The Egyptian Journal of Internal Medicine

CASE REPORT Open Access

Renal, splenic, and mesenteric artery thrombosis in the setting of cytomegalovirus infection of an immunocompromised patient: a case report

Garyll Ryan Tariang Blah*, Megha Pradeep, C. Shah Harshil and Rajnish Singh

Abstract

We present a case report of an immunocompromised adult with cytomegalovirus infection and APLA positivity complicated by multiple large arterial thrombi. This is a rare presentation as most of the cases reported earlier have been of venous thrombosis, thus demonstrating propensity of CMV to induce arterial thrombosis either directly or indirectly.

Keywords CMV, Cytomegalovirus, APLA, Thrombosis, HIV

Case presentation

A 29-year-old female (nulligravida) who was previously healthy presented with history of fever, abdominal pain localized to the left flank associated with burning micturition for 3 weeks. The patient was being managed from other hospitals before presenting to us. She was not on any hormonal contraceptives, had no history of smoking or alcohol use. She had no family history suggestive of thromboembolic disease.

A physical examination on admission revealed a regular pulse of 98 beats per minute, blood pressure of 120/68 mmHg, respiratory rate of 20 breaths per minute, temperature noted to be 99.8 °F and oxygen saturation of 98% on room air. There was no rash. An abdominal examination revealed tenderness in the left hypochrondrium as well as the lumbar fossa with a palpable ballotable mass. Respiratory examination revealed decreased breath sound intensity over the left infra-axillary and infra scapular regions.

Laboratory studies showed a white blood cell count of $29.6 \times 10^3/mm^3$; with a differential count of 92% polymorphs, 5% lymphocytes, 2% eosinophils, and 1% monocytes; hemoglobin of 7.3 g/dL; and hematocrit of 21.5%. Renal function studies revealed urea 33 mg/dL and a creatinine of 1.2 mg/dL. Liver function studies showed total bilirubin of 0.5 mg/dL, AST of 25 U/L, and ALT of 4 U/L, total protein 5.7 g/dL and albumin of 1.9 g/dL. Ultrasonography revealed right kidney 11.2 × 5 cm size, whereas left kidney was 13.4 × 6.5 cm, bulky with altered echotexture. Chest radiograph was suggestive of left pleural effusion. Serum procalcitonin and cultures were drawn. Patient was started on empirical antibiotics in view of pyelonephritis. Pleural fluid studies revealed 200 cells (50% polymorphonuclear and mononuclear 50%), protein of 3.04 g/dL, albumin of 1.14 g/dL, and LDH of 671 U/L. Pleural fluid ADA came out to be 7.7 U/L. Patient incidentally came out to be reactive for HIV-I and CD4 counts were 308 cells/mm^3. Procalcitonin was 0.5–2 ng/mL (by rapid ICT) and cultures were sterile. Fundus examination showed the presence of cotton wool spots.

*Correspondence:
Garyll Ryan Tariang Blah
drgaryll913@gmail.com
ABVIMS & Dr. RML Hospital, New Delhi, India

Three days later, she developed increased shortness of breath and saturation fell to 84% on room air. Supplemental oxygen therapy was given. COVID19 RT-PCR came out negative. Ultrasonography of the chest was suggestive of left pleural effusion with internal echogenic debris and few air foci with underlying lung collapse. White blood cell count increased to 82.6 × 10^3/mm^3 with an elevated NAP score of 235. Repeat serum procalcitonin was negative.

On day 8 of hospital stay, patient developed ascites and ascitic fluid studies revealed 250 cells (90% polymorphonuclear), glucose 150 mg/dL, protein 1.5 g/dL, and albumin 0.5 g/dL. A contrast enhanced computed tomography (CT) scan of chest and abdomen revealed multiple areas of ground glassing and consolidation with air bronchograms in both lungs, left pleural effusion with passive atelectasis of adjacent lung, left renal infarct with extensive fat stranding and fascial thickening, splenic infarct, and distal colon ischemia. 2D echocardiography revealed normal chambers, no wall motion abnormality, ejection fraction of 60% and no vegetations.

Workup for hypercoagulability revealed a positive beta 2 glycoprotein IgG 8.3 U/mL IgM 11 U/mL. Other APS antibodies were negative. There was a positive detection of cytomegalovirus (CMV) DNA by PCR method. A CT angiogram was also done. She however continued to deteriorate and on day 14 of hospital stay succumbed to her illness. CT angiogram report later revealed splenic artery thrombosis with splenic infarct, left renal artery thrombosis with renal infarct and features suggestive of transverse and descending colon gangrene with distal transverse colon perforation causing extensive inflammatory phlegmon/collection (Fig. 1).

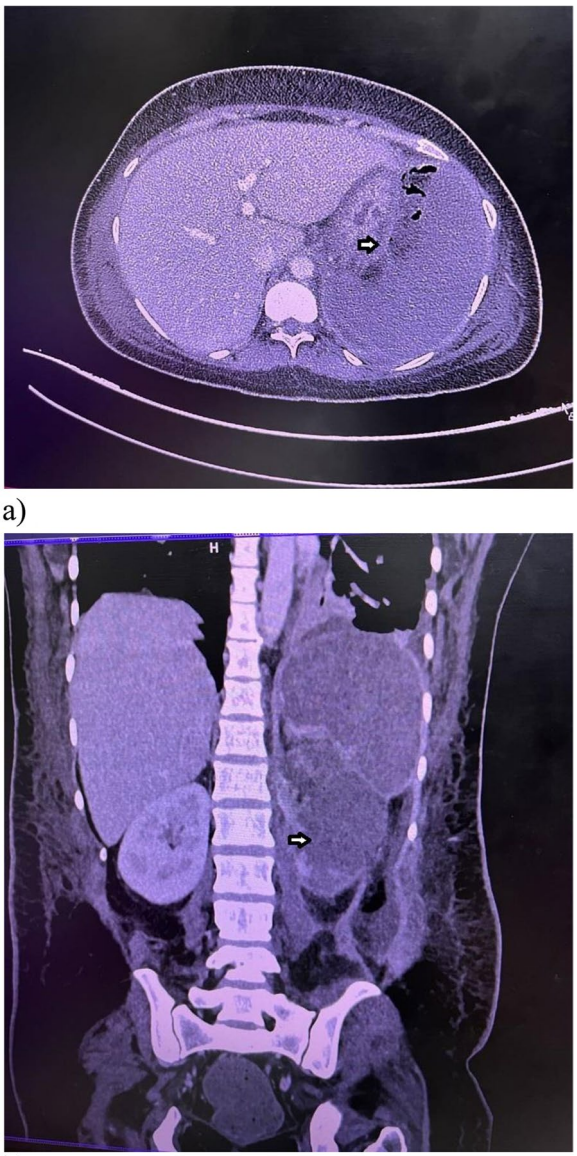

Fig. 1 Contrast-enhanced CT scan of the abdomen showing evidence of infarcts. **a** Splenic infarct. **b** Left renal infarct

Discussion

Many studies have been previously published on the association of cytomegalovirus and venous thrombosis and also the association with antiphospholipid syndrome. The presence of APLA positivity with viral infections is well known although studies have shown that cytomegalovirus is unique in causing a true transient APS [1–3]. Multiple studies done have demonstrated the same and currently is the most accepted theory; however, the exact mechanism as to the cause of APLA generation is yet to be determined [4].

Tichelaar et al. [5] showed that the incidence of acute CMV infection among hospitalized patients was 1.9% and Schimanski et al [6] found that it was 4.3% in general population of venous thrombosis patients and 7.4% in unprovoked venous thrombosis patients. Shimanski et al demonstrated that 14.3% (1 out of 7) patients with venous thrombosis and CMV infection also had APS antibodies.

In 2013, Sherman and colleagues [7] had reviewed the association of thrombosis with cytomegalovirus and concluded that it may be considered as a thrombosis trigger independently. Several mechanisms have been proposed for CMV-induced thrombosis. It can cause vascular damage that activates coagulation factors and adhesion of platelets and leukocytes, promotion of factor VIII or thrombin while limiting production of heparin sulfate and further inhibiting anti-coagulation pathways.

The more common presentation of thrombosis in cytomegalovirus infection has been seen to be acute

pulmonary embolism, portal vein thrombosis or deep vein thrombosis [6, 8] as such it is highly unusual for it to present with arterial thrombosis of three separate organ systems as seen in our patient. A search of the literature revealed approximately 100 cases have been reported of presence of a single venous thrombus in such cases [9]. Three cases of multiple microthrombi have been reported [10]. Multiple large arterial thrombi are extremely rare.

Conclusion

We present an extremely rare case of an immunocompromised patient with CMV infection and APLA positivity with multiple arterial thrombi. Given our patient did not survive, it is not possible to state whether she had definite APS or not. Our case highlights the possible risk of thrombosis whether venous or arterial in immunocompromised patients with CMV. It draws attention to the importance of investigating such patients for APLA and thrombotic markers and assessing the need for thromboprophylaxis in such patients.

Abbreviations

APLA	Anti-phospholipid antibody
CMV	Cytomegalovirus
RT-PCR	Real time Polymerase chain reaction
APS	Anti-phospholipid syndrome
CT	Computed tomography
AST	Aspartate transaminase
ALT	Alanine transaminase
LDH	Lactate dehydrogenase
ADA	Adenosine deaminase
HIV	Human immunodeficiency virus
CD4	Cluster of differentiation 4
IgM	Immunoglobulin M
IgG	Immunoglobulin G

Acknowledgements
Not applicable.

Authors' contributions
All authors contributed in the management of the patient, and in preparation, proof-reading, and submission of the article. The authors read and approved the final manuscript.

Funding
There are no funding sources for the submission process.

Declarations

Ethics approval and consent to participate
Written informed consent was obtained to participate. Ethical approval not applicable for case reports as per institutional committee. Proper written consent from the patient's family has been obtained in their own language.

Consent for publication
Written informed consent to publish this case was obtained from the patient's family.

Competing interests
The authors declare that they have no competing interests.

Received: 28 December 2022 Accepted: 23 February 2023
Published online: 13 March 2023

References

1. Denham C, Tissier G, Golding A (2019) Antiphospholipid antibody syndrome with thrombotic splenic infarcts associated with acute cytomegalovirus infection. Access Microbiol 1(7):e000032. https://doi.org/10.1099/acmi.0.000032
2. Justo D, Finn T, Atzmony L, Guy N, Steinvil A (2011) Thrombosis associated with acute cytomegalovirus infection: a meta-analysis. Eur J Intern Med 22:195–199
3. Labarca JA, Rabaggliati RM, Radrigan FJ et al (1997) Antiphospholipid syndrome associated with primary cytomegalovirus infection: a case report and literature review. Clin Infect Dis 24:197–200
4. Nakayam T, Akahoshi M, Irino K et al (2014) Transient antiphospholipid syndrome associated with primary cytomegalovirus infection: a case report and literature review. Case Rep Rheumatol 2104:271548
5. Tichelaar VY, Sprenger HG, Mäkelburg AB, Niesters BG, Kluin-Nelemans HC, Lijfering WM (2011 Jun) Active cytomegalovirus infection in patients with acute venous thrombosis: a case-control study. Am J Hematol 86(6):510–512
6. Schimanski S, Linnemann B, Luxembourg B, Seifried E, Jilg W, Lindhoff-Last E, Schambeck CM (2012) Cytomegalovirus infection is associated with venous thromboembolism of immunocompetent adults--a case-control study. Ann Hematol 91(4):597–604
7. Sherman S, Eytan O, Justo D (2014) Thrombosis associated with acute cytomegalovirus infection: a narrative review. Arch Med Sci 10(6):1186–1190
8. Bertoni M, Squizzato A, Foretic M, Zanieri S, Di Natale ME (2018) Cytomegalovirus associated splancnic vein thrombosis in immunocompetent patients: a systemic review. Thromb Res 168:104–112
9. Neppelenbroek SIM, Rootjes PA, Boxhoorn L, Wagenaar JFP, Simsek S, Stam F (2018) Cytomegalovirus-associated thrombosis. Neth J Med 76:251–254
10. Kamatani K, Kenzaka T, Sugimoto R, Kumabe A, Kitao A, Akita H (2021) Multiple thrombosis associated with Cytomegalovirus enterocolitis in an immunocompetent patient: a case report. BMC Infect Dis 21(1):530

Publisher's Note