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RESEARCH ARTICLE

Does COVID-19 Augmented Life-threatening Spontaneous Iliopsoas Hematomas?

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ABSTRACT

Objective: Iliopsoas hematoma (IPH) is a potential life-threatening condition that generally appears after trauma and concomitant hematologic abnormalities. It may rarely occur spontaneously. We determined a significant increase in the prevalence of this rarely encountered entity during the COVID-19 pandemic. Therefore, in this study, we aimed to investigate the relationship between COVID-19 and IPH.

Materials and Methods: The study included 18 patients who were hospitalized in our hospital due to COVID-19 between February 2020 and February 2021 and were consulted to our clinic due to the detection of IPH in abdominal computed tomography (CT) during their follow-up. Demographic data, medical history, physical examination findings, laboratory tests, and radiological imaging results of the patients and administered anticoagulant and antiaggregants were recorded.

Results: The median age was 63±13.6 (42–90) years. Eleven (61.1%) patients were consulted from the COVID-19 intensive care units and 7 (38.9%) were consulted from the COVID-19 wards. All patients were on anticoagulants at the time of IPH diagnosis. Eight (44.4%) patients had already been on anticoagulants before they had COVID-19. The largest diameter of hematoma measured by CT varied between 4 and 15 cm in the axial plane and 9–12 cm in the coronal plane. Seven patients (38.9%) died on days 1–11 after IPH diagnosis.

Conclusion: Given the indications for prescribing anticoagulant therapy in COVID-19 and the lack of definite evidence regarding its optimal dose and duration, it is important to be aware of IPH as a potentially severe complication in hospitalized COVID-19 patients.

Keywords: Complication, COVID-19, ilio-psoas hematomas

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INTRODUCTION

The COVID-19 pandemic began in 2019 and it has become a public health emergency. Although most of the affected individuals develop only mild symptoms, some have severe respiratory conditions including dyspnea and pneumonia.[1] COVID-19-related severe pulmonary damage, arterial and venous thrombosis, and severe pulmonary embolism carry a high risk for mortality.[2] Empirical low-molecular-weight heparin (LMWH) therapy was standard early in COVID-19 pandemic; however, it was switched to higher doses in hospitalized COVID-19 patients later on.[3] On the other hand, severe COVID-19 has also been associated with a disturbance of hemostasis, for instance high D-dimer levels, and mild to severe thrombocytopenia.[4] High factor VIII, fibrinogen, and von Willebrand factor levels and fibrinolysis shutdown have also been reported in hospitalized COVID-19 patients.[5]

Iliopsoas hematoma (IPH) is a potential life-threatening condition that generally appears after trauma and in patients with coagulation disorders. It may rarely occur spontaneously, particularly in elderly patients who are on anticoagulants, and hospitalizing those patients in intensive care unit (ICU) is problematic.[6]

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We determined a significant increase in the number of patients consulted to our clinic due to spontaneous IPD during COVID-19 pandemic, and we thought that this might be due to the anticoagulants used in COVID-19 patients. There is insufficient evidence regarding the indications, optimal doses, and duration of administration of anticoagulants in patients with COVID-19; in addition, anticoagulants are administered at higher-than-standard doses to these patients. Therefore, it is essential to be alert for the development of IPH, a severe and life-threatening complication, while administering anticoagulants to the patients with COVID-19.

To date, COVID-19-related spontaneous IPH has been reported as a case report and in two case series.[7–9] In this study, we aimed to analyze spontaneous IPH in severe COVID-19 patients hospitalized in our hospital.

MATERIALS and METHODS

The study was conducted in accordance with the principles of the Declaration of Helsinki. Institutional Ethics Committee approved this study (March 31, 2021-No: E1/1700/2021). The patients who were consulted to our department due to spontaneous IPH between February 2020 and February 2021 (during COVID-19 pandemic) were reviewed retrospectively. The patients with a history of recent major trauma or surgery and/or hematologic disorders were excluded. Eighteen patients met the inclusion criteria and were included in the study. Eleven (61.1%) patients were consulted from the COVID-19 ICUs and 7 (38.9%) were consulted from the COVID-19 wards, and the median hospital stay was 13 (5–33) days. Nine patients were consulted to our clinic because of flank pain, and 9 patients after detection of IPH on abdominal CT performed due to deterioration of vital signs and unexplained decrease in their hemoglobin levels. Demographic data, comorbidities, use of anticoagulants, radiological images, management protocols, follow-up, and administration of blood or blood products were examined. Laboratory parameters including thrombocyte international normalized ratio (INR), hemoglobin and D-dimer, and length of hospital stay were recorded. After the diagnosis of IPH, all patients were followed up conservatively by administering blood products and intravenous (IV) fluids. All patients were followed up closely with vital signs (all patients were monitored) and serial hemoglobin, hematocrit, and INR. In addition, symptom alterations were carefully monitored in symptomatic patients, and if necessary, the size of hematoma was followed with abdominal USG and CT. None of the patients who were followed up conservatively with IV fluids and blood product replacements required an invasive procedure during their follow-up.

Statistical Analysis

The statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 20.0 for Windows (SPSS Inc., Chicago, IL) software. Descriptive statistics including mean, median, standard deviation, minimum, and maximum values were calculated for the quantitative data included in the study. The distribution of qualitative data was presented using absolute values and percentages.

RESULTS

The mean age of all patients was 65.5±14 (range: 42–90, median: 63) years. The demographics and comorbid conditions of the patients are presented in Table 1. All patients had at least one comorbid condition. The median hospital stay was 13 (5–33) days. Severe COVID-19 was observed in all patients, and mortality occurred 1–11 days after IPH diagnosis in 7 (38.9%) patients.

The most frequent findings at diagnosis were hemodynamic changes due to low hemoglobin. Eight (44.4%) patients had sudden-onset pain. The pain was most frequently at the lumbar region. Subileus symptoms, nausea, and abdominal mass on palpation were other symptoms and findings.

All IPH patients were on anticoagulants. Eight (44.4%) patients had already been on anticoagulants (LMWH, warfarin, or clopidogrel) before they had COVID-19. Other patients were administered prophylactic LWMH during their hospitalization for COVID-19. COVID-19 management protocol included oral favipiravir (600 mg bid for 10 days) in all patients, IV dexamethasone (6–8 mg/day for 10 days) was administered to all ICU patients, three patients were administered oral hydroxychloroquine (200 mg bid for 7 days), and one patient was administered anakinra (5 mg/kg).

The median hemoglobin level was 9.3±2.3 (5.7–14.1) g/dL when IPH was diagnosed. Hemoglobin was lower than 10 g/dL in 11 (61.1%) patients. Erythrocyte suspension transfusion was performed in symptomatic patients (hypotensive and tachycardic) with an Hb value below 9 g/dL. At least one erythrocyte suspension was transfused to 9 (50%) patients during their hospitalization. The median number of erythrocyte suspensions transfused was 3±1.7 (1–7). At the time of IPH diagnosis, the median INR was 1.2±1.35. INR was higher than 3 in 1 (5.6%) patients. At least one fresh frozen plasma was transfused to 6 (33.3%) patients. The median fresh frozen plasma transfusions administered was 2±1.8 (1–6) (Table 1). Thrombocytopenia was apparent in 4 (22.2%) patients. The minimum size of the hematoma on abdominal computed tomography (CT) was 4×9 cm. The transverse diameter of hematoma was bigger than 15 cm and its longitudinal diameter was >12 cm in 8 patients.

Table 1. Demographic, clinical, and laboratory parameters of the patients

	n	%	Min-max
Gender (n=18)			
Female	5	27.8	
Male	13	72.2	
Median age (years)			63±13.6 (42–90)
Comorbidities			
Hypertension	9	50	
Diabetes mellitus	2	11.1	
Heart failure	3	16.7	
Coronary artery disease	3	16.7	
Arrhythmia	3	16.7	
Chronic obstructive pulmonary disease	3	16.7	
Cerebrovascular disease	3	16.7	
Others	10	55.6	
Median hospital stay (day)			13±8.7 (5–33)
Median hemoglobin level (g/dL)			9.3±2.3 (5.7–14.1)
Median INR			1.2±1.35 (0.9–6.8)
Median number of erythrocyte suspensions transfused			3±1.7 (1–7)
Median number of fresh frozen plasma transfusions			2±1.8 (1–6)
Median size of the hematoma (mm)			
Axial			65±34.9 (38–180)
Coronal			60±21.9 (28–120)
Sagittal			59±23.6 (11–130)

INR: International normalized ratio

DISCUSSION

IPHs usually appear after trauma or may be due to concomitant hematologic disorders. The prevalence of spontaneous IPH gets higher after administration of anticoagulants for various medical conditions, particularly in the elderly and hemodialysis patients.[10] The exact pathogenesis of retroperitoneal hematoma is not clear. IPH was reported as a complication of anticoagulant therapy and more rarely in the case of a coagulation disorder or a trauma during mobilization of prone-positioned patients. The pathogenesis may be related to retroperitoneal microvascular atherosclerosis, which may increase the chance of rupture. Anticoagulants and micro-trauma causing an increase in intra-abdominal pressure, i.e. vomiting or coughing, may also cause retroperitoneal hemorrhage.[11] Clinical presentation is related to the severity of the hematoma, anemia, ischemia, nerve palsy, and lower abdominal pain. CT is the gold standard for diagnosis, providing beneficial information on the extent and volume of hematoma, complications, and presence of active bleeding.[12] In our patients, the most frequent finding at diagnosis was hemodynamic changes due to low hemoglobin. Eight patients had sudden-onset pain in their lumbar regions. Subileus symptoms and/or nausea were also present.

IPH is a rare complication in ICU patients. The data on the prevalence of spontaneous IPH in patients on anticoagulants is scarce, and its prevalence has been reported as 0.1–0.6%.[13] Two retrospective studies that included non-COVID-19 ICU patients reported the prevalence of IPH as 3.8 and 3.0/1000 cases.[11,14] Recently, the prevalence of IPH was reported 7.6 cases over 1000 hospitalizations in COVID-19 patients, which is higher than the rate in the non-COVID-19 patients.[8] Similarly, in this study, we found IPH prevalence as 8.2/1000 COVID-19 hospitalizations, and this rate is higher than the previously reported rate in non-COVID-19 patients.

Life-threatening venous and arterial thrombosis were reported in the previous studies, and the prevalence of pulmonary embolism and deep venous thrombosis is higher than 10% in almost all of them.[15] Thrombotic events led clinicians to administer empirical thromboprophylaxis to

hospitalized COVID-19 patients, and LMWH was administered in higher-than-common doses.

The pathophysiology of COVID-19-related thrombosis is not clear. High levels of factor VIII, fibrinogen and von Willebrand factor, positivity for lupus anticoagulant, and presence of antiphospholipid antibodies have been accused.[16] The COVID-19-related cytokine storm appears to be the likely cause of the change in plasma protein levels, possibly causing an imbalance of pro-and anticoagulant activities. For the coagulation parameters, the most frequent abnormality in COVID-19 patients is an increase in D-dimer level and INR. A high D-dimer level has been shown to be related to severe COVID-19 and higher mortality.[17] Concerning INR, it has been reported that severe COVID-19 patients or the ones who died had significantly higher INR values within 24–48 h of hospitalization compared to the patients with mild COVID-19 or those who recovered.[18] On the other hand, thrombocytopenia was reported in 55% of COVID-19 patients and was identified as a significant risk factor for mortality. If performed, mechanical ventilation causes endothelial damage in the lungs and triggers platelet activation, aggregation, and thrombosis, leading vast platelet consumption. COVID-19 may also directly affect the bone marrow, causing alterations or an autoimmune response to blood cells that can result in abnormal hematopoiesis.[19] In our study, high D-Dimer level and INR and thrombocytopenia were found in approximately half of the included patients. The COVID-19-related coagulation dysfunction typically includes the combined activation of coagulation, complement, and immune pathways as well as endothelial dysfunction. This hypercoagulable condition is due to high pro-inflammatory cytokine levels causing atherosclerotic damage through local inflammation, microvascular thrombi, and hemodynamic instability,[20] and it may pave the way for LMWH-related IPH.

The management of IPH includes close follow-up, arterial embolization, or surgery. Cessation of anticoagulants, transfusion of blood or its products, IV fluid replacement, and supportive management constitute the first step of treatment in the elderly COVID-19 patients with comorbid conditions. If hemodynamic stability cannot be established with supportive therapy, arterial embolization may be an option as it is a minimally invasive method and avoids surgical morbidities.

Given the indication of anticoagulant therapy in COVID-19 patients and the lack of sufficient evidence regarding its optimal dose and duration of administration, particularly in case of microthrombi, it is important to be alert for IPH, which is a severe complication.

The retrospective nature of our study is its major limitation.

CONCLUSION

IPH is strongly associated with LMWH use, and COVID-19 seems to potentiate this effect. COVID-19 patients on LMWH should be closely followed up for IPH. Conservative management and follow-up are the first treatment option; however, invasive procedures should be kept in mind in case of hemodynamic instability.

Disclosures

Ethics Committee Approval: The study was approved by the Ankara City Hospital No 1 Clinical Research Ethics Committee (No: E1/1700/2021, Date: 31/03/2021).

Informed Consent: Written informed consent was obtained from all patients.

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