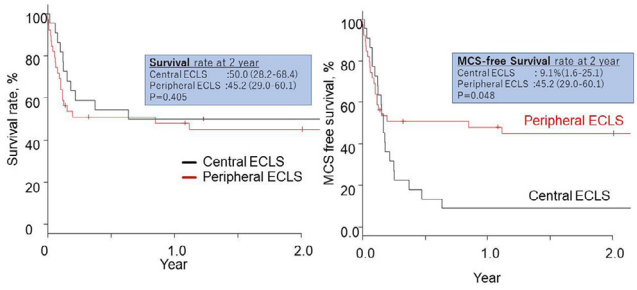

Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

ECLS for left main occlusion-induced cardiogenic shock. Life-long mechanical circulatory support is inevitable in cases who need upgrade to central ECLS.




## (1072)

### Prone Positioning Under ECMO: A Retrospective Cohort of 34 Patients

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**Purpose:** Extracorporeal Membrane Oxygenation (ECMO) become standard therapy for refractory hypoxemia (veno-venous (VV)) and circulatory failure (veno-arterial (VA)). However, severe hypoxemia may persist in some patients under ECMO. Prone position (PP) has been shown to have a benefit on oxygenation in patients with acute respiratory distress syndrome. We performed a retrospective study to evaluate the change of oxygenation and the risks involved in positioning patients under ECMO in PP.
**Methods:** All patients who underwent PP under ECMO from August 2014 to December 2020 were included. PP was performed on two criteria: refractory hypoxemia defined by a P/F<80mmHg despite 100% FiO2 on ventilator and ECMO or persistent hypoxemia defined by a need to maintained FiO2 ≥80% on ECMO with posterior pulmonary condensations on CT scan. Ventilatory and ECMO parameters and PP-related complications were collected.
**Results:** From 556 patients under ECMO, 34 (6.1%) (median age 54 years) were included for 87 PP procedures (2.5 +/-2.4 sessions per patient). ECMO was VA for 6 patients, VV for 27 patients and VAV for one patient. 19 patients were placed in PP for refractory hypoxemia and 15 for persistent hypoxemia. Mean tidal volume was 4.5mL/kg +/-1.7, median positive end-expiratory pressure at 10 cmH20 (IQR 10-15), respiratory rate at 20/min (IQR 18-28). Mean PP session duration was 18 h +/-4.2. Median time from ECMO placement to first PP was 7 days (IQR 4-10). PP procedures resulted in a significant improvement in oxygenation, with increasing $P/F_{ECMO}$ ratio from 92.6 to 133.2 on average (p<0.0001). Concomitantly the ventilator FiO2 decreased from 65% to 55% (p<0.0001).The most frequent complication was the presence of bedsores of the face and trunk (6 patients). The other complications reported were: 1 cardio respiratory arrest due to tamponade, 1 pump thrombosis, 1 displacement of limb reperfusion cannula, 1 tracheostomy decanulation. No ECMO decanulation occurred. At discharge, 9 of 34 patients with PP (26%) had died compared to 237 on 522 patients under ECMO without PP(45.4%) (p=0.033).
**Conclusion:** PP in hypoxemic patients under ECMO is effective for improving oxygenation. A beneficial effect on mortality is also suggested. In an expert center, less than 20% of patients experienced bedsores and 12% may suffer from severe complications requiring urgent treatment.

## (1073)

### VAD Support of High-Risk Infants with HLHS: Comparison of Rescue VAD After Prior Palliation versus Primary VAD Insertion

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**Purpose:** To evaluate outcomes in high-risk infants with hypoplastic left heart syndrome (HLHS) supported with the Berlin Heart Ventricular Assist Device (VAD), comparing those with rescue VAD after prior palliation vs those with primary VAD insertion.
**Methods:** We reviewed all 11 high-risk infants with HLHS who were supported with the Berlin Heart VAD at our institution. Patients are divided into two categories: bridged to decision (BTD) and bridged to transplant (BTT). Patients categorized as BTD were either status post prior palliation or had delayed referral for treatment and had cardiac failure and severe end-organ injury. Patients categorized as BTT were deemed too high risk for staged palliation and underwent primary VAD insertion along with placement of bilateral pulmonary artery bands and atrial septectomy if needed. The primary outcome was mortality.
**Results:** 11 patients were supported by the Berlin Heart EXCOR between 2012-2021. **BTT**: 64% (n=7) of the patients were categorized as BTT (median age = 20 days; median weight = 3.2 kilograms). Elevated panel reactive antibody was present. Median duration of VAD support was 101 days. 71% (n=5) in the BTT group survived to hospital discharge. All 5 (100%) were alive one year after orthotopic heart transplant. **BTD**: 36% (n=4) of the patients were categorized as BTD (median age = 121.5 days; median weight = 3.8 kilograms). Elevated panel reactive antibody was present in 50% (n = 2). Median duration of VAD support was 212 days. 50% (n=2) in the BTT group survived to hospital discharge. Zero (0%) were alive one year after orthotopic heart transplant. Additional patient data is summarized in Table 1.
**Conclusion:** Outcomes for VAD insertion in infants with HLHS and end-organ injury after failed prior palliation or delayed referral are suboptimal and not as good as outcomes after primary VAD insertion. Neonates with HLHS at high risk for staged palliation should be considered for primary VAD insertion to facilitate cardiac transplantation.

Table 1: Demographic Comparison of BTT vs. BTD

| | BTT | BTD |
|---|---|---|
| # of Patients | 7 | 4 |
| Age Range (days) | 13-25 | 13-215 |
| Mean Age(days) | 19.6 | 117.8 |
| Median Age (days) [IQR} | 20 [18.5,22] | 121.5 [78.3,161] |
| Mean Weight (kilograms) | 3.2 | 3.8 |
| Median Weight (kilograms) [IQR} | 3.2 [3,3.5] | 3.9 [3.7,4.1] |
| | | |
| Intubated at VAD implantation | 5 (71%) | 3 (75%) |
| Surgery Prior to VAD Support | 0 (0%) | 4 (100%) |
| | | |
| Death on VAD | 2 (29%) | 2 (50%) |
| Heart Transplant | 5 (71%) | 2 (50%) |
| Alive at Hospital Discharge | 5 (71%) | 2 (50%) |
| Alive 1 Year After Transplant | 5 (71%) | 0 |

## (1074)

### Persistent Subclinical SARS-CoV-2 Isolation After Redo Lung Transplant for COVID-19-Induced Lung Injury

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**Introduction:** Lung transplantation (LTx) is lifesaving for patients with irreversible lung injury due to COVID-19; however, all viable virus must be cleared before transplant. Prolonged viral shedding is common, particularly among immunosuppressed patients. Thus, ongoing detection of SARS-CoV-2 RNA may delay transplant and prolong hospitalization. We report a case of an LTx recipient who developed COVID-19-associated lung injury with prolonged viral shedding that persisted following redo LTx.
**Case Report:** A 48-year-old man developed COVID-19 17 months after bilateral LTx. His illness rapidly progressed to hypoxemic respiratory failure requiring bilevel ventilation and prone positioning. He was treated with corticosteroids, remdesevir, convalescent plasma, anticoagulation,

and reduced immunosuppression. Tocilizumab was not administered as data supporting its use was unavailable. Despite aggressive therapy, he remained hypoxemic and developed radiographic evidence of pulmonary fibrosis. SARS-CoV-2 was persistently isolated between November 2020 and April 2021; the PCR cycle threshold in March 2021 was 32, indicating a low level of viral RNA. There was no evidence of antibodies to SARS-CoV-2. Finally, after 2 negative nasopharyngeal swabs in April, he underwent redo bilateral LTx in May 2021, 163 days after his initial diagnosis. Postoperative critical illness myopathy required prolonged mechanical ventilation, nutrition via a feeding tube, and 19 days at an acute rehabilitation center. Routine surveillance bronchoscopy 40 days after retransplant revealed SARS-CoV-2 in bronchoalveolar lavage fluid and again in a nasal wash sample. He had no COVID-19 symptoms at the time of viral isolation, and inflammatory markers were normal. He was empirically treated with casirivimab and imdevimab, with resolution of SARS-CoV-2 isolation 8 days later.

**Summary:** Prolonged viral shedding is common in immunocompromised patients with COVID-19; however, ongoing viral isolation is not a reliable indicator of active viral replication and transmissibility. Our patient had persistent SARS-CoV-2 isolation after redo LTx with no evidence of COVID-19 or allograft injury. Thus, persistent viral shedding alone may not be an absolute contraindication to LTx and additional factors such as PCR cycle threshold and time from original infection should be considered.

## (1075)

### Parvovirus B19: A Potential Cause of Refractory Leukopenia in Lung Transplant Recipients

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**Introduction:** Leukopenia is common among lung transplant (LT) recipients and medications are the most common offending agents, including valganciclovir (VG), mycophenolate mofetil (MMF), and trimethoprim-sulfamethoxazole (TMS). If leukopenia persists despite stopping culprit medications, patients are typically referred for a bone marrow biopsy (BMB) and parvovirus B19 (B19) testing. In immunocompromised hosts, persistent B19 infection most commonly manifests as pure red cell aplasia and chronic anemia. We report unusual cases of refractory leukopenia in 2 LTR who were found to have B19 on BMB.

**Case Report:** A 68-year-old woman had bilateral LT (BLT) in February 2020 for idiopathic pulmonary fibrosis (IPF). She had basiliximab induction and our standard immunosuppressive and prophylactic regimen: MMF, VG, and TMS. Four months after BLT she became neutropenic, but not lymphopenic, anemic, or thrombocytopenic. MMF, VG, and TMS were stopped, but she continued to require recurrent filgrastim as her absolute neutrophil count was <500 cells/$\mu$L. BMB revealed a hypocellular-for-age bone marrow with diminished, but maturing trilineage hematopoiesis, and PCR detected B19. She was prescribed IVIG, but it was held due to rapidly progressive renal dysfunction. To date, she remains off MMF, VG, and TMS, with letermovir, acyclovir, and pentamidine replacing the latter 2 medications. She is still leukopenic and now also mildly anemic. A 62-year-old man had BLT in August 2020 for IPF. He had basiliximab induction and our standard immunosuppressive and prophylactic regimen: MMF, VG, and TMS. Two months after BLT he became leukopenic and mildly anemic, but not thrombocytopenic. MMF, VG, and TMS were stopped, but he continued to require recurrent filgrastim. BMB revealed a hypocellular-for-age bone marrow (10-15%), and PCR detected B19. He was prescribed IVIG, but IVIG infusions are yet to begin. To date, he remains off of MMF, VG, and TMS, with letermovir, acyclovir, and atovaquone replacing the latter 2 medications. He remains leukopenic, but not anemic or thrombocytopenic.

**Summary:** We report unusual cases of refractory leukopenia, without significant anemia, in 2 LT recipients with B19 identified on BMB. We suspect that B19 is the culprit as stopping offending medications has been ineffective and hematologic workup has been unrevealing.

## (1076)

### Atypical HUS in a Lung Transplant Recipient with Salmonellosis

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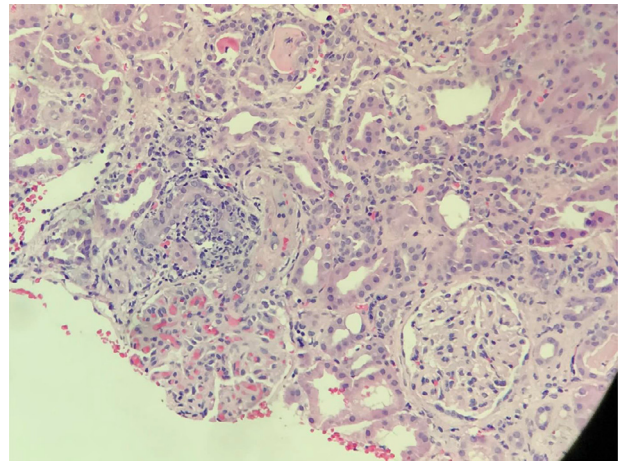
**Introduction:** Thrombotic microangiopathy/Atypical HUS following lung transplantation is unusual. An unusual case of TMA with multiple possible etiologies, including infection, is presented.

**Case Report:** 64-year-old African American woman 2 years post right single lung transplant presented with shortness of breath, lethargy and diarrhea. Infectious work up revealed MRSA in BAL and Salmonella in stool by PCR. She was treated with Vancomycin and Levaquin. Her immunosuppression regimen consisted of prednisone, Tacrolimus and Mycophenolate. Tacrolimus levels were within normal range (5-8 ng/ml). The platelet count started to decline on day 5 of hospitalization, with a nadir of 74K. She was also noted to have worsening renal function with creatinine increasing. There was evidence of hemolytic anemia. ADAMTS-13 activity was normal. Renal Biopsy was performed: There were arteriolar and glomerular capillary thrombi associated with intimal edema and endothelial injury. Ischemic glomerular changes were notes as was acute tubular injury. The findings were interpreted as thrombotic microangiopathy. There was no evidence of myoglobin casts. Therapy included transitioning calcineurin inhibitor to Cyclosporine and continued antibiotic therapy. Due to rapid improvement of renal function, Plasmapheresis was not performed.

**Summary:** Atypical HUS is a very unusual cause of AKI in salmonellosis, felt to relate to S.Typhi virulence factors. Cases of CNI induced atypical HUS have also been reported in lung transplant recipients, with an annual incidence of 2.3%. Early recognition is important in regards to prognosis and survival. In summary, regardless of etiology, is vital to recognize clinical features of atypical HUS/TTP early in transplant recipients and to clinically evaluate for many possibly etiologic factors before directly attributing injury solely to CNI related endothelial injury, as documented in this clinical case.



## (1077)

### Rare Immune Dysregulatory Disorder Leading to Lung Transplantation

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