ISSN 2307-8960 (online)

World Journal of *Clinical Cases*

World J Clin Cases 2024 June 26; 12(18): 3281-3647

Published by Baishideng Publishing Group Inc

World Journal of Clinical Cases

Contents

Thrice Monthly Volume 12 Number 18 June 26, 2024

EDITORIAL

3281 Patient-centric periodontal research: A pioneering application of patient-reported outcome measures
Agrawal AA

3285 Machine learning insights on intensive care unit-acquired weakness
Hassan MA, Nashwan AJ

3288 Unveiling significant risk factors for intensive care unit-acquired weakness: Advancing preventive care
Cheng CY, Hao WR, Cheng TH

3291 Metastatic clear cell sarcoma of the pancreas: A sporadic cancer
Gebbia V, Carnaghi C

3295 Primary extrapulmonary tuberculosis diagnosis warrants extra-precautious pulmonary tuberculosis exclusion workup
Saha S

3298 Intestinal lymphangiectasia: Understanding the bigger picture
Marrapu S, Kumar R

MINIREVIEWS

3304 Clinical issues and challenges in imaging of gastrointestinal diseases: A minireview and our experience
Gulinac M, Kiprin G, Tsranchev I, Graklanov V, Chervenkov L, Velikova T

3314 Research progress on insomnia treated by traditional Chinese medicine and acupuncture based on microbial-gut-brain axis theory
Pan LM, Hong ZB, Guan RQ

ORIGINAL ARTICLE

Case Control Study

3321 Therapeutic efficacy of methylprednisolone sodium succinate *via* diverse administration routes for mid- to high-frequency sudden sensorineural hearing loss
Meng XD, Li TT, Deng LM

Retrospective Cohort Study

3332 Prevalence and impact of diabetes and prediabetes on presentation and complications of primary hyperaldosteronism at diagnosis
Sanyal D, Mukhopadhyay P, Ghosh S

World Journal of Clinical Cases

Thrice Monthly Volume 12 Number 18 June 26, 2024

Contents

3340 Omics-imaging signature-based nomogram to predict the progression-free survival of patients with hepatocellular carcinoma after transcatheter arterial chemoembolization

Guan QL, Zhang HX, Gu JP, Cao GF, Ren WX

Retrospective Study

3351 Complicated calcified alloplastic implants in the nasal dorsum: A clinical analysis

Hwang YS, Kim TK, Yang DJ, Jang SH, Lee DW

3360 Effect of cetuximab plus FOLFOX4 regimen on clinical outcomes in advanced gastric carcinoma patients receiving evidence-based care

Ying H, Huang RJ, Jing XM, Li Y, Tong QQ

3368 Operation room nursing based on humanized nursing mode combined with nitric oxide on rehabilitation effect after lung surgery

Wang QL, Wang ZB, Zhu JF

3378 Comparative effects of insulin pump and injection on gestational diabetes mellitus pregnancy outcomes and serum biomarkers

Wang Y, Gao W, Wang XJ

3385 Development and validation of a circulating tumor DNA-based optimization-prediction model for short-term postoperative recurrence of endometrial cancer

Liu Y, Lu XN, Guo HM, Bao C, Zhang J, Jin YN

3395 Short-term efficacy of microwave ablation in the treatment of liver cancer and its effect on immune function

Yao LJ, Zhu XD, Zhou LM, Zhang LL, Liu NN, Chen M, Wang JY, Hu SJ

3403 Follow-up study of gallbladder stones in 44 children

Yu JX, Jiang ZZ, Cai YH, Zhou L, Cai B

Observational Study

3410 Increased alcohol consumption during the COVID-19 pandemic: A cross-sectional study

Rathore R, Rangrej SB, Carvalho V

3417 Current state and influencing factors in airbag management among emergency department nurses: A multicenter study

Wei XH, Zhou LJ, Li R, Li XY, Zhang Y, Zhang HY, Wang SM, Zhang J

3428 Association of total bilirubin with depression risk in adults with diabetes: A cross-sectional study

Ye ML, Wang JK

3438 Application of prostate resectoscope in the treatment of massive rectal bleeding after transrectal prostate puncture

Li HM, Yang FY, Tu S, Yan P, Qian J, Yao JX

3444 Clinical therapeutic effect of self-prescribed Sanhanchushi Tongbi on lumbar disc herniation

Yao C, He B, Zhou J, Xie L

World Journal of Clinical Cases

Thrice Monthly Volume 12 Number 18 June 26, 2024

Contents

3453 Facilitating and hindering factors of community nurses' emergency and critical care treatment abilities: A qualitative study

Cheng WL, Li R, Song Y, Qian FH, Sha SY, Song SY

3461 Serum cystatin C, monocyte/high-density lipoprotein-C ratio, and uric acid for the diagnosis of coronary heart disease and heart failure

Li M, Yuan DH, Yang Z, Lu TX, Zou XB

Randomized Controlled Trial

3468 Effect of dapagliflozin on uric acid in patients with chronic heart failure and hyperuricemia

Lin MJ, Zou SB, Zhu BX

3476 Evaluating the clinical application and effect of acupuncture therapy in anal function rehabilitation after low-tension rectal cancer surgery

Shen LZ, Li W, Liu ZL, Wang N, Liu YF, Miao LL

3482 Effects of acetylcysteine on micro-inflammation and pulmonary ventilation in chronic obstructive pulmonary disease exacerbation

Huang LY, Huang B, Lv Z, Lu XD

Randomized Clinical Trial

3491 A comparative study of acupuncture combined with rehabilitation gymnastics on postoperative anal function of lower rectal cancer

Liu ZL, He YW, Liu YF, Wang N, Li W, Shen LZ

Clinical and Translational Research

3497 Association between gut microbiota and hepatocellular carcinoma and biliary tract cancer: A mendelian randomization study

Zhang Y, Yang FJ, Jiang QR, Gao HJ, Song X, Zhu HQ, Zhou X, Lu J

3505 Exploring the potential mechanism of WuFuYin against hypertrophic scar using network pharmacology and molecular docking

Zhang SY, Guo SX, Chen LL, Zhu JY, Hou MS, Lu JK, Shen XX

META-ANALYSIS

3515 Comparative efficacy and safety of Chinese patent medicines of iron deficiency anemia during pregnancy: A network meta-analysis

Zou JC, Jia XL, Wang HX, Su YJ, Zhu JY

CASE REPORT

3529 Laryngeal leiomyoma: A case report and review of literature

Wu Y, Li JM, Zhang TJ, Wang X

3534 Twin fetuses associated with double amniotic sacs diagnosed using transvaginal ultrasonography: A case report

Liang ZQ, Ding WQ

World Journal of Clinical Cases

Thrice Monthly Volume 12 Number 18 June 26, 2024

Contents

3539 High-grade serous carcinoma of the fallopian tube in a young woman with chromosomal 4q abnormality: A case report

Zhang KC, Chu SY, Ding DC

3548 Colon perforation with severe peritonitis caused by erotic toy insertion and treated using vacuum-assisted closure: A case report

Lin CY, Pu TW

3555 Cytokine release syndrome triggered by programmed death 1 blockade (sintilimab) therapy in a psoriasis patient: A case report

Zhou MH, Ye MF, Zhang ZX, Tao F, Zhang Y

3561 Simultaneous portal vein thrombosis and splenic vein thrombosis in a COVID-19 patient: A case report and review of literature

Abramowitz BR, Coles M, Aytaman A, Chander-Roland B, DiLeo DA

3567 Emergency rescue of a patient with hemorrhagic shock caused by superior mesenteric artery rupture: A case report

Lin XP, Guo XL, Tian HF, Wu ZR, Yang WJ, Pan HY

3575 Modified approach of regenerative treatment for distal intrabony defect beneath non-keratinized mucosa at terminal molar: A case report

Liu JR, Huang Y, Ouyang XY, Liu WY, Xie Y

3582 Complex heterozygous mutations in hereditary spherocytosis: A case report

He M, Lv YC, Wei YH, Liu LQ, Guo L, Li C

3589 Extracorporeal membrane oxygenation states basilar artery thrombectomy and left posterior cerebral artery stent thrombectomy: A case report

Ding LS, Liang H, Zheng M, Shen M, Li ZJ, Song RP, Chen QL

3596 *Eikenella corrodens* isolated from pleural effusion: A case report

Liang ZC, Ouyang H, Song XJ, Liang JX, Zheng WH, Chen JJ, Yin ZG, Chen SY

3603 Tennis ball cord combined with endoscopy for giant gastric phytobezoar: A case report

Shu J, Zhang H

3609 Parathyroid carcinoma located in the thyroid gland: A case report

Gui SY, Zhang CN, Ling L, Tang RX, Yang J

3615 Vomiting-induced pharyngeal perforation during bowel preparation for colonoscopy: A case report

Kim G, Lee WH, Kang S, Moon JR, Lee YS, Son JH, Kim NH, Kim JW

3622 Endoscopic radial incision and cutting method for adult congenital duodenal webs: A case report

Shin HD

3629 Midpoint transverse process to pleura block for postoperative analgesia following laparoscopic renal cyst decortication: Two case reports

He WJ, Xu WX, Zhang XD, Chen Y, He SY, Wei XQ, Huang XL

3636 Human herpesvirus 7 meningitis in an adolescent with normal immune function: A case report

Zhen YY, Yang J, Liao PY

LETTER TO THE EDITOR

3644 Intensive care unit-acquired weakness and mechanical ventilation: A reciprocal relationship

Sinha RK, Sinha S, Nishant P, Morya AK

World Journal of Clinical Cases

Thrice Monthly Volume 12 Number 18 June 26, 2024

Contents

ABOUT COVER

Peer Reviewer of *World Journal of Clinical Cases*, Suman Bhushan Koganti, MD, Assistant Professor, HPB Surgery and Liver Transplantation, Lowell General Hospital Tufts University Medical Center, Boston, MA 02420, United States. sumankoganti@gmail.com

AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The *WJCC* is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Current Contents®/Clinical Medicine, PubMed, PubMed Central, Reference Citation Analysis, China Science and Technology Journal Database, and Superstar Journals Database. The 2023 Edition of Journal Citation Reports® cites the 2022 impact factor (IF) for *WJCC* as 1.1; IF without journal self cites: 1.1; 5-year IF: 1.3; Journal Citation Indicator: 0.26; Ranking: 133 among 167 journals in medicine, general and internal; and Quartile category: Q4.

RESPONSIBLE EDITORS FOR THIS ISSUE

NAME OF JOURNAL
World Journal of Clinical Cases

ISSN
ISSN 2307-8960 (online)

LAUNCH DATE
April 16, 2013

FREQUENCY
Thrice Monthly

EDITORS-IN-CHIEF
Bao-Gan Peng, Salim Surani, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati

EDITORIAL BOARD MEMBERS
https://www.wjgnet.com/2307-8960/editorialboard.htm

PUBLICATION DATE
June 26, 2024

INSTRUCTIONS TO AUTHORS
https://www.wjgnet.com/bpg/gerinfo/204

GUIDELINES FOR ETHICS DOCUMENTS
https://www.wjgnet.com/bpg/GerInfo/287

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH
https://www.wjgnet.com/bpg/gerinfo/240

PUBLICATION ETHICS
https://www.wjgnet.com/bpg/GerInfo/288

PUBLICATION MISCONDUCT
https://www.wjgnet.com/bpg/gerinfo/208

ARTICLE PROCESSING CHARGE
https://www.wjgnet.com/bpg/gerinfo/242

STEPS FOR SUBMITTING MANUSCRIPTS
https://www.wjgnet.com/bpg/GerInfo/239

ONLINE SUBMISSION
https://www.f6publishing.com

World Journal of Clinical Cases

Submit a Manuscript: https://www.f6publishing.com

World J Clin Cases 2024 June 26; 12(18): 3561-3566

DOI: 10.12998/wjcc.v12.i18.3561

ISSN 2307-8960 (online)

CASE REPORT

Simultaneous portal vein thrombosis and splenic vein thrombosis in a COVID-19 patient: A case report and review of literature

Binyamin Ravina Abramowitz, Michael Coles, Ayse Aytaman, Bani Chander-Roland, Daniel Anthony DiLeo

Specialty type: Medicine, research and experimental

Provenance and peer review: Unsolicited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's classification

Scientific Quality: Grade D

Novelty: Grade B

Creativity or Innovation: Grade C

Scientific Significance: Grade C

P-Reviewer: Nassar G, France

Received: January 29, 2024

Revised: April 9, 2024

Accepted: May 6, 2024

Published online: June 26, 2024

Binyamin Ravina Abramowitz, Michael Coles, Department of Gastroenterology and Hepatology, SUNY Downstate Health Sciences University, Brooklyn, NY 11203, United States

Ayse Aytaman, Bani Chander-Roland, Daniel Anthony DiLeo, Department of Gastroenterology and Hepatology, Brooklyn Campus of the Veterans Affairs New York Harbor Healthcare System, Brooklyn, NY 11209, United States

Corresponding author: Binyamin Ravina Abramowitz, MD, Researcher, Department of Gastroenterology and Hepatology, SUNY Downstate Health Sciences University, 450 Clarkson Avenue Brooklyn, NY 11203, United States. binyamin.abramowitz@downstate.edu

Abstract

BACKGROUND

It is well-described that the coronavirus disease 2019 (COVID-19) infection is associated with an increased risk of thrombotic complications. While there have been many cases of pulmonary emboli and deep vein thrombosis in these patients, reports of COVID-19 associated portal vein thrombosis (PVT) have been uncommon. We present a unique case of concomitant PVT and splenic artery thrombosis in a COVID-19 patient.

CASE SUMMARY

A 77-year-old-male with no history of liver disease presented with three days of left-sided abdominal pain. One week earlier, the patient was diagnosed with mildly symptomatic COVID-19 and was treated with nirmatrelvir/ritonavir. Physical exam revealed mild right and left lower quadrant tenderness, but was otherwise unremarkable. Significant laboratory findings included white blood cell count 12.5 K/μL, total bilirubin 1.6 mg/dL, aminoaspartate transferase 40 U/L, and alanine aminotransferase 61 U/L. Computed tomography of the abdomen and pelvis revealed acute PVT with thrombus extending from the distal portion of the main portal vein into the right and left branches. Also noted was a thrombus within the distal portion of the splenic artery with resulting splenic infarct. Hypercoagulable workup including prothrombin gene analysis, factor V Leiden, cardiolipin antibody, and JAK2 mutation were all negative. Anticoagulation with enoxaparin was initiated, and the patient's pain improved. He was discharged on apixaban.

CONCLUSION

It is quite uncommon for PVT to present simultaneously with an arterial thrombotic occlusion, as in the case of our patient. Unusual thrombotic manifest-

ations are classically linked to hypercoagulable states including malignancy and hereditary and autoimmune disorders. Viral infections such as Epstein-Barr virus, cytomegalovirus, viral hepatitis, and COVID-19 have all been found to increase the risk of splanchnic venous occlusions, including PVT. In our patient, prompt abdominal imaging led to early detection of thrombus, early treatment, and an excellent outcome. This case is unique in that it is the second known case within the literature of simultaneous PVT and splenic artery thrombosis in a COVID-19 patient.

Key Words: COVID-19; Thromboembolism; Portal vein thrombosis; Splenic artery thrombosis; Anticoagulation; Lovenox; Thrombotic complication; Case report

Core Tip: Thromboembolism is a severe but clinically common complication of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Thrombotic events classically occur in infected patients who are critically ill, and typically present as deep vein thrombosis or pulmonary embolism. We report a rare case of a patient with SARS-CoV-2 infection complicated by simultaneous portal vein thrombosis and splenic artery thrombosis. A presentation of moderate to severe abdominal pain in SARS-CoV-2 patients should trigger prompt abdominal imaging, as early diagnosis and treatment of splanchnic thrombosis with anticoagulation leads to favorable outcomes.

Citation: Abramowitz BR, Coles M, Aytaman A, Chander-Roland B, DiLeo DA. Simultaneous portal vein thrombosis and splenic vein thrombosis in a COVID-19 patient: A case report and review of literature. *World J Clin Cases* 2024; 12(18): 3561-3566
URL: https://www.wjgnet.com/2307-8960/full/v12/i18/3561.htm
DOI: https://dx.doi.org/10.12998/wjcc.v12.i18.3561

INTRODUCTION

The coronavirus disease 2019 (COVID-19) infection is associated with a hypercoagulable state and increased risk of thrombotic complications[1]. Although thrombosis in COVID-19 patients can affect any blood vessel, the incidence of venous thromboembolism within these patients is far greater than that of arterial thromboembolism[2,3]. Up to 30% of critically ill COVID-19 patients have been reported to experience either deep vein thrombosis (DVT) or pulmonary embolism (PE)[4]. In contrast, ischemic strokes, acute coronary syndrome, acute limb ischemia, and mesenteric ischemia have only been reported in up to 3.7% of patients[5].

Splanchnic vein thrombosis is an uncommon thrombotic complication of COVID-19[6]. As thrombosis within the portal system can rapidly expand, the clot may progress into the mesenteric venous system, leading to intestinal ischemia[7]. Although splanchnic venous thrombosis is rare, it has been reported in patients with mild COVID-19 infection, including patients without respiratory symptoms[8,9]. We present an exceptionally unique case of simultaneous portal vein thrombosis (PVT) and splenic artery thrombosis in a COVID-19 patient with mild upper respiratory symptoms.

CASE PRESENTATION

Chief complaints

A 77-year-old Caucasian male presented to the emergency room with three days of left-sided abdominal pain.

History of present illness

The patient described his pain as continuous and crampy in character, most severe in the left lower quadrant, and associated with constipation. He denied flank pain, melena, hematochezia, nausea, or vomiting.

History of past illness

The patient had no history of liver disease. One week earlier he tested positive for COVID-19 after experiencing a mild cough and sore throat. He was treated with nirmatrelvir/ritonavir. His upper respiratory symptoms resolved three days after nirmatrelvir/ritonavir initiation.

Physical examination

On presentation, the patient was hemodynamically stable. Physical exam revealed mild right and left lower quadrant tenderness, and was otherwise unremarkable.

Laboratory examinations

Laboratory findings showed a white blood cell count of 12.5 K/μL, hemoglobin of 16.8 g/dL, total bilirubin of 1.6 mg/dL, aspartate aminotransferase of 40 U/L, alanine aminotransferase of 61 U/L, and alkaline phosphatase of 80 U/L. Partial thromboplastin time and international normalized ratio were within normal limits.

Imaging examinations

Computed tomography of the abdomen and pelvis (CTAP) revealed acute PVT with the thrombus extending from the distal portion of the main portal vein into the right and left portal branches. Thrombus was also present within the distal portion of the splenic artery with resultant developing splenic infarct. Finally, ill-defined soft tissue was noted in the region of the splenic hilum measuring approximately 2.5 cm, likely reflecting inflammatory changes, though an exophytic pancreatic lesion could not be ruled out (Figure 1).

Further diagnostic workup

Hypercoagulable workup including prothrombin gene analysis, factor V Leiden, cardiolipin antibody, and JAK2 mutation were obtained and later all resulted negative.

FINAL DIAGNOSIS

Based on the imaging findings, the patient was diagnosed with both PVT and splenic artery thrombosis.

TREATMENT

Anticoagulation was initiated promptly with full dose enoxaparin. After three days, the patient reported complete resolution of his abdominal pain. He was discharged on a 6-month course of apixaban.

OUTCOME AND FOLLOW-UP

The patient returned for magnetic resonance imaging (MRI) of his abdomen eight weeks after discharge. He denied any recurrence of abdominal pain since his hospitalization. MRI revealed reperfusion of the portal vein and the previously visualized soft tissue density noted in the CTAP was no longer seen, ruling out an exophytic pancreatic lesion.

DISCUSSION

Thrombosis is a serious complication of COVID-19, which has significantly contributed to its morbidity and mortality throughout the pandemic[10]. Several retrospective studies have shown the incidence of thromboembolism in patients admitted to intensive care units to be quite high, with one study revealing an incidence rate of 69%[11]. DVT and PE comprise the main bulk of cases of thromboembolism in COVID-19 patients, but the virus does increase the general risk of thromboembolism within all vasculature, including the splanchnic circulation, as in the case of our patient.

Delineating the pathophysiology behind thrombosis in COVID-19 infection is key to understanding the increased thrombotic risk in these patients. The SARS-CoV-2 virus primarily infects and enters endothelial cells through membrane-bound angiotensin converting enzyme-2 (ACE2) receptors[12,13]. Once inside the cell, the virus is able to hijack its host cell machinery in order to replicate viral RNA, perform particle assembly, and release an even greater viral load back into the extracellular environment. The infected endothelial cells accrue damage that leads to cell dysfunction, pyroptosis, and apoptosis, which leads to increased vascular permeability[14,15]. Recognition of viral RNA by the innate immune system results in the production of pro-inflammatory cytokines[16]. Massive cytokine build-up allows for the pouring of both innate and adaptive immune cells into the vasculature in the setting of acutely increased permeability, which is subsequently followed by widespread platelet activation[17]. Additionally, damaged endothelial cells lose their physiological capability of blocking the coagulation cascade, while immune cells and cytokines act to promote activation of coagulation factors[18]. This all creates the pathophysiologic context for COVID-19 patients in which their risk of thromboembolism formation is significantly elevated.

Although the risk of splanchnic vein thrombosis is higher in COVID-19 patients than the average population, its incidence within the infected population has been reported to be as low as 0.6%, far below that of DVT or PE[19]. The most common subtype of splanchnic vein thrombosis in COVID-19 patients is PVT, followed by mesenteric vein thrombosis, splenic vein thrombosis, and Budd-Chiari syndrome[20]. Although thrombotic risk is elevated with increased severity of COVID-19 infection, thrombosis can still be diagnosed in mild and even asymptomatic COVID-19 infections [21]. In our case, the patient only experienced mild upper respiratory symptoms that had already resolved before he began to develop thrombotic-related clinical symptoms. Therefore, thrombotic risk still exists in COVID-19 patients whose symptoms may have already resolved.

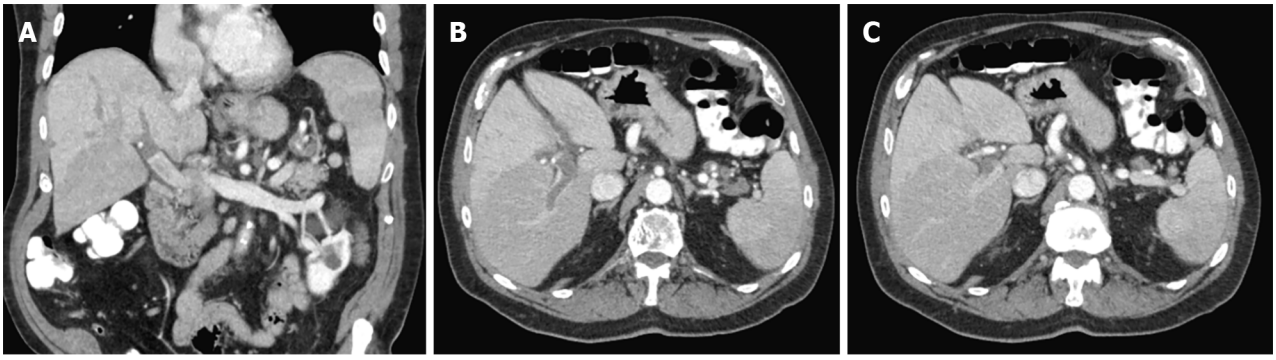

Figure 1 Computed tomography of the abdomen and pelvis. A: Coronal view of portal vein. Thrombus is seen in the main portal vein extending into the right and left portal branches; B: Axial view of portal vein. Once again, thrombus can be visualized within the main portal vein and extending into its branches; C: Axial view of splenic artery. Thrombus can be visualized within the distal portion of the splenic artery.

The incidence of arterial thromboembolism in COVID-19 is significantly lower than that of venous thromboembolism, with the most common subtypes being acute coronary syndrome followed by ischemic stroke, and acute limb ischemia [22]. Splanchnic arterial thromboembolism in COVID-19, such as the splenic artery thrombosis that occurred in our patient, is even rarer. There is only one additional known case within the literature of simultaneous PVT and splenic artery thrombosis in a COVID-19 patient[23].

As PVT in COVID-19 patients has been found to have mortality rates up to 16%, early diagnosis and treatment is imperative[24]. Presenting clinical symptoms typically involve abdominal pain and are otherwise non-specific. Thus, imaging with CT scan, ultrasound, or MRI will facilitate the diagnosis[25,26]. Once the diagnosis is made, treatment with anticoagulation must be prioritized, as early anticoagulation has been associated with positive outcomes[27,28]. Low molecular weight heparin (LMWH) is often utilized as the primary anticoagulant of choice in COVID-19 patients rather than direct oral anticoagulants, as LMWH is less likely to have negative drug interactions with antiviral therapies[29,30].

As dozens of cases of COVID-associated PVT have been reported ever since the start of the pandemic with relatively high mortality rates, it is important for clinicians to have PVT within the differential for COVID-19 patients presenting with abdominal pain. In our patient, prompt abdominal imaging led to early detection of thrombus with early treatment and an excellent outcome. This case is quite unique in that it is only the second known imaging confirmed case within the literature of simultaneous PVT and splenic artery thrombosis in a COVID-19 patient.

CONCLUSION

Thromboembolism is a severe potential complication of COVID-19 infection. Thrombosis more commonly affects venous circulation within the extremities or the pulmonary vessels, but it can also affect splanchnic vessels. Although it is relatively rare, splanchnic thrombosis should be on the differential in a patient presenting with abdominal pain in the setting of a COVID-19 infection. Our case was quite unique in that the patient presented with both portal vein and splenic artery thrombosis simultaneously. As previous literature has shown, timely imaging and early treatment with anticoagulation resulted in a positive outcome in our patient.

FOOTNOTES

Author contributions: Abramowitz BR, Coles M, and Aytaman A contributed to manuscript writing and editing; DiLeo DA and Chander-Roland B contributed to conceptualization and supervision; and all authors have read and approved the final manuscript.

Informed consent statement: Informed consent was obtained from the patient prior to the submission of this manuscript.

Conflict-of-interest statement: All authors have no relevant conflicts of interests to disclose.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016)

Country of origin: United States

ORCID number: Binyamin Ravina Abramowitz 0009-0006-7436-962X.

Corresponding Author's Membership in Professional Societies: American College of Gastroenterology, 185018.

S-Editor: Che XX
L-Editor: A
P-Editor: Yu HG

REFERENCES

1 **Al-Ani F**, Chehade S, Lazo-Langner A. Thrombosis risk associated with COVID-19 infection. A scoping review. *Thromb Res* 2020; **192**: 152-160 [PMID: 32485418 DOI: 10.1016/j.thromres.2020.05.039]
2 **Ten Berg J**. Venous and arterial thromboembolic disease in COVID-19. *J Thromb Thrombolysis* 2021; **52**: 1007-1009 [PMID: 34255267 DOI: 10.1007/s11239-021-02524-1]
3 **Violi F**, Ceccarelli G, Cangemi R, Cipollone F, D'Ardes D, Oliva A, Pirro M, Rocco M, Alessandri F, D'Ettorre G, Lichtner M, Pignatelli P, Ferro D, Ruberto F, Lip GYH, Pugliese F, Mastroianni CM; Intensive Care, Infectious Diseases COVID-19 Study Group of Sapienza University. Arterial and venous thrombosis in coronavirus 2019 disease (Covid-19): relationship with mortality. *Intern Emerg Med* 2021; **16**: 1231-1237 [PMID: 34218413 DOI: 10.1007/s11739-020-02621-8]
4 **Angelini DE**, Kaatz S, Rosovsky RP, Zon RL, Pillai S, Robertson WE, Elavalakanar P, Patell R, Khorana A. COVID-19 and venous thromboembolism: A narrative review. *Res Pract Thromb Haemost* 2022; **6**: e12666 [PMID: 35224417 DOI: 10.1002/rth2.12666]
5 **Duhailib ZA**, Oczkowski S, Polok K, Fronczek J, Szczeklik W, Piticaru J, Mammen MJ, Alshamsi F, Eikelboom J, Belley-Cote E, Alhazzani W. Venous and arterial thrombosis in COVID-19: An updated narrative review. *J Infect Public Health* 2022; **15**: 689-702 [PMID: 35643053 DOI: 10.1016/j.jiph.2022.05.003]
6 **Sharma N**, Shukla R, Kumar K, Arora S, Warrier R, Philip S. Portal Vein Thrombosis-a Rare Complication of SARS-CoV-2 Infection. *SN Compr Clin Med* 2021; **3**: 1416-1419 [PMID: 33842842 DOI: 10.1007/s42399-021-00877-5]
7 **Costache RS**, Dragomirică AS, Dumitraș EA, Mariana J, Căruntu A, Popescu A, Costache DO. Portal vein thrombosis: A concise review (Review). *Exp Ther Med* 2021; **22**: 759 [PMID: 34035856 DOI: 10.3892/etm.2021.10191]
8 **Buso G**, Becchetti C, Berzigotti A. Acute splanchnic vein thrombosis in patients with COVID-19: A systematic review. *Dig Liver Dis* 2021; **53**: 937-949 [PMID: 34120860 DOI: 10.1016/j.dld.2021.05.021]
9 **Singh B**, Kaur P, Maroules M. Splanchnic vein thrombosis in COVID-19: A review of literature. *Dig Liver Dis* 2020; **52**: 1407-1409 [PMID: 33067157 DOI: 10.1016/j.dld.2020.09.025]
10 **Gonzalez-Fajardo JA**, Ansuategui M, Romero C, Comanges A, Gómez-Arbeláez D, Ibarra G, Garcia-Gutierrez A. Mortality of COVID-19 patients with vascular thrombotic complications. *Med Clin (Engl Ed)* 2021; **156**: 112-117 [PMID: 33521296 DOI: 10.1016/j.medcle.2020.10.008]
11 **Nahum J**, Morichau-Beauchant T, Daviaud F, Echegut P, Fichet J, Maillet JM, Thierry S. Venous Thrombosis Among Critically Ill Patients With Coronavirus Disease 2019 (COVID-19). *JAMA Netw Open* 2020; **3**: e2010478 [PMID: 32469410 DOI: 10.1001/jamanetworkopen.2020.10478]
12 **Gąsecka A**, Borovac JA, Guerreiro RA, Giustozzi M, Parker W, Caldeira D, Chiva-Blanch G. Thrombotic Complications in Patients with COVID-19: Pathophysiological Mechanisms, Diagnosis, and Treatment. *Cardiovasc Drugs Ther* 2021; **35**: 215-229 [PMID: 33074525 DOI: 10.1007/s10557-020-07084-9]
13 **Ali MAM**, Spinler SA. COVID-19 and thrombosis: From bench to bedside. *Trends Cardiovasc Med* 2021; **31**: 143-160 [PMID: 33338635 DOI: 10.1016/j.tcm.2020.12.004]
14 **Bittner ZA**, Schrader M, George SE, Amann R. Pyroptosis and Its Role in SARS-CoV-2 Infection. *Cells* 2022; **11**: 1717 [PMID: 35626754 DOI: 10.3390/cells11101717]
15 **Otifi HM**, Adiga BK. Endothelial Dysfunction in Covid-19 Infection. *Am J Med Sci* 2022; **363**: 281-287 [PMID: 35093394 DOI: 10.1016/j.amjms.2021.12.010]
16 **Jing H**, Wu X, Xiang M, Liu L, Novakovic VA, Shi J. Pathophysiological mechanisms of thrombosis in acute and long COVID-19. *Front Immunol* 2022; **13**: 992384 [PMID: 36466841 DOI: 10.3389/fimmu.2022.992384]
17 **Becker RC**, Sexton T, Smyth S; International COVID-19 Thrombosis Biomarkers Colloquium (ICODE) Investigators. COVID-19 and biomarkers of thrombosis: focus on von Willebrand factor and extracellular vesicles. *J Thromb Thrombolysis* 2021; **52**: 1010-1019 [PMID: 34350541 DOI: 10.1007/s11239-021-02544-x]
18 **Birnhuber A**, Fließer E, Gorkiewicz G, Zacharias M, Seeliger B, David S, Welte T, Schmidt J, Olschewski H, Wygrecka M, Kwapiszewska G. Between inflammation and thrombosis: endothelial cells in COVID-19. *Eur Respir J* 2021; **58**: 2100377 [PMID: 33958433 DOI: 10.1183/13993003.00377-2021]
19 **Zheng X**, Gao F, Wang L, Meng Y, Ageno W, Qi X. Incidence and outcomes of splanchnic vein thrombosis after diagnosis of COVID-19 or COVID-19 vaccination: a systematic review and meta-analysis. *J Thromb Thrombolysis* 2023; **55**: 18-31 [PMID: 36402911 DOI: 10.1007/s11239-022-02732-3]
20 **Deltenre P**, Payancé A, Elkrief L, La Mura V, Artru F, Baiges A, Cervoni JP, China L, Colle I, Lemaitre E, Procopet B, Schiller D, Bureau C, Goria O, Ollivier I, Nuzzo A, Rautou PE, Plessier A; for VALDIG, an EASL consortium. Splanchnic vein thrombosis associated with SARS-CoV-2 infection: A VALDIG case-control study. *JHEP Rep* 2023; **5**: 100894 [PMID: 37841638 DOI: 10.1016/j.jhepr.2023.100894]
21 **Cheng NM**, Chan YC, Cheng SW. COVID-19 related thrombosis: A mini-review. *Phlebology* 2022; **37**: 326-337 [PMID: 35403487 DOI: 10.1177/02683555211052170]
22 **Kunutsor SK**, Laukkanen JA. Incidence of venous and arterial thromboembolic complications in COVID-19: A systematic review and meta-analysis. *Thromb Res* 2020; **196**: 27-30 [PMID: 32823173 DOI: 10.1016/j.thromres.2020.08.022]
23 **Rehman A**, Thoppil AJ, Wallach SL. Portal Vein Thrombosis and Splenic Infarction in a COVID-19 Patient. *Cureus* 2021; **13**: e16843 [PMID: 34513429 DOI: 10.7759/cureus.16843]

24 **El-Hady HA**, Mahmoud Abd-Elwahab ES, Mostafa-Hedeab G, Shawky Elfarargy M. Portal vein thrombosis in patients with COVID-19: A systematic review. *Asian J Surg* 2023; **46**: 3017-3026 [PMID: 36435627 DOI: 10.1016/j.asjsur.2022.11.002]

25 **Jafari SH**, Naseri R, Khalili N, Haseli S, Bahmani M. Portal vein thrombosis associated with COVID-19: points to consider. *BJR Case Rep* 2020; **6**: 20200089 [PMID: 32922855 DOI: 10.1259/bjrcr.20200089]

26 **Shrestha PS**, Ishak A, Napit AR, Sarwar S, Rai N, Nizami Z, Bheemisetty N, Jayaraj P, Shrestha A, Rodriguez ID. Portal vein thrombosis as a thrombotic complication of COVID-19 mRNA vaccine: A case report and literature review. *IDCases* 2022; **29**: e01582 [PMID: 35915737 DOI: 10.1016/j.idcr.2022.e01582]

27 **Sinz S**, Glaser-Gallion F, Steffen T. Portal vein thrombosis in COVID-19 infection. *Surg Case Rep* 2021; **7**: 87 [PMID: 33830380 DOI: 10.1186/s40792-021-01173-z]

28 **Akella R**, Raj R, Kannan L, Jacob A. Coexisting portal vein thrombosis and aortic thrombosis in a patient with COVID-19: A case report and literature review. *IDCases* 2022; **28**: e01509 [PMID: 35602469 DOI: 10.1016/j.idcr.2022.e01509]

29 **Kreidieh F**, Temraz S. Anticoagulation for COVID-19 Patients: A Bird's-Eye View. *Clin Appl Thromb Hemost* 2021; **27**: 10760296211039288 [PMID: 34595937 DOI: 10.1177/10760296211039288]

30 **Ahuja N**, Bhinder J, Nguyen J, Langan T Jr, O'Brien-Irr M, Montross B, Khan S, Sharma AM, Harris LM. Venous thromboembolism in patients with COVID-19 infection: risk factors, prevention, and management. *Semin Vasc Surg* 2021; **34**: 101-116 [PMID: 34642030 DOI: 10.1053/j.semvascsurg.2021.06.002]

Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-3991568
E-mail: office@baishideng.com
Help Desk: https://www.f6publishing.com/helpdesk
https://www.wjgnet.com