagulants for mechanical valve replacement and/or another clinical-pathological condition might have faced various clinical scenarios. One of these scenarios, RSH, is an important pathological condition that can be observed due to blunt abdominal trauma, anticoagulation therapy, or more rarely spontaneously without an underlying cause (4, 6). Excessive contraction of the rectus abdominis muscle or direct abdominal trauma causes a hemorrhagic condition, which can originate from a rupture of the rectus abdominis muscle and/or rupture of one of the epigastric arteries (7). It can often be misdiagnosed with acute abdominal pain syndromes.

About 2,500 years ago, RSH was first described by Hippocrates and Galen, and the first case in the literature was reported by Richardson in 1857 (8). Although it is generally a self-limiting condition, mortality rates have been reported in the range of 4%-25% in the literature (5). It is generally seen in women between the ages of 50 and 60 years (9). Episodes of acute paroxysmal coughs are the most important triggering factors of RSH (5). Among the most important risk factors of RSH are direct abdominal trauma, iatrogenic injury after abdominal surgery, advanced age, thin body habitus, central obesity, coughing, and pregnancy (4, 5, 9). Abdominal pain is the most common symptom reported in 84%-97% of patients. Patients can often describe a persistent, sharp unilateral pain that involves the lower quadrant of the abdomen (4, 9). Our case had a sharp pain that started suddenly after coughing in the left upper quadrant of the abdomen. Subsequently, the pain became constant, which had an increasing intensity with the movement of the abdomen.

Physical examination can reveal a tense, non-pulsatile mass on palpation (10). The Carnett's sign (increased tenderness after tensing the abdominal muscles), with a sensitivity of 81% and a specificity of 88%, can be helpful for differential diagnosis between intraabdominal and abdominal wall pathologies (5). However, the Fothergill's sign is

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another valuable finding (palpable mass does not cross the midline and does not change with flexion of the rectus muscles) (5). Other late signs include Cullen's sign (periumbilical ecchymosis) and Gray Turner's sign (lateral ecchymosis). Blood loss can lead to hypotension and tachycardia. Moreover, the signs of peritoneal irritation may occur depending on the size of the hematoma (5).

Replacement of blood and blood products is critical according to serial monitoring of complete blood count. Coagulation factors should be measured and can help determine the need for reversal in patients given anticoagulation therapy. However, RSH has also been reported in patients with coagulation factors within normal ranges (11). Nevertheless, our patient developed RSH with an INR of 3.45, due to the use of oral anticoagulants for mechanical valve replacement. Therefore, on the 1st day, oral anticoagulants were discontinued and 2 units of fresh frozen plasma were transfused. Subsequent INR was 1.45. The patient was given low molecular weight heparin twice a day for 1 month for both COVID-19-induced hypercoagulability and pre-existing mechanical valve. After a stable course of hemoglobin levels and the regression of the hematoma on abdominal CT, oral anticoagulant therapy was resumed.

Ultrasonography and CT are first-line imaging modalities used to reduce mortality and morbidity rates in RSH (4). In addition, ultrasonography is cheaper, faster, and easily accessible and is, therefore, a useful tool in the initial diagnostic stage and monitoring the course of RSH. However, CT provides more detailed information on the size and location of the hematoma, with a sensitivity and specificity of 100%. Moreover, it is important in differential diagnosis from other abdominal pathologies (9). In the present case, CT was preferred as a first-line diagnostic imaging method and for differential diagnosis from acute abdominal pathologies. In addition, the use of CT was preferred during the follow-up period. The purpose of not using USG was to minimize the contamination and interpersonal transmission of COVID-19.

Conservative and invasive approaches can be used in the treatment of RSH (4). The conservative approach is preferred more often and is based on providing adequate analgesia, ice therapy, bed rest, transfusions, elimination of risk factors, and reversal of anticoagulation (4, 9). The invasive approach should be considered for patients with a progressive hematoma despite intravenous administration of fluids and/or blood transfusions, an unstable hemodynamic state, and severe abdominal compartment syndrome or signs of peritoneal irritation (4, 9). Invasive treatment strategies include coil embolization of the bleeding vessel, imaging-guided drainage of the hematoma, and rare surgical exploration (12, 13). Surgical treatment should be reserved to drain unusually enlarged RSH or for patients who have suffered an unsuccessful embolization mainly due to an increased risk of infection and impaired breathing or mobility (14). In our patient, having severe comorbid conditions and receiving treatment for COVID-19, the conservative approach was chosen as the first-choice treatment option, which included serial monitoring of hemoglobin levels, transfusion of blood and blood products, reverse anticoagulation, ice therapy, and analgesia with the infusion of Contramal. It has been reported in the literature that RSH can rarely develop secondary to the administration of LMWH (15). However, the increasing evidence regarding the existence of a relationship between coronavirus infection and coagulopathy has made LMWH an important part of the treatment of hospitalized patients to reduce the risk of venous thromboembolism (13). Nevertheless, a twice-daily dose of LMWH was initiated to prevent thrombotic complications of preexisting mechanical valves. During the follow-up period, our patient had a stable course of hemoglobin levels and regression of hematoma on abdominal CT. In addition, a complete recovery of the lungs was achieved following the completion of treatment for COVID-19. In the light of these data, the researchers of the current study assumed that considering the conditions associated with COVID-19 infection, it was extremely important to cure our patient without using any invasive approach.

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Conclusion

Among the many clinical scenarios that may be associated with the COVID-19 pandemic, rectus sheath hematoma, which manifests itself with atypical clinical conditions and is an important cause of morbidity and mortality, is a highly considerable clinical pathology in patients having a preexisting mechanical valve and use anticoagulant therapies. Early diagnosis and treatment of RSH are highly important, especially as this disorder can be overlooked in this difficult pandemic period.

Conflicts of ınterest

There is no conflict of interest.

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