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ORIGINAL ARTICLE

Rectus Sheath Hematoma in COVID-19 Patients

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Abstract

Introduction: The COVID-19 pneumonia epidemic that started in 2020 and the management of its cases are not completely clear. Moreover, the process becomes more complicated in patients with comorbidities. In this study, we presented COVID-19 pneumonia patients diagnosed with rectus sheath hematoma (RSH).

Methods: We retrospectively analyzed 12 patients that we followed up in the pandemic clinic between March 2020 and September 2021. The examinations performed at admission, the blood values and imaging findings in the detection of RSH, and the procedures performed were recorded.

Results: Six of our cases were male and six were female, and the mean age was 77 (range: 68–89) years. In treatment protocols, low-molecular-weight heparin 0.6 milliliter and prednol 40 milligrams (IV) were administered twice a day. The diagnosis of RSH was made on the 8th (6–12) day on average of hospitalization and the start of treatment. A possible intra-abdominal connection of the hematoma or other intra-abdominal bleeding foci were excluded by computed tomography (CT) in all cases. After LMWH was discontinued, all patients were followed conservatively by recording their daily examinations and hematoma diameters, and the hematoma stopped and regressed spontaneously. All patients were followed conservatively and bleeding was successfully stopped. No morbidity or mortality associated with RSH was observed.

Discussion and Conclusion: CT is the main tool used to determine the origin, amount, and type of bleeding in the diagnosis of RSH. Although it is a self-limiting entity, it may rarely require intervention. Hypercoagulation appears to play a key role in the pathogenesis of COVID-19. Side effects seen while intervening in the coagulation cascade require rapid diagnosis and treatment.

Keywords: Computed tomography; COVID-19 pneumonia; hypercoagulation; rectus sheath hematoma.

Rectus sheath hematoma (RSH) is rarely encountered in the etiology of abdominal pain and often occurs due to injury to the epigastric artery and vein and/or its branches[1]. It may mimic several more common conditions such as acute abdomen, acute appendicitis, and inflammatory bowel diseases. RSH is often a self-limiting process. The overall mortality rate is 4% but has been observed as high as 25% in patients using anticoagulants which is striking[2,3]. The absence of a posterior sheath under the arcuate line may be inadequate to limit RSH and the bleeding may become massive. The need for intervention was stated to be 8–21% in patients with hemodynamic instability and hematomas that continue to grow[1].

Anticoagulant use, which is among the risk factors, seems to have a major role. More than six million people around the world use anticoagulants owing to heart disease[4]. RSH cases have been reported with unfractionated heparin (UFH), warfarin, low-molecular-weight heparin (LWMH),

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apixaban, and rivaroxaban[5]. It has been reported that LWMH causes less bleeding than UFH and heparin-related thrombocytopenia is observed less[6]. As we know, anticoagulant therapy with LMWH has become the standard step of treatment in hospitalized patients with COVID-19.

In this study, we aimed to present our experience on COVID-19 pneumonia patients under prophylactic treatment of LMWH and diagnosed with RSH.

Materials and Methods

Our study was approved by the ethics' committee of our institution (file number 2021–162), and all patients signed the consent form. We retrospectively reviewed 14 patients who were followed up with the diagnosis of RSH in the pandemic clinic between March 2020 and September 2021.

Demographic data of the patients, blood biochemistry values detected at the time of diagnosis of RSH, physical examination, imaging scan findings, and the treatments applied were recorded with overall results. Accompanying diseases and changes in the diameters of hematomas were also noted.

All data were transferred to the Excel (Microsoft 97, Illinois, U.S.) file, and statistical evaluation was made with student's t-test, and $p<0.05$ value was considered significant.

Results

Of the 14 patients diagnosed with RSH, 6 (42.8%) were male and 8 (57.2%) were female. The mean age was 77 years (range, 68–89). At the time of diagnosis, all patients were SARS-CoV-2 positive, verified with PCR test. In treatment protocols of COVID-19 patients, LWMH 0.6 mL and prednol 40 mg (i.v.) were being administered routinely twice a day. The diagnosis of RSH was made on the 8th day (range, 6–12 days) after hospitalization and the start of treatment with physical examination. A possible intra-abdominal connection of the hematoma or other intra-abdominal bleeding foci were excluded by computed tomography (CT) in all cases (n=14, 100%).

The most common comorbidities were heart diseases and diabetes mellitus (each, n=4, 33%). Their heart diseases were seen to be complete heart block, atrial fibrillation, ischemic cardiomyopathy, and stroke. They were using ecopirin. The average fibrinogen value was 556 mg/dL (range, 353–776 mg/dL), the D-dimer was 1.22 mg/L (range, 0.93–3.26 mg/L), and procalcitonin was 0,78 ng/mL (range, 0.35–1.68 ng/mL). INR was within normal limits (mean value 0.92, range 0.8–1.28). Pulse rate 88 beats/min (range, 56–110 beats/min) and oxygen (O_2) saturation 90% (range, 45–96%).

The most common complaint of the patients was abdominal pain. On physical examination, we saw a mass in the right lower quadrant in 10 (71.5%, $p<0.05$), and ecchymosis in 4 (28.5%). All of the cases (n=14, 100%, $p<0.05$) had tenderness on abdominal examination.

The mean diameter measured on imaging was 12 cm (range, 5–23 cm). Severe anemia was noted in biochemistry tests, with an average hemoglobin level of 8.42 g/dL (range, 6.7–13.6 g/dL, $p<0.05$), and blood transfusions were necessary in those cases (mean 2 Units, range: 1–3 U). Fresh frozen plasma and Vitamin K (10 mg, i.m.) were included in routine treatment.

CT was used as the main diagnostic tool (Figs. 1 and 2). The patients with 23 cm and 14 cm hematomas were drained under US guidance. The drainage catheter was removed on the 6th and 4th days, respectively. The rest were followed

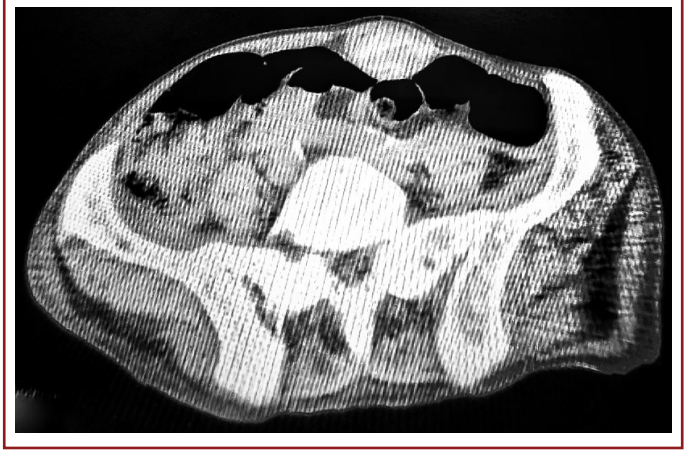

Figure 1. CT scan showing RSH, 4 cm in diameter, in the right lower quadrant.

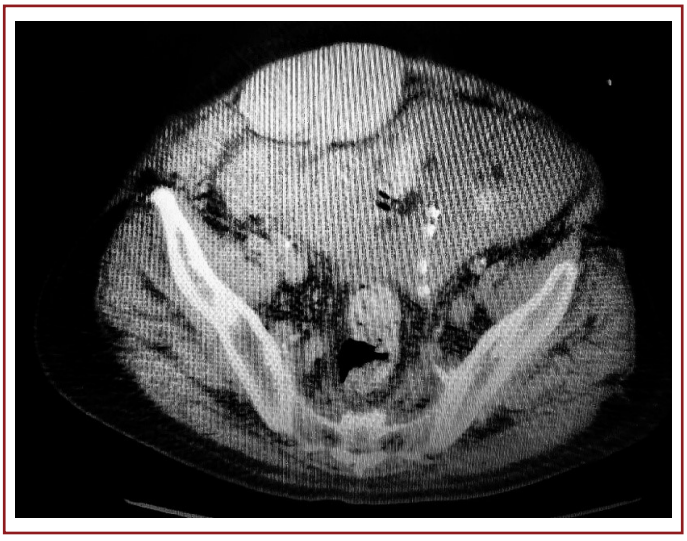

Figure 2. CT image indicating a 3 cm-sized RSH.

up conservatively, and the bleeding has been stopped successfully on average of 7 days (range, 1–21 days; mean diameter 4 cm, range: 0–7 cm). No RSH-related morbidity or mortality was observed.

Discussion

In December 2019, a pandemic of pneumonia from an unclear factor was reported in the Hubei Province of Wuhan municipality, China. In January 2020, the etiologic agent was isolated and described as a new coronavirus (SARS-CoV-2 or 2019-CoV)[7]. Since then, there have been 95.612.831 cases of COVID-19, of which 2.066.176 died, as reported by the World Health Organization (WHO) and it has continued to rise[8]. COVID-19 mainly attacks the pulmonary system and causes acute lung injury and diffuse alveolar damage, but it also has been shown to affect multiple systems in patients with or without comorbidities[8]. Among other pathophysiological modifications, SARS-CoV-2 induces a state of hypercoagulability[7].

COVID-19 is still being investigated, and some ideas about its physiological functioning have also been suggested. In pathophysiology, factors such as disseminated intravascular coagulation, properties of the virus itself, antiphospholipid syndrome, activation of the complement cascade, and endothelial dysfunction stimulated by the infection and the virus itself are emphasized[9]. As we know, SARS-CoV-2 acts by binding to the angiotensin-converting enzyme (ACE)-2 receptor. The spike (S) protein of SARS-CoV-2 more easily finds entry through the ACE-2 receptor and binds to the TMPRSS2 receptor. SARS-CoV-1 has been shown to stimulate coagulation cascade factors, including factors II, III, and X, ultimately leading to a procoagulable state by inducing gene expression of fibroblast growth factor, fibrinogen gamma chain, and serine proteases (SERPINs as shown in vitro analyses. However, expert opinions for the use of anticoagulants in treatment have been accepted in medical sources[9]. Of course, the use of anticoagulants carries the risk of bleeding. D-dimer and fibrinogen are guiding markers used in determining the prognosis[8].

RSH accounts for 2% of cases of idiopathic abdominal pain. Patients with RSHs typically apply to the hospital with abdominal pain, palpable abdominal wall mass (generally in the right lower quadrant), and abdominal distension[3]. In our series, a similar presentation was noted, as well. Risk factors contain anticoagulation, trauma, pregnancy, repeated Valsalva maneuvers, recent laparoscopic surgeries, recent invasive procedures (such as paracentesis), hypertension, coughing, advanced age, and obesity[10,11]. Three classes are used in RSH typing; type I is small and imprisoned within the rectus muscle; type II can dissect throughout the transversalis fascial plane or protrude from the midline, and type III is large and frequently presents with evidence of blood within the prevesical space[12]. It is usually a self-limiting entity and can be controlled conservatively, in spite of it may require blood transfusions, arterial embolization, or surgical intervention if bleeding insists[12,13].

The sensitivity of US used often as the first diagnostic tool in the suspicion of RSH is 80–90%. US generally provides accurate information about the size and localization of the mass. However, CT, which is the gold standard, is used to rule out other diagnoses and to characterize RSH. Its sensitivity and specificity approach to 100%[3]. Contrella et al.[1] proposed a scoring system to decide on embolization in growing hematomas (including extravasation on CT angiography, hematoma volume >1.300 mL, transfusion of 4 U of blood, and maximum rate of hemoglobin decrease >0.25 g/L/h. The mortality rate in the group they embolized is 19%, which seems lower compared to surgery. On the other hand, conservative management of the disease is often successful, as seen in our cases. US-guided drainage may be sufficient in patients having pressure symptoms. However, this practice should not be routinely recommended[2]. We applied US-guided drainage to only two patients (14.2%) with the largest diameters (14 and 23 cm) and prevented compression symptoms. We observed that the hematoma regressed in a minimally invasive manner without the need for embolization or surgery.

Although there are RSH cases in the literature that can be considered a treatment complication of COVID-19 pneumonia, more studies are needed to determine its etiopathophysiology. Further studies are needed to clearly understand the basis of procoagulation in COVID-19. Prophylactic dose administration may be considered rather than a therapeutic dose. Dosage decisions should be guided by observations, benefit, and harm ratio should also be kept in the mind. Bleeding in older patients should be monitored closely, and the side effects seen while intervening in the coagulation cascade require rapid diagnosis and treatment.

Ethics Committee Approval: Our study was approved by the ethics' committee of our institution (file number 2021–162), and all patients signed the consent form. We retrospectively reviewed 14 patients who were followed up with the diagnosis of RSH in the pandemic clinic between March 2020 and September 2021.

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