

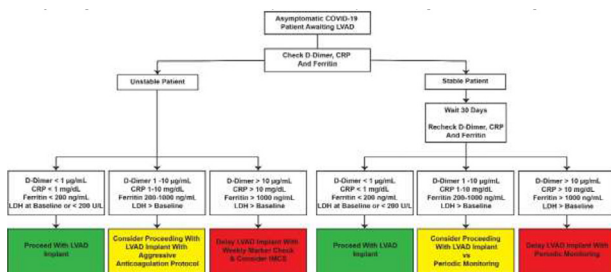


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contrasted with the severity of shock, the decision was made to proceed with implantation. Temporary mechanical support was considered but not thought to mitigate risks of thrombosis rather adding procedural risk with ECMO cannulation and left ventricular unloading. He successfully underwent LVAD implantation as INTERMACS 1. He required high doses of heparin to achieve ACT for cardiopulmonary bypass. On day 2, he developed left-sided weakness with imaging revealing multifocal acute cerebral infarcts. Despite normal LVAD function, the embolic infarcts to multiple organs led to further deterioration and death

Summary: LVAD implantation in COVID patients appears inevitable. Centers must risk stratify this cohort to reduce susceptibility to thrombosis and improve outcomes. We propose an algorithm that triages patients for elective and urgent LVAD implantation based on specific coagulation and inflammatory markers (figure 1) and have successfully implanted an LVAD in a COVID patient using this. We acknowledge this method has not been validated in a large cohort and are unable to recommend anticoagulation protocols. Further research is necessary to address safety of LVAD implantation in COVID patients



1184

Recovery from COVID-19 Pneumonia in a Heart Transplant Recipient

A. Bakhsh,¹ M. AlSaied,² M. Ibrahim,³ Y. AlHebaishi,⁴ M. AlBarrak,⁵ S. AlAmro,⁶ A. Ezzeddien,¹ A. AlKhushail,⁷ and A. Amro.¹ ¹Heart Failure and Transplant, Prince Sultan Cardiac Centre, Riyadh, Saudi Arabia; ²Division of Infectious Disease, Prince Sultan Military Medical City PSMCC, Riyadh, Saudi Arabia; ³Cardiology, Prince Sultan Cardiac Centre, Riyadh, Saudi Arabia; ⁴Heart Failure, Transplant and Electrophysiology, Prince Sultan Cardiac Centre, Riyadh, Saudi Arabia; ⁵Intensive Care, Prince Sultan Cardiac Centre, Riyadh, Saudi Arabia; ⁶Cardiac Clinical Pharmacist, Prince Sultan Cardiac Centre, Riyadh, Saudi Arabia; and the ⁷Interventional Cardiology, Prince Sultan Cardiac Centre, Riyadh, Saudi Arabia.

Introduction: Solid-organ transplant patients have a high risk of severe infection related to Severe Acute Respiratory Syndrome Coronavirus-2. There are limited data on COVID-19 presentation and clinical outcome in a cardiac transplant recipient.

Case Report: A 54-year old woman a heart transplant recipient presented with symptoms of fatigue, excessive sleepiness and cough with phlegm for one week. She did not report any fever or shortness of breath. She had a heart transplant six months prior complicated by antibody-mediated rejection. She was treated with plasmapheresis, intravenous immune globulin, and high dose methylprednisolone. She could not have further scheduled RV biopsies due to the lockdown. She remained on a high dose of immune suppressive medication till her current presentation. Her medication included Prednisolone 20mg daily, Mycophenolate Mofetil (MMF) 1g bid, Tacrolimus 7 mg bid for a target FK level 10-15. On her current presentation to the hospital, she was found to be hypoxic, tachypnic, tachycardic with a BP 130/70. Her chest x-ray showed bilateral infiltrates. She had leukopenia 3.5 and lymphopenia 0.2, CRP 25, ferritin 1106, LDH 632, and IL6 87. She was started empirically on oseltamivir, vancomycin and piperacillin/tazobactam. Her COVID-19 PCR result was positive. Subsequently, she was started on Favipiravir loading of 1600 mg for two doses and a

maintenance dose of 600 mg twice daily for 7 days. The MMF and tacrolimus were discontinued. The prednisone was switched to hydrocortisone 50mg IV q6h. Despite treatment, she had reduced level of consciousness and progressive bilateral lung infiltrates requiring mechanical ventilation. The multidisciplinary team discussed enrolling patients in the convalescent plasma study. The patient’s family was informed and they agreed and consented to proceed with plasma therapy. Two units of compatible ABO plasma therapy was given for two consecutive days. Intravenous dexamethasone was started. She was extubated successfully after ten days. Given her marked clinical improvement, she was started on MMF 1g bid, and tacrolimus adjusted to the target FK level of 5. The patient was discharged home after three weeks of admission.

Summary: This case represents a recent heart transplant recipient who presented with COVID-19 pneumonia. Her treatment involved convalescent plasma transfusion, Favipiravir, dexamethasone, and reduction of immune suppression.

1185

Aortic and Renal Artery Thrombosis as the First Clinical Manifestation of COVID-19 in a Heart Transplant Recipient

D.S. Belfort,¹ C.R. Cafezeiro,¹ D.A. Furlan,¹ M.S. Lira,¹ R.C. Dantas,¹ C.A. Araújo,¹ I.W. Campos,¹ M.S. Ávila,¹ S. Mangini,¹ L.B. Seguro,¹ F.G. Marcondes-Braga and F. Bacal Heart Institute - HCFMUSP, São Paulo, Brazil.

Introduction: The relation between coronavirus 2019 disease (COVID-19) and thrombotic events is well established, and both arterial and venous thrombotic events are described. Although arterial events occur in about 3.6 to 10.5% of critically ill patients, they are usually stroke or acute myocardial infarction. Arterial thrombosis of other sites is rare.

Case Report: We report a case of a 28-year-old male heart transplant recipient admitted into emergency department presenting right flank pain associated with fever, chills, nausea and vomiting for three days. Apart from diabetes mellitus and dyslipidemia, he had no other comorbidity and he was on regular immunosuppression. Physical exam revealed right costovertebral angle tenderness. Blood tests showed C-reactive protein of 317mg/dL, lactate dehydrogenase of 1827U/L, D-dimer of 4126ng/mL, ferritin of 651ng/mL and leukocytosis of 16100/mm³. An abdominal and thoracic computed tomography scan (CT scan) revealed sparse luminal peripheral thrombi in the descending thoracic aorta. One of the thrombi extended to right renal artery ostium and caused subocclusion of the proximal segment of this artery. Right kidney presented multiple renal infarcts. Also ground-glass opacities were found in 25% of pulmonary parenchyma. COVID-19 was suspected and nasopharynx real-time fluorescence polymerase chain reaction result for SARS-CoV-2 was positive. Coagulopathy tests were performed because of atypical presentation and lupus anticoagulant (LAC) was positive. Hydration, antibiotics and anticoagulation with enoxaparin were prescribed. The patient recovered and became asymptomatic. Warfarin was prescribed and patient was discharged after 15 days of hospitalization.

Summary: This case report illustrates the heterogeneity of clinical presentation of COVID-19 and reinforces the existence of a prothrombotic state, even in the outpatient setting. Moreover, it adds information to the recent reports regarding the presence of antiphospholipid antibodies in COVID-19, although their importance in the pathophysiology of thromboembolic events in this setting is still not clear. The implication of these findings in transplant recipients is even less established, and this case report highlights the need for further research.

1186

COVID-19 Infection in a 13-year-old Heart Transplant Recipient in Immediate Post Transplant Period - A Case Report

I. Biswas,¹ A. Bahl,² B. Kumar,¹ H. Singh,³ S.K. Thingnam,³ and G.D. Puri.¹ ¹Anaesthesia and Intensive Care, Postgraduate Institute of Medical Education and Research, Chandigarh, Chandigarh, India; ²Cardiology, Postgraduate Institute of Medical Education and Research,

Chandigarh, Chandigarh, India; and the ³Cardiothoracic and Vascular Surgery, Postgraduate Institute of Medical Education and Research, Chandigarh, Chandigarh, India.

Introduction: Experience regarding course and outcome of Covid-19 infection in heart transplant recipients is limited. Case fatality rate of 25% of covid-19 infection in adult recipients of heart transplant and mild and self-limited disease in young heart transplant patients have been reported in small case series. We describe a case where a 13 year old patient contracted covid-19 infection on 7th post-operative day after undergoing heart transplant and was subsequently discharged from hospital uneventfully.

Case Report: A 13 year old boy, with dilated cardiomyopathy underwent orthotopic heart transplant surgery. In the immediate pre-operative period, the real-time polymerase chain reaction (RTPCR) of nasopharyngeal swabs of both the recipient and the brain-dead organ donor were negative for severe acute respiratory syndrome coronavirus type 2 (SARS CoV 2). The intraoperative and immediate postoperative periods were uneventful. The recipient got weaned off from mechanical ventilation on the 1st postoperative day and O₂ support was weaned off on 4th postoperative day. He was put on immunosuppressive regimen consisting of mycophenolate mofetil, tacrolimus and prednisone. On 7th postoperative day, he complained of fever, sore throat and dry cough. Nasopharyngeal swab for RTPCR was sent. It reported positive for SARS CoV 2. He was shifted to isolation facility. He maintained more than 94% saturation on pulse oximetry in room air. Immunosuppressive regimen was continued. He was administered 5-day course of remdesivir. Inotropic support was weaned off on 10th postoperative day. On serial bedside echocardiography, the allograft function was found to be normal throughout. He was kept on prophylactic antimicrobial, antifungal and anti-cytomegaloviral therapy and on prophylactic dose of low molecular weight heparin. There was initial rise in neutrophil lymphocyte ratio (17), C reactive protein (58 mg/l), ferritin (871 ng/ml), D-dimer (1904 ng/ml), Troponin T (227 pg/ml) levels, which gradually came down to within normal limits. He was discharged on 38th postoperative day to a home isolation facility as his RTPCR for SARS CoV 2 was still positive, although he remained completely asymptomatic for the last 21 days.

Summary: The course of Covid-19 infection in the immediate post-transplant period of this young heart transplant recipient was largely uneventful.

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1187

Venous Thromboembolism as an Initial Manifestation of COVID-19 in a Heart Transplant Patient

R.C. Tourinho Dantas, M. Lira, D. Belfort, C. Araújo, C. Murad, M. Ávila, L. Seguro, S. Mangini, I. Campos, F. Marcondes-Braga and F. Bacal Transplante Cardíaco, Instituto do Coração - HCFMUSP, São Paulo, Brazil.

Introduction: The disease caused by the coronavirus 2019 (COVID-19) is mainly characterized by symptoms related to the upper respiratory tract associated with fever and constitutional symptoms, progressing in the most severe cases to pneumonia and severe acute respiratory syndrome (SARS). However, due to the increasing number of cases, atypical presentations have been found. Among them, thromboembolic manifestations stand out, since the virus itself seems to predispose to changes in the coagulation system.

Case Report: A 62-year-old male patient who underwent cardiac transplantation 6 months ago, secondary to chagasic cardiomyopathy, had pain and edema in his left foot for 1 week. Upon admission, he was eupneic, afebrile, heart rate of 96bpm, blood pressure of 120 × 70mmhg, with edema and erythema on his left foot. Chagas reactivation, cellulite or deep vein thrombosis were the diagnostic hypotheses suggested. Soft tissue

ultrasound and venous doppler of the left lower limb were compatible with deep venous thrombosis and superficial thrombophlebitis. Skin lesion biopsy confirmed Chagas reactivation. Antibiotic therapy with cefazolin, full anticoagulation with enoxaparin and treatment with benzonidazole were introduced. In the second day of hospitalization, patient presented myalgia and dry cough, in addition to an increased C-reactive protein and multiple ground-glass opacities on computed tomography of the chest, suggestive of COVID-19. This finding was corroborated by a positive result of RT-PCR for SARS-COV2. The patient evolved with SARS, requiring progressive use of vasoactive drugs, mechanical ventilation and pronation.

Summary: It is currently known that COVID-19 increases the risk of thromboembolic events, especially in hospitalized patients, reaching an incidence of 25%, even in the presence of effective prophylaxis. Several mechanisms have been proposed for this association, but not with robust evidence. Despite these increased cases, there are no reports in the literature of initial presentation with a thromboembolic event in a heart transplant patient, emphasizing the importance of clinical suspicion and appropriate investigation.

1188

Longest Storage Period with Static Hypothermic Preservation in Cardiac Transplantation: Initial Experience in the West Coast

B.A. Guenthart, A. Alassar, T. Koyano, S. La Francesca, J.L. Chan, A. Krishnan, J.W. MacArthur, Y. Shudo, W. Hiesinger and Y. Woo Cardiothoracic Surgery, Stanford University, Stanford, CA.

Introduction: Improvement in preservation and transportation conditions has the potential to enhance organ quality at the time of transplant, optimize patient outcomes, and prolong the acceptable maximum allograft ischemic time. Herein, we describe our initial successful experience with the static hypothermic preservation system (Paragonix) for a donor heart. Our storage period and allograft ischemic time are the longest reported in the literature.

Case Report: A 68-year-old woman with HF was listed for transplantation. A donor heart was procured from a hospital located 3.5 hours away. The donor allograft was secured and packaged using the SherpaPak™ device (Fig. 1); total storage period was 283 mins. Heart transplantation was performed in standard fashion. AV conduction and normal sinus rhythm were regained after 7 mins of reperfusion. Total ischemic time was 330 mins, including a warm ischemic time of 20 minutes. The recipient CPB time and aortic cross clamp time were 153 and 50 mins, respectively. The patient recovered well and was discharged on postoperative day 10. At three months post-transplant, the patient continues to have excellent graft function without any evidence of rejection.

Summary: Historically, Shumway *et al.* initially obtained donor hearts from operating rooms immediately adjacent to a recipient. Over time, donor distance and allograft ischemic times have increased with advances in cardiac preservation. However, long cold ischemic times may induce PGD, cardiac allograft vasculopathy, and contribute to increased length of stay. Maintaining storage temperatures within the narrow range of 4-8° C is optimal for the preservation of high energy phosphate stores and avoids the risk of cold ischemic injury at temperatures below 2°C. By expanding geographic boundaries and total ischemic times, we believe that regulated static hypothermic preservation is a useful addition to a growing armamentarium of devices and strategies to increase access to transplantation.

