Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

(1299)

Successful Treatment of Fulminant Myocarditis with Intracardiac Thrombus in COVID-19

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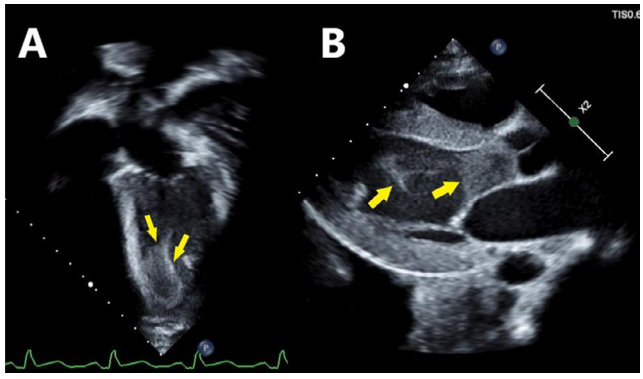
Introduction: The treatment of pediatric patients with COVID-19 associated myocardial injury and prothrombotic coagulation derangements remains to be established. We cared for an adolescent with COVID-19 and fulminant myocarditis who required veno-arterial extracorporeal membrane oxygenation (VA-ECMO). Her course was complicated by a large intracardiac thrombus, which was successfully treated with systemic tissue plasminogen activator (tPA).

Case Report: A 17 year old unvaccinated female presented with fever and chest pain 7 days after testing positive for COVID-19. She had a peak troponin of 21.48 ng/ml, elevated brain natriuretic peptide (629 pg/ml), and severely diminished left ventricular systolic function. She progressed to cardiogenic shock and was cannulated to VA-ECMO via the neck. On ECMO day 2 while therapeutic on unfractionated heparin (UFH), a large thrombus was noted in the left ventricular apex, extending toward the aortic valve (Figure 1). Prior to this, she had no evidence of a deep vein thrombosis. Given the concern for an impending stroke upon restoration of ventricular function, a continuous systemic high-dose tPA infusion (0.1mg/kg/hr) was initiated, while she was continued on UFH. A twenty-fold increase in D-dimer levels and serial echocardiograms indicated a thrombolytic effect. After 22 hours of thrombolysis, the patient developed bleeding complications and tPA was discontinued. By ECMO day 4, the thrombus completely resolved. Once her bleeding was controlled, she was transitioned to bivalirudin. Cardiac function recovered by day 11 allowing for separation from ECMO. 25 days later, she was discharged without any neurologic deficits.

Summary: The coagulopathic derangements associated with COVID -19 pose significant challenges to the management of fulminant myocarditis. There are no guidelines regarding management of an intracardiac thrombus on ECMO. However, with careful monitoring, systemic tPA can be used to provide life-saving therapies with excellent neurological outcomes.



(1300)

Use of Isolated Right Ventricular Assist Device for Refractory Graft Failure Following a Pediatric Orthotopic Heart Transplantation

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Introduction: Mechanical circulatory support for isolated right ventricular (RV) failure following heart transplantation (HT) is well described in the adult literature. However, there are no similar pediatric reports . We report a case of successful use of paracorporeal CentriMag ventricular assist device as a bridge to recovery for acute RV failure following HT.

Case Report: This is a 12-month-old with complex congenital heart disease; single ventricle (SV), common AV valve, pulmonary atresia, heterotaxy, with dextrocardia, situs inversus and interrupted inferior vena cava with azygous continuation to a left superior vena cava.

Stage 1 palliation with a ductal stent was performed in the neonatal period. She was deemed not a suitable candidate for SV palliation due to poor ventricular function as such was listed for HT. She underwent a complex HT operation including hilum-to-hilum pulmonary artery reconstruction.

Intraoperative echocardiogram showed reasonable left ventricular function but poor RV function with high central venous pressure(CVP). Despite increasing inotropic support she remained hypotensive. A decision was made to place the patient on RVAD using a CentriMag device, with configuration from the right atrium to the main pulmonary artery. The patient hemodynamics improved immediately and decreased CVP. Patient was supported on RVAD for 72h before explantation. She was extubated on post op day 4 and discharged home after two weeks. At six months post HT she remains with normal graft function.

Summary: Acute RV dysfunction after HT is attributed to either an increase in pulmonary vascular resistance or loss of contractility in the donor heart. In this patient, a combination of pulmonary hypertension, diffuse hypoplasia of the pulmonary arteries and long donor ischemic time contributed to RV dysfunction. The present case is unique in that this patient was successfully supported with isolated RVAD, avoiding VA ECMO which is traditionally the modality of choice in such a case scenario. To the best of our knowledge, this is first case report of an infant supported on RVAD following HT. Consideration of RVAD to manage refractory primary graft failure related to RV dysfunction following HT should be considered especially in the absence of need for pulmonary or left ventricular support.

(1301)

VAD as Bridge to Transplant Decision in Nine-Year-Old Child with Duchenne Muscular Dystrophy

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Introduction: Overall survival and quality of life has been improving in patients with Duchenne Muscular Dystrophy (DMD) in recent years in the setting of increased treatment with steroids and non-invasive positive pressure. Cardiac disease is now the primary cause of death. Given this shift, advanced cardiac therapies such as ventricular assist devices (VADs) and transplantation are being increasingly considered in selected individuals.

Case Report: A 9-year-old, ambulatory male with DMD, treated with prednisone and eteplirsen (exon-skipping agent), had rapid progression of ventricular dysfunction over a 6 month period. Given the patient's young age, additional work-up was done to rule out secondary causes. Viral myocarditis labs were unremarkable, but cardiac MRI demonstrated diffuse fibrosis consistent with DMD cardiomyopathy. Despite optimized oral medications, he was hospitalized twice for decompensated heart failure, ultimately requiring intravenous inotropic support. Given that his cardiomyopathy was rapidly progressive and out of proportion to his skeletal muscle disease (remained ambulatory with minimal respiratory muscle weakness), the family opted for VAD implantation with the possibility of subsequent transplant. For successful device placement, a subdiaphragmatic Gore-Tex pericardial pocket extension was created intraoperatively to fit the HeartMate3 LVAD given his small size (45 kg, BSA 1.35/m^2). He was extubated on POD#1 and on baseline nocturnal BiPAP by POD#2. He was discharged with improved exercise tolerance and remains ambulatory. The patient was listed for heart transplant 3 months after VAD placement and had no unplanned readmissions.

Summary: In a carefully selected population of muscular dystrophy patients, even at small size and age, VAD placement can be safely performed with good outcomes. VAD support can be used as destination therapy, or in some cases, as bridge to transplantation. Transplantation may be appropriate for those DMD patients with cardiac disease out of proportion to skeletal and respiratory muscle disease, particularly if they are expected to have reasonable longevity from a non-cardiac standpoint. VAD support may allow for full evaluation of these non-cardiac co-morbidities in the absence of heart failure and thus may be helpful in the proper selection of appropriate transplant candidates.