Renal graft artery thrombosis following COVID-19 infection

A 47-year male received renal allograft from his mother on 17 November 2020 for basic disease, chronic interstitial nephritis. The study has ethical review board approval. During pre-transplant work-up, both patient and donor were COVID-19 real-time reverse transcription-polymerase chain reaction (RT-PCR) negative. Patient received Thymogloblin induction and tripleimmunosuppression (tacrolimus, mycophenolate and steroids). Post-transplant course was uneventful and creatinine at discharge was 1.12 mg/dl. A week after discharge, evaluation for fever revealed patient to be COVID-19 positive. Investigations showed haemoglobin of 8 gm/dl, total leucocyte count (TLC) of 22 500/cmm, absolute lymphocyte count (ALC) of 340 (1.5%), platelets count of 218 000/cmm. Ferritin level 379 ng/ml, D-dimer–211 ng/ml and IL-6 32.3 pg/ml. Patient opted for home quarantine and no thrombo-prophylaxis was given. Four weeks after transplant he presented with fever and graft pain. On examination temperature was 101.3°F, pulse 108/min and BP 130/80 mm Hg and graft was tender. Investigations revealed haemoglobin of 8.3gm/dl, TLC–19500/cmm, D-dimer–1719 ng/ml, CRP-84 mg/L, creatinine of 6.34 mg/dl and tacrolimus blood level was 7.8 ng/ml. Urine exam showed 3–5 pus cells and 10–15 RBC/hpf. Urine and blood cultures were sterile. He was tested covid-19 RT-PCR negative. Diagnosis of graft pyelonephritis was considered. Graft doppler showed poor blood flow in the graft and angiography confirmed thrombosis. Our patient had no past h/o thrombosis, had normal thrombophilia workup (Table 1) and no surgical issue. He was maintaining normal graft functions, however, pro-thombotic state induced by COVID-19 infection resulted in graft renal artery thrombosis (RAT). High D-dimer levels at admission was a pointer. The efforts for local thrombus removal/thrombolysis ware unsuccessful and graft was lost. The case highlights that RAT can be a dangerous complication of COVID-19 infection leading to graft loss.

COVID-19 induces pro-thombotic state due to endothelial dysfunction, cytokine storm, hypoxia related injury and hypercoagulability. 16%–53% of hospitalized patients have evidence of thrombosis.[1,2] D-dimer is an independent predictor of thrombosis.[1,2] Experts has recommended thrombosis prophylaxis in hospitalized COVID-19 patients.[2] However, despite thrombo-prophylaxis a large ICU based data shows 34% incidence of arterial or venous thrombosis.[3] RAT a dangerous complication, is reported in 0.2%–7.5% of cases. Atherosclerotic vessels, kidney donation from extremes of age, past history of thrombosis, antiphospholipid syndrome and surgical technical issue are some of the common causes of graft RAT.[4] To the best of our knowledge, this is first case of graft RAT associated with COVID-19 infection.

CONFLICT OF INTEREST

The authors of this manuscript have no conflicts of interest to disclose.

AUTHOR CONTRIBUTION

All authors (Prem P. Varma, Vivek B. Kute, Geet Bajpai) contributed equally to the conception, design of the work; acquisition, analysis, interpretation of data; drafting the work, revising it critically for important intellectual content; final approval of the version to be published; agreement to be accountable for all aspects of the work and Prem P. Varma, Geet Bajpai contributed to clinical management of patient.

TABLE 1 Thrombophilia work up

Parameter	Value	Range
lupus anticoagulant	absent	
DRVVT screen ratio	1.03	0.85–1.20
Cardiolipin antibody ACL–IgG (EIA)	Negative (2.90 U/ml)	>10 Positive
Cardiolipin antibody ACL–IgM (EIA)	Negative (2.36 U/ml)	>7 Positive
APA (phospholipid)- IgG (EIA)	Negative (3.46 U/ml)	>10 Positive
APA (phospholipid)- IgM (EIA)	Negative (1.82 U/ml)	>10 Positive
Protein c activity (Chromogenic assay)	86%	70–130
Protein c antigen (ELFA)	93.57%	65%–140%
Protein s antigen (free) (immunoturbidometry)	104%	89.5–128.5
protein s activity (automated coagulometer)	75%	77–143
Antithrombin 3 activity (Chromogenic assay)	91%	80–120
Antithrombin 3 antigen, plasma (immunoturbidometry)	102%	80–120
Homocysteine (CMIA)	10 umol/l	5.46–16.2

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