rest of the world if there is any break in the chain of screening the affected in the incubation period.

Current reported experience is discussed.

A7 Initiating an Adult and Pediatric Extracorporeal Membrane Oxygenation Program in a Developing Country: Challenges, Successes, Opportunities, and Road Ahead

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In developing countries, there are a growing number of patients with complex heart and lung disease (both adults and pediatric population) that is coupled with an environment of scarce resources. There is, therefore, a huge need for the adoption of modern medical technology in the field of mechanical circulatory systems, including extracorporeal membrane oxygenation (ECMO) treatments. The development of ECMO in particular has been extremely slow, and no system is currently approved and available for clinical application in developing countries, such as Pakistan. Reasons include financial constraints that have been a barrier to the development of robust adult and pediatric cardiac intensive care units critical to the success of such programs. Second, because of substantial resource limitations, the existing models of such care cannot be applied in their existing forms without addressing the numerous challenges that limit the delivery of ECMO in the developing world. Other limitations include absence of skilled technologists and material resources for adapting such technologies. Additionally, there is need to adopt strategies for delivering to the patients and health care providers such technologies at affordable costs. Here, we present a framework for the establishment of a new ECMO program in a resource-limited environment typically encountered in the developing world and the emerging economies.

A8 Management of Hemopneumothorax on Venoarterial Extracorporeal Membrane Oxygenation in a Patient with Acute Viral Pneumonia, Kyphoscoliosis, and Hypothyroidism

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Introduction: Extracorporeal membrane oxygenation (ECMO) is becoming an important therapeutic option for patients with severe acute respiratory distress syndrome (ARDS). Pneumothorax is a known complication of mechanical ventilator strategy in ARDS. Anticoagulation given during ECMO increases the chance of uncontrolled bleeding. We report management of hemopneumothorax in a patient with kyphoscoliosis, hypothyroidism, and acute viral pneumonia in a patient with severe ARDS who was on ECMO support.

Case Report: We report a 55-year-old woman, a known case of kyphoscoliosis and primary hypothyroidism received with refractory hypoxemia. The patient was immediately intubated and put on mechanical ventilation. In view of high fraction of inspired oxygen (FiO₂) requirement (severe ARDS) on ventilator, prone positioning was done. Due to high positive end-expiratory pressure (PEEP), she developed sight-sided pneumothorax leading to implantable cardioverter-defibrillator (ICD) insertion. Still she was not maintaining peripheral capillary oxygen saturation (SpO₂), and chest X-ray (CXR) worsened. She was put on ECMO. During ECMO, she developed bleed from ICD site. Local site adrenaline infiltration was done. Massive blood transfusion was done (13 units in 24 hours). Target activated clotting time (ACT) level was kept on lower side and bleeding stopped. CXR revealed right hemothorax (clots). Till seventh day of ECMO, the patient did not show any improvement, so thoracotomy was done on ECMO and clots were retrieved. Postthoracotomy CXR revealed lung expansion. Following this, the patient had massive bleed for which massive blood transfusion (packed red blood cell [RBC], random donor platelets [RDP], single donor platelets [SDP], cryoprecipitate, fresh frozen plasma [FFP]) was done. On 01/11/17 (eighth day), the patient was weaned off from ECMO. Post ECMO, her FiO₂ requirement was 65%. Computed tomographic (CT) scan of her chest revealed bilateral diffuse ground-glass opacities with septal thickening, and her bleeding stopped. In next 3 days, her FiO₂ requirement was increased so she was started on steroid and diuretics, and antibiotics were escalated. The patient's condition did not improve, and she was discharged against medical advice.

Conclusion: Management of hemopneumothorax on ECMO is a very challenging task due to anticoagulation. Massive bleeding needs blood transfusion, targeting low ACT during ECMO. Surgical exploration on ECMO is also challenging, but with careful planning, surgery can be managed well.

A9 Venoarterial Extracorporeal Membrane Oxygenation in Case of Drug-Induced Stress Cardiomyopathy—A Lifesaving Intervention

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A 30-year-old female patient underwent functional endoscopic sinus surgery (FESS) under general anesthesia. After intramucosal infiltration of diluted dose of Inj. adrenaline, the patient developed sinus tachycardia and bigeminy followed by pulseless ventricular tachycardia. She was resuscitated, surgery was deferred, and she shifted to intensive care unit with Inj. noradrenaline infusion at 0.1 µg/kg/min. She developed ST elevation in all leads, and her transthoracic echocardiography showed severe global left ventricular (LV) dysfunction with normal functioning valves. She was started on Inj. levosimendan infusion considering global LV dysfunction. However, there was no improvement in hemodynamics, and she went into refractory shock with severe metabolic acidosis with acute renal failure. Finally, it was decided to initiate venoarterial extracorporeal membrane oxygenation (VA-ECMO) for this patient. During intraoperative transthoracic echocardiography, the patient was diagnosed to have LV noncompaction/Takotsubo cardiomyopathy. After 7 days of VA-ECMO, she was treated successfully and discharged. We present here a case of drug-induced stress cardiomyopathy and the importance of VA-ECMO as a lifesaving intervention.

A10 When Nothing Is Going Right

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Extracorporeal life support (ECLS) will be required when the conventional measures to support the heart and lungs fail despite optimizing the care. In resource-limited countries where health care is not uniform, the referral times as well as the time for initiation of extracorporeal membrane oxygenation (ECMO) would be prolonged as the family members have to pool up resources for the financial implications of supporting their loved ones. History has shown that the longer the delay in initiating ECMO, the poorer the outcome.

ECMO supports the body by optimizing oxygen delivery while helping the tissues to utilize the available oxygen in the circulation. Hence, optimizing oxygen-carrying capacity (Hb, circulating blood volume), rebalancing vasoconstriction/vasodilatation to the optimal extent while carefully watching the trend of metabolic end products, tissue oxygenation indices is the key to keep life going. The body might need time to set the metabolic processes back to near-normal levels. One can understand the damage done by cytokines and other inflammatory mediators liberated resulting in massive systemic inflammatory response. The injury caused by reperfusion to the ischemic area has been well described. At times, we might not be able achieve saturations greater than 85%. As long as the trend of the lactate and other metabolic end products are improving in the right

direction, we may have to give time for the healing process and wait.

Optimizing basal metabolic rate, minimizing the energy expenditure of the tissues, providing nutrition in right proportion resulting in normoglycemia, euthermia, and early initiation of hemofiltration if the kidneys are in a state of refractory shock, and preventing nosocomial infections are few of the measures in careful analysis and support of the body systems. The beauty of ECLS is caregivers need to have the strength to assess each and every organ system, compare the pathophysiology with the physiology, and take actions not resulting in harm.

A11 Venovenous Extracorporeal Membrane Oxygenation with Intra-aortic Balloon Pump—Case Scenarios

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Extracorporeal support by means of venovenous or venoarterial extracorporeal membrane oxygenation (VV- or VA-ECMO) is an advanced form of cardiopulmonary support when all conventional therapies fail. VV ECMO is indicated in patients with preserved cardiac function who need advanced pulmonary support. VA ECMO is indicated in patients with unstable hemodynamics and in need of advanced cardiac and pulmonary support. Intra-aortic balloon pump (IABP) has been used for left ventricular (LV) decompression with VA-ECMO in several cases. However, use of IABP with VV-ECMO can avoid the requirement of VA-ECMO.

Case 1: A 56-year-old male patient with poor LV function (ejection fraction [EF] 30%) with severe triple-vessel disease underwent coronary artery bypass grafting (CABG) with three grafts (off-pump) and was extubated, following which he needed reventilation on the second day due to development of respiratory distress with patchy lower lobe opacities. He needed inotropes and vasopressors. His chest skiagram and blood gases were consistent with a picture of acute respiratory distress syndrome (ARDS) due to pneumonia, and he was rescued with VV-ECMO. Transesophageal echocardiographic assessment revealed biventricular dysfunction, and an IABP was inserted, which gradually reduced his dependence on inotropes. He was put on antimicrobial coverage as per his endotracheal bacterial growth and antibiotic sensitivity pattern. On the 8th day, ECMO support was weaned off on IABP support that could be weaned off on the 11th day IABP was removed. His further recovery was uneventful.

Case 2: A post-lower segment Caesarean section (LSCS) patient of 30 years without any significant antenatal history developed severe respiratory distress immediately after cesarean section, and she was put on conventional