Annals of Short Reports and Clinical Images

Case Series

Muscular Hematomas and COVID-19: A Missed Diagnosis?: A Case Report

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Abstract

Background: Bleeding complications have been reported with coronavirus disease 2019 (COVID-19) especially in association with anticoagulation use. Muscular hematomas are an uncommon bleeding complication of anticoagulation and notably absent in most series assessing thrombotic and bleeding complications associated with COVID-19. We report muscular hematomas in three hospitalized COVID-19 patients receiving anticoagulation.

Case presentation: Three critically ill male COVID-19 patients had acute renal failure and worsening anemia. The worsening anemia led to computed tomography imaging and a diagnosis of muscular hematoma with anticoagulation subsequently held in all three patients. Two patients required pack-red-blood-cell transfusions. No surgical intervention was needed.

Conclusions: Anticoagulation is extensively used in COVID-19 patients both in prophylactic and therapeutic dosing. Muscular hematomas should be considered a potential complication of COVID-19 in hospitalized patients, especially those receiving anticoagulation and unexplained anemia.

Keywords: Muscular hematomas; COVID-19; SARS-CoV-2 infection; Case report

Abbreviations

ICU: Intensive Care Unit; VTE: Venous Thromboembolism; CVA: Cerebrovascular Accident; ARDS: Acute Respiratory Distress Syndrome; SVT: Supraventricular Tachycardia; AKI: Acute Kidney Injury; TPA: Tissue Plasminogen Activator; PE: Pulmonary Embolism; CT: Computed Tomography; PRBC: Packed Red Blood Cells; DM: Diabetes Mellitus; CAD: Coronary Artery Disease; CABG: Coronary Artery Bypass Graft; PCI: Percutaneous Coronary Intervention; HTN: Hypertension; MRI: Magnetic Resonance Imaging

Introduction

Thrombotic risk increases in Coronavirus Disease 2019 (COVID-19), and thromboembolism denotes poor prognosis [1,2]. Increased d-dimmers, c-reactive protein, and fibrinogen, have been reported and may predict mortality [1-3]. Critically ill COVID-19 patients in the Intensive Care Unit (ICU) have a high risk of thrombosis, especially Venous Thromboembolism (VTE), despite prophylactic anticoagulation [1,4,5]. Anticoagulation has been associated with a lower mortality [2,3,5] and has prompted increased use of intermediate and therapeutic dose anticoagulation [6,7]. Bleeding is a well recognized side effect of anticoagulation [8]. Among bleeding sites in patients on anticoagulation, however, muscular hematomas are uncommon [9-11]. The overall rate of bleeding reported in association with COVID-19 has been reported to range from 2% to 4.6% in two US studies [12,13] with no intramuscular hematomas reported in these studies. We report muscular hematomas in three COVID-19 hospitalized patients.

Case Series

All three patients were male. All had acute renal failure and worsening anemia prior to the diagnosis of an intramuscular hematoma. Has-BLED [14] and IMPROVE [15] bleeding scores, laboratory data on hospital admission and at time of bleeding, and treatment received during hospitalization are included.

Case 1

Sixty-five-year-old male, former smoker (40 pack-year history), with a history of Cerebrovascular Accident (CVA) (2018) was admitted due to Acute Respiratory Distress Syndrome (ARDS) secondary to COVID-19. The patient required immediate ICU admission and emergent intubation. He was started on enoxaparin 1 mg/kg BID and continued on home medication of clopidogrel. The hospital course was complicated by recurrent Supraventricular Tachycardia (SVT) requiring recurrent cardio version as well as Acute Kidney Injury (AKI), requiring hemodialysis. He also received Tissue Plasminogen Activator (TPA) on hospital day four due to acute worsening of his respiratory status and concern for Pulmonary Embolism (PE). Post TPA, patient was started on intravenous unfractionated heparin, which was eventually held due to worsening anemia and persistent oozing from lines. He was resumed on heparin prophylaxis but again developed acute worsening of his anemia requiring blood transfusion. At that time, the patient had a Computed Tomography (CT) scan and was found to have a 4.6x6.3 cm intramuscular hematoma of left

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psoas (Figure 1) and iliacus muscles and focal hematomas in the right pectineus/adductor longus muscle, the right adductor brevis, the vastus lateralis bilaterally, and the left rectus femoris muscles (Figure 2). All anticoagulation was held at that time, and surgery was consulted for evaluation of compartment syndrome. He received three units of Packed Red Blood Cells (PRBCs) but no surgical intervention was required. There was also concern for Vitamin K deficiency and patient received intravenous Vitamin K replacement. The patient recovered with conservative therapy. He was subsequently resumed on heparin prophylaxis, which he was able to tolerate for the duration of the hospitalization.

Case 2

Seventy-eight-year-old male with a history of type 2 Diabetes Mellitus (DM), Coronary Artery Disease (CAD) post-Coronary Artery Bypass Graft (CABG) and Percutaneous Coronary Intervention (PCI) with a stent, hypertension, hyperlipidemia, asthma, nasopharyngeal cancer post-chemotherapy (2015), and history of right pontine ischemic CVA was admitted due to ARDS and AKI secondary to COVID-19. The patient was receiving dual antiplatelet therapy with aspirin and clopidogrel prior to hospitalization. Upon admission, the patient was started on intermediate-dose enoxaparin 40 mg BID and aspirin was held. Enoxaparin was increased to 1 mg/kg BID due to development of atrial fibrillation during the hospital course. Enoxaparin was decreased back to 40 mg BID due to a decline in Hgb. CT scan was performed due to progressive anemia and showed right lower extremity obturator, adductor, and hamstring intramuscular hematoma measuring 7.8x2.5 cm. Anticoagulation washeld but eventually resumed with unfractionated heparin prophylaxis. The patient recovered with conservative treatment and was ultimately discharged on aspirin 81mg daily due to paroxysmal atrial fibrillation.

Case 3

Fifty-nine-year-old male with a history of Hypertension (HTN) and newly diagnosed type 2 DM, admitted with ARDS secondary to COVID-19. The patient required immediate ICU admission and emergent intubation secondary to ARDS and hypoxic respiratory failure, hypertensive emergency, and AKI. He initially received enoxaparin 1mg/kg BID with further dose adjustments due to AKI and was eventually changed to IV unfractionated heparin. Due to a change in mental status, the patient underwent a head CT and was found to have an acute left frontal subdural hematoma and subdural hemorrhage in the inferolateral right frontal and temporal subdural space. The patient also had CT scans of the chest, abdomen, and pelvis at that time due to acute anemia and was found to have a muscular hematoma involving the right subscapularis (Figure 3), left gluteus minimus, and left obturator internus muscles (Figure 4). Patient was not felt to be candidate for protamine sulfate due to timing of last heparin exposure. He received 2 units of PRBCs and no surgical intervention was required. Anticoagulation was held for two weeks. He was eventually resumed on unfractionated heparin prophylaxis which he was able to tolerate until discharge.

Discussion

Muscular hematomas are a rare complication of anticoagulation [16]. In non-Covid patients, advanced age (>75 years), the intensity of anticoagulation (especially INR >4), history of CVA (recent or remote), and concomitant use of drugs that interfere with hemostasis (aspirin or non-steroidal anti-inflammatory drugs) are the most important risk factors for bleeding complications while receiving anticoagulation [17]. Psoas muscle hematomas are rare, with an occurrence of 0.1% to

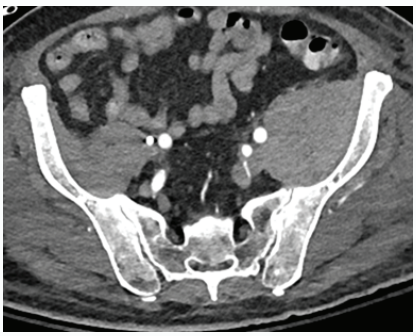

Figure 1: Enlarged and hyperdense left iliopsoas muscle.
Abbreviations: IPs: Iliopsoas.

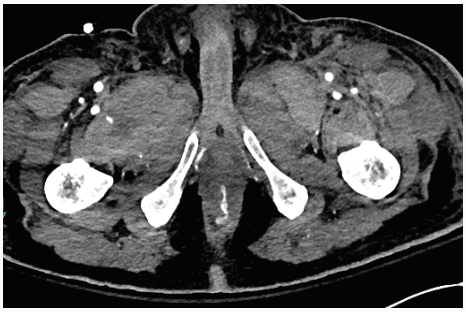

Figure 2: Hyperdense left rectus femoris, right pectineus and adductor brevis, and vastus lateralis muscles
bilaterally. Right pectineus muscle enlargement and shows low density fluid within.
Abbreviations: VL: Vastus Lateralis; P: Pectineus; B: Adductor Brevis; RF: Rectus Femoris.

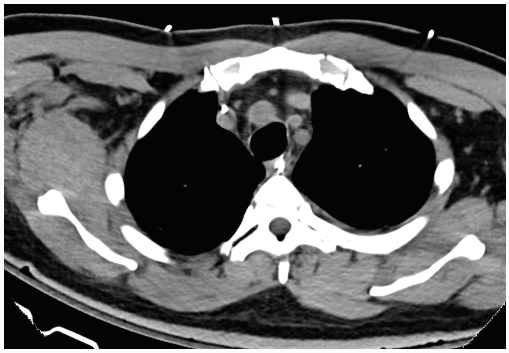

Figure 3: Abnormal right subscapularis with hemorrhage.
Abbreviations: SS: Subscapularis.

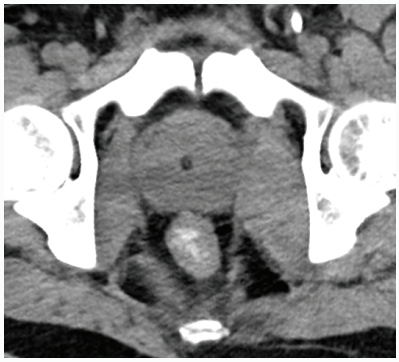

Figure 4: Left obturator internus with bleeding.
Abbreviations: OI: Obturator Internus.

0.6% [10,18]. The diagnosis of intramuscular hematomas is challenging and made in only 40% of patients [19]. CT images of muscular hematomas show diffuse muscle involvement, and hyperdense muscle lesions may be an early sign of a hematoma. Thus, CT imaging can help evaluate the extent of the hematoma and its regression [19,20], allowing a detailed retroperitoneal space study. Recent publications shed light on hemorrhagic events as a complication of COVID-19, especially in critically-ill ICU patients. One US retrospective study reported that among 4389 hospitalized COVID-19 patients, 1.9% of patients who did not receive anticoagulation had hemorrhagic events, compared to 3% among those who received therapeutic dose anticoagulation (p=0.2). Hemorrhagic events were more common among intubated patients. The most common site of hemorrhage was gastrointestinal, occurring in 50.7%. No intramuscular hematomas were identified [12]. In another US study of 429 hospitalized COVID patients, an overall bleeding rate of 4.6% was observed. In this study, gastrointestinal bleeding was reported in 42% (8/19) patients with bleeding events. No intramuscular hematomas were reported [13]. Interestingly in a recent one-center retrospective study of thrombotic and hemorrhagic events in critically-ill COVID-19 ICU patients from France, 23% of hemorrhagic events observed were intramuscular bleeds with an overall rate of 21% hemorrhagic events [21,22]. 84% were on full-dose anticoagulation [22]. All hemorrhagic events required interruption of anticoagulation and 14% (n=4) were fatal. The percentage of intramuscular hematomas is relatively high in this paper, as is the overall bleeding rate. One other single center study from Switzerland identified 14 hemorrhagic events (5.1%), including 6 muscle hematomas out of 270 COVID-19 patients [23]. We suspect the muscular hematomas in our patients to be multifactorial. Two out of 3 of our cases had mild thrombocytopenia with platelet counts on admission of 102,000 and 129,000. Al-Samkari et al. [13] identified platelet counts < 150,000/ul on initial presentation as a risk for bleeding (adjusted OR 2.9 [1.05,7.99]) during hospitalization for COVID-19. The authors also identified elevated d-dimer >2500 ng/mlat presentation to be associated with increased risk for bleeding (adjusted OR 3.58 [1.01,12.66]). One of our cases presented with a d-dimer > 4000 ng/ml and one was just below 2500 ng/ml. COVID-19 has been associated with arthralgias, myalgias, proximal muscle weakness, and elevated CPK [24]. Whether muscle injury associated with COVID-19 is a predisposing risk to muscle hematomas in COVID-19 patients especially in associated with anticoagulation is unknown. Certain bleeding disorders, particularly hemophilia, are associated with muscle hematomas, and muscle injury, contusion, and strain are predisposing risks [24,25]. Other potential risks in our cases include instrumentation (injections/line placement), TPA in one patient, platelet dysfunction due to uremia, and Vitamin K deficiency (corrected in one patient), None of the three patients had low fibrinogen. Imaging studies including CT scanning, ultrasound, or magnetic resonance imaging (MRI) are essential to the correct diagnosis of intramuscular hematomas once suspected. In addition to delays in clinical suspicion for muscle hematoma due to their infrequent nature, COVID-19 poses significant additional logistic barriers to the diagnosis of suspected muscle hematomas, potentially leading to the delay or omission of imaging required for the diagnosis. In hemodynamically stable patients, standard management of muscle hematomas is conservative, as was the case in our three patients. Surgical treatment is reserved for hemodynamically unstable patients.

Conclusion

Anticoagulation is routinely used to prevent and manage VTE in patients with COVID-19.Although bleeding is a well-known side effect of anticoagulation, muscular hematomas are uncommonly recognized as a site of bleeding. Intramuscular hematomas should be considered a potential complication of COVID-19 in hospitalized patients with unexplained anemia receiving anticoagulation, especially those receiving therapeutic dose anticoagulation. Early clinical suspicion and the appropriate imaging studies are essential to prompt diagnosis and avoidance of surgical intervention.

References

1. Liang WH, Guan WJ, Li CC, Li YM, Liang HR, Zhao Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med. 2020;382:1708-20.
2. Connors JM, Levy JH. COVID-19 and its implications for thrombosis and anticoagulation. Blood. 2020;135:2033-40.
3. Xiao M, Zhang Y, Zhang S, Qin X, Xia P, Cao W, et al. Brief Report: Anti-phospholipid antibodies in critically ill patients with Coronavirus Disease 2019 (COVID-19). Arthritis Rheumatol. 2020;72(12):1998-2004.
4. Middeldorp S, Coppens M, van Haaps TF, Foppen M, Vlaar AP, Muller MCA, et al. Incidence of venous thromboembolism in hospitalized patients with COVID-19. J Thromb Haemost. 2020;18(8):1995-2002.
5. Paranjpe I, Fuster V, Lala A, Russak AJ, Glicksberg BS, Levin MA, et al. Association of Treatment Dose Anticoagulation With In-Hospital Survival Among Hospitalized Patients With COVID-19. J Am Coll Cardiol. 2020;76(1):122-4.
6. Spyropoulos AC, Levy JH, Ageno W, Connors JM, Hunt BJ, Iba T, et al. Scientific and Standardization Committee communication: Clinical guidance on the diagnosis, prevention, and treatment of venous thromboembolism in hospitalized patients with COVID-19. J Thromb Haemost. 2020;18(8):1859-65.
7. Spyropoulos AC. The management of venous thromboembolism in hospitalized patients with COVID-19. Blood Adv. 2020;4(16):4028.
8. Palareti G, Leali N, S. Coccheri, Poggi M, Manotti C, D'Angelo A, et al. Bleeding complications of oral anticoagulant treatment: an inception-cohort, prospective collaborative study (ISCOAT) Italian Study on Complications of Oral Anticoagulant Therapy. Lancet. 1996;348(9025):423-8.
9. Basheer A, Jain R, Anton T, Rock J. Bilateral iliopsoas hematoma: Case report and literature review. Surg Neurol Int. 2013;4:121.
10. Artzner T, Clere-Jehl R, Schenck M, Greget M, Merdji H, De Marini P, et al. Spontaneous ilio-psoas hematomas complicating intensive care unit hospitalizations. PloS One. 2019;14(2):e0211680.
11. Patel N, Baker SM, Modrykamien A. Hemorrhagic shock due to spontaneous pectoral hematoma associated with anticoagulation therapy. J Gen Intern Med. 2013;28(12):1673.
12. Nadkarni GN, Lala A, Bagiella E, Chang HL, Moreno PR, Pujadas E, et al. Anticoagulation, Bleeding, Mortality, and Pathology in Hospitalized Patients With COVID-19. J Am Coll Cardiol. 2020;76(16):1815-26.
13. Al-Samkari H, Karp Leaf RS, Dzik WH, Carlson JCT, Fogerty AE, Waheed A, et al. COVID-19 and coagulation: bleeding and thrombotic manifestations of SARS-CoV-2 infection. Blood. 2020;136(4):489-500.
14. Lip GY, Frison L, Halperin JL, Lane DA. Comparative validation of a novel risk score for predicting bleeding risk in anticoagulated patients with atrial fibrillation: the HAS-BLED (Hypertension, Abnormal Renal/Liver Function, Stroke, Bleeding History or Predisposition, Labile INR, Elderly, Drugs/Alcohol Concomitantly) score. J Am Coll Cardiol. 2011;57:173-80.
15. Hostler DC, Marx ES, Moores LK, Petteys SK, Hostler JM, Mitchell JD, et al. Validation of the Internal Medial Prevention Registry of Venous Thromboembolism Bleeding Risk Score. 2016;149:372-9.
16. Smithson A, Ruiz J, Perello R, Valverde M, Ramos J, Garzo L. Diagnostic and management of spontaneous rectus sheath hematoma. Eur J Intern Med. 2013;24:579-82.

17. Basheer, A.Fitzmaurice DA, Blann AD, Lip GY. Bleeding risks of antithrombotic therapy. BMJ. 2002;325:828-31.

18. Saad Z, Ahmed B, Mostafa R, Hicham B, Lahcen B. Conservative treatment of a psoas hematoma revealed by a lower limb palsy. Pan Afr Med J. 2017;28:138.

19. Dohan A, Darnige L, Sapoval M, Pellerin O. Spontaneous soft tissue hematomas. Diagn Interv Imaging. 2015;96:789-96.

20. Zissin R, Ellis M, Gayer G. The CT findings of abdominal anticoagulant-related hematomas. Semin Ultrasound CT MRI. 2006;27:117-25.

21. Menter T, Haslbauer J, Nienhold R, Savic S, Hopfer H, Deigendesch N, et al. Post-mortem examination of COVID19 patients reveals diffuse alveolar damage with severe capillary congestion and variegated findings of lungs and other organs suggesting vascular dysfunction. Histopathology. 2020;77:198-209.

22. Fraissé, M, Logre E, Pajot O, Mentec H, Plantefève G, Contou D. Thrombotic and hemorrhagic events in critically ill COVID-19 patients: a French monocenter retrospective study. Crit Care. 2020;24:275.

23. Kessler C, Stricker H, Demundo D, Elzi L, Monotti R, Bianchi G, et al. Bleeding prevalence in COVID-19 patients receiving intensive antithrombotic prophylaxis. J Thromb Thrombolysis. 2020;50(4):833-6.

24. Abdullahi A, Candan SA, Abba MA, Bello AH, Alshehri MA, Afamefuna Victor E, et al. Neurological and Musculoskeletal Features of COVID-19: A Systematic Review and Meta-Analysis. Front Neurol. 2020;11:687.

25. lcalay M, Deplas A. Rheumatological management of patients with hemophilia. Part II: Muscle hematomas and pseudotumors. Joint Bone Spine. 2002;69(6):556-9.

26. Beyer R, Ingerslev J, Sorensen B. Muscle bleeds in professional athletes--diagnosis, classification, treatment and potential impact in patients with haemophilia. Haemophilia. 2010;16(6):858-65.