International Surgery Journal
Lal N et al. Int Surg J. 2021 Oct;8(10):3204-3207
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20214026

Case Report

COVID vaccine related lower limb gangrene: the first case report

Nishant Lal[1]*, Saajid Ali Khan[2], Aiswarya R. Pillai[3], Shafy Ali Khan[1]

[1]Department of General Surgery, Kerala Institute of Medical Sciences Hospital, Trivandrum, Kerala, India
[2]Hamdard Institute of Medical Sciences and Research (HIMSR), New Delhi, India
[3]Department of Pediatric Surgery, Sree Avittam Thirunal (SAT) Hospital, Trivandrum, Kerala, India

Received: 22 July 2021
Revised: 29 August 2021
Accepted: 01 September 2021

***Correspondence:**
Dr. Nishant Lal,
E-mail: nishantlal91@gmail.com

ABSTRACT

Though there have been multiple cases of arterial thrombosis and gangrene of limbs reported following COVID-19 infections, there has not been any case reported following COVID-19 vaccinations. Here we reported a case of acute lower limb ischemia following COVID-19 vaccination in a 32 year male with no co-morbidities. The clinical symptoms and signs related to lower limb ischemia started 2 weeks after COVID-19 vaccination. Despite anticoagulation, thrombo embolectomy and intraluminal catheter guided thrombolysis, patient's left forefoot became gangrenous and had to be amputated.

Keywords: COVID-19 vaccine, Lower limb ischemia, Gangrene, COVID related vascular complications

INTRODUCTION

Corona virus disease 2019 (COVID-19) is primarily a respiratory illness caused by severe acute respiratory syndrome corona virus-2 (SARS-CoV-2) which was first detected in Wuhan, Hubei Province, China.[1] It was primarily considered to be a disease of respiratory system causing severe respiratory infection and adult respiratory distress syndrome (ARDS). However, over time it has been found to involve cardiovascular, renal, hematological, vascular and other systems.[2] Hypercoagulability causing widespread thrombosis and gangrene has been reported in COVID-19 infections, but gangrene following vaccination has not been reported yet.[3]

CASE REPORT

A 36 year old male non-smoker with no co-morbidities, presented with complaints of left lower limb pain, numbness and discoloration of 5 days. The pain was present even at rest. Patient gave history of vaccination with first dose of Covishield (ChAdOx1-AstraZeneca, Serum Institute of India) 2 weeks ago. There was no significant personal or family history. On clinical examination, the left foot was found to be cold and dusky compared to the right one. There was no pulse in left popliteal, anterior tibial and posterior tibial arteries. The right lower limb pulses were clinically normal (Figure 1).

Figure 1: Clinical picture of the patient's left foot showing discoloration with blebs and demarcation suggestive of gangrene.

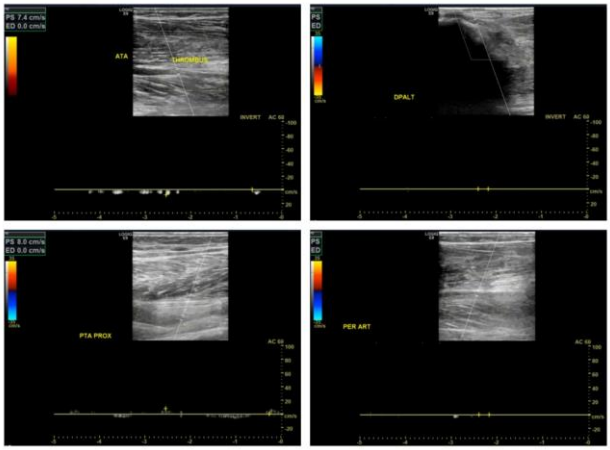

Figure 2: Arterial Doppler images showing occlusion of anterior and posterior tibial, peroneal and dorsalis pedis arteries.

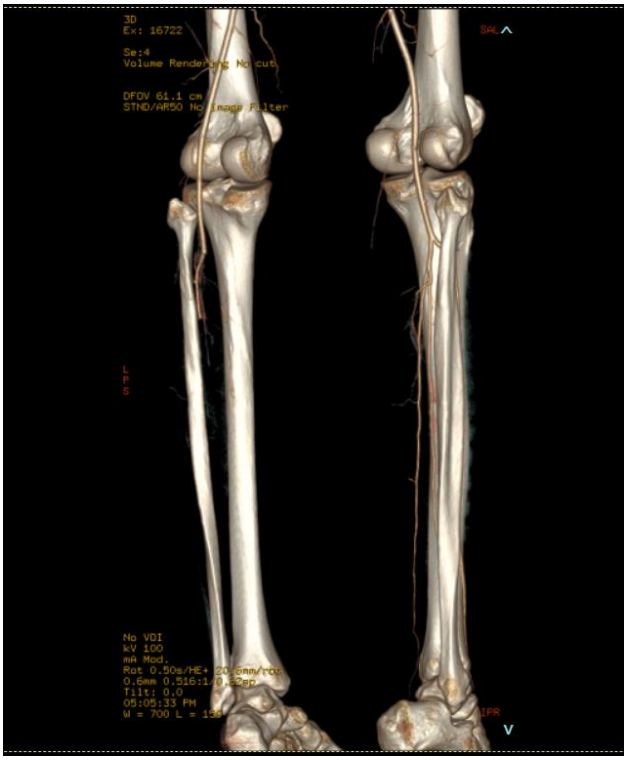

Figure 3: CT peripheral angiogram showing occlusion of left lower limb arteries as mentioned.

Patient was evaluated. Thrombophilia work up was done. It was found to be negative for lupus anticoagulant, anti-cardiolipin IgG and IgM, beta 2 glycoprotein IgG and IgM, serum homocysteine, potein C and protein S. Peripheral blood film showed normochromic normocytic anemia with neutrophilic leucocytosis and monocytosis. Left lower limb arterial Doppler showed occlusion below left popliteal artery. CT peripheral angiogram was done which showed partial filling defect in left common iliac artery extending into left internal and external iliac arteries. Peripheral contrast opacification with central filling defect noted in left deep femoral artery and proximal aspect of muscular branch to left vastus medialis muscle. Occlusion of left peroneal trunk was noted along with peripheral opacification of proximal posterior tibial artery and peroneal arteries; distally there was no flow noted. Occlusion of anterior tibial artery was noted throughout its extent. Right common iliac, external and internal iliac arteries appear normal in luminal caliber. Bilateral common femoral artery and popliteal artery appeared normal in luminal caliber and course (Figure 2 and 3).

Patient was taken up for left femoro popliteal thrombo embolectomy. Proximal and distal embolectomy was done using no. 5 and no. 4 fogarty catheter respectively and clots were removed. Check angiography revealed mid and distal leg poor run off. Thrombo aspiration was tried which failed. Hence, catheter guided thrombolysis distal to popliteal artery was done with one lakh units of urokinase. A short segment dissection was seen at origin of left superficial femoral artery while attempting thrombolysis. Thus, a Dacron graft was placed from distal common femoral artery to proximal superficial femoral artery. Despite all the above measures, the forefoot remained cold. Recheck angiogram showed increased collateral flow from anterior and posterior tibial artery. No significant further recanalisation of left anterior and posterior tibial arteries noted. The left forefoot was cold and discoloration was persistent. A day later there was no sensation and the toe movements were absent with demarcation of gangrenous areas (Figure 4).

Figure 4: Clinical picture showing left groin and above knee incision of bypass grafting and result following graft.

Figure 5: Intra operative image showing transmetatarsal amputation; following which the lower flap was used to cover the wound.

Despite all the measures there was no improvement in vascularity of forefoot. Atrans metatarsal amputation was performed and the stump was covered loosely with plantar skin. Dressings were done on a regular basis (Figure 5).

He was managed with adequate analgesia, anticoagulants and antibiotics in the postoperative period. He was discharged on postoperative day 5 and was on outpatient follow up.

DISCUSSION

The first case of COVID-19 in India was reported from Thrissur, Kerala on 27 January 2020 where a 20 year old female presented with a one day history of dry cough and sorethroat.[4] Nearly 20-55% of patients with COVID-19 infections developed coagulation abnormalities.[5] The arterial and venous thromboembolic events were found to be more common than bleeding in COVID-19 associated coagulopathies.[6] Autopsy conducted in patients who died of COVID-19 infections showed presence of generalized thrombotic microangiopathy.[7] COVID-19 caused a hypercoagulable state with micro and macro angiopathy.[8] The endothelial injury was caused either directly by COVID-19 or following systemic inflammatory response syndrome.[9] The arterial and venous thrombosis that occured due to hematological abnormalities in COVID-19 infected patients occured due to release of inflammatory cytokines. The production of APLA mainly lupus anticoagulant was also found to be a cause for coagulation abnormalities.[10] The presence of APLA has also been implicated with worse survival outcomes.[11] The increase in values of d-dimer, fibrinogen, prothrombin time and activated partial thromboplastin time were most commonly reported hemostatic abnormalities and were associated with worse survival outcomes.[12] Lupus anticoagulant positivity had also been noticed in many cases associated with thrombosis.[13] There have been studies in COVID-19 disease which showed inhibition of fibrinolysis leading to extensive thromboses. The IL-6 caused production of fibrinogen and thrombopoetin from liver which also disrupted the endothelium of vessels causing activation of extrinsic pathway of coagulation and further extensive thrombosis.[14] The clinical manifestations of limb injury ranged from chilblains and bulla to acute limb threatening ischemia including acral cyanosis, bruising, blood blister and dry gangrene. It can be cutaneous, subcutaneous or even can involve an entire digit or limb.[15] There have been cases of acute lower limb ischemia reported in young individuals with no co-morbidities while on prophylactic low molecular weight heparin.[16] From existing literature, it still remained unclear whether amputation provided any benefit in management of acute lower limb ischemia after the failure of attempts to revascularise via medical and surgical methods. Therefore, further evidence was required to decide regarding the impact of amputation on survival when attempts to revascularise blood vessel fail.[17]

CONCLUSION

Though gangrene of limbs has been reported following COVID-19 infection despite anticoagulation, the same can happen following COVID-19 vaccination as in our case. Effective prevention and treatment measures for thromboembolic events remain a challenge due to lack of clear understanding of exact underlying mechanisms. Our case contributes to the finding of a potential unreported complication following COVID-19 vaccination and highlights the adverse prognostic impact. It is therefore critical to monitor for thromboembolic events in patients taking COVID vaccinations. Further evidence is required to establish this association, determine the mechanism and recommend effective strategies for prevention.

ACKNOWLEDGEMENTS

The authors would like to thank the patient and his family for allowing publication of this case. We also extend special thanks to department of radiology, Kerala institute of medical sciences hospital, Trivandrum, Kerala for providing radiographic images.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. WHO. Fact sheet: COVID-19 China, 2020. Available at: who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/. Accessed on 6 July 2021.
2. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395(10223):497-506.
3. Klok FA, Kruip MJ, Meer NJV, Arbous MS, Gommers DA, Kant KM, et al. Confirmation of the high cumulative incidence of thrombotic complications in critically ill ICU patients with

COVID-19: an updated analysis. Thromb Res. 2020;191:148-50.
4. Andrews MA, Areekal B, Rajesh KR, Krishnan J, Suryakala R, Krishnan B, et al. First confirmed case of COVID-19 infection in India: a case report. Indian J Med Res. 2020;151(5):490-2.
5. Lee SG, Fralick M, Sholzberg M. Coagulopathy associated with COVID-19. CMAJ. 2020;192(21):583.
6. Oxley TJ, Mocco J, Majidi S, Kellner CP, Shoirah H, Singh IP, et al. Large-vessel stroke as a presenting feature of COVID-19 in the young. N Engl J Med. 2020;382(20):60.
7. Menter T, Haslbauer JD, Nienhold R, Savic S, Hopfer H, Deigendesch N, et al. Postmortem examination of COVID-19 patients reveals diffuse alveolar damage with severe capillary congestion and variegated findings in lungs and other organs suggesting vascular dysfunction. Histopathology. 2020;77(2):198-209.
8. Magro C, Mulvey JJ, Berlin D, Nuovo G, Salvatore S, Harp J, et al. Complement associated microvascular injury and thrombosis in the pathogenesis of severe COVID-19 infection: a report of five cases. Transl Res. 2020;220:1-13.
9. Bikdeli B, Madhavan MV, Jimenez D, Chuich T, Dreyfus I, Driggin E, et al. Global COVID-19 thrombosis collaborative group, endorsed by the ISTH, NATF, ESVM, and the IUA, supported by the esc working group on pulmonary circulation and right ventricular function. covid-19 and thrombotic or thromboembolic disease: implications for prevention, antithrombotic therapy, and follow-up: JACC state-of-the-art review. J Am Coll Cardiol. 2020;75(23):2950-73.
10. Beyrouti R, Adams ME, Benjamin L, Cohen H, Farmer SF, Goh YY, et al. Characteristics of ischaemic stroke associated with COVID-19. J Neurol Neurosurg Psychiatry. 2020;91(8):889-91.
11. Zhang Y, Xiao M, Zhang S, Xia P, Cao W, Jiang W, et al. Coagulopathy and antiphospholipid antibodies in patients with COVID-19. N Engl J Med. 2020;382(17):38.
12. Ranucci M, Ballotta A, DiDedda U, Bayshnikova E, Poli MD, Resta M, et al. The procoagulant pattern of patients with COVID-19 acute respiratory distress syndrome. J Thromb Haemost. 2020;18(7):1747-51.
13. Bowles L, Platton S, Yartey N, Dave M, Lee K, Hart DP, et al. Lupus anticoagulant and abnormal coagulation tests in patients with COVID-19. N Engl J Med. 2020;383(3):288-90.
14. Anwar S, Acharya S, Shabih S, Khabut A. Acute limb ischemia in COVID-19 disease: a mysterious coagulopathy. Cureus. 2020;12(7):9167.
15. Zhang Y, Cao W, Xiao M, Li YJ, Yang Y, Zhao J, et al. Clinical and coagulation characteristics of 7 patients with critical COVID-2019 pneumonia and acro-ischemia. Zhonghua Xue Ye Xue Za Zhi. 2020;41(0):006.
16. Bellosta R, Luzzani L, Natalini G, Pegorer MA, Attisani L, Cossu LG, et al. Acute limb ischemia in patients with COVID-19 pneumonia. J Vasc Surg. 2020;72(6):1864-72.
17. Galanis N, Stavraka C, Agathangelidis F, Petsatodis E, Giankoulof C, Givissis P. Coagulopathy in COVID-19 infection: a case of acute upper limb ischemia. J Surg Case Rep. 2020;2020(6):204.

Cite this article as: Lal N, Khan SA, Pillai AR, Khan SA. COVID vaccine related lower limb gangrene: the first case report. Int Surg J 2021;8:3204-7.