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Physical Rehabilitation during Extracorporeal Membrane Oxygenation for Lung Transplant Candidates and Recipients: A Clinical Approach

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Objectives: Physical therapy has huge importance for the protection and development of muscles in lung transplant candidates and recipients. Extracorporeal membran oxygenation (ECMO) is used in two ways: bridge to transplantation (BTT) and bridge to recovery (BTR). In the world of science, physical therapy in ECMO-assisted patients have not been fully characterized. In this article, physiotherapy methods applied in our center will be explained.

Methods: In our hospital, there were fifteen cases between January 2016 and January 2019. Right jugular vein avalon cannula was used in one of the cases with venovenous ECMO. Pulmonary artery left atrium novalung cannula was used in only one pediatric patient with arteriovenous ECMO. Thirteen of these cases were BTT and two of them were BTR patients. Four of BTT patients had been transplant surgery, the others were exitus before transplantation. BTR patients were both exitus. All transplant recipients were discharged from hospital to their home.

Results: All patients got involved physical therapy sessions when their vital signs and hemodynamics were stable. If the level of oxygen saturation decreased below%88, the hearth rhythm and blood pressure increased thirty units or decreased twenty units, the patients were rested or sessions were ended. Positioning and stretching exercises were practiced each patients by physiotherapist. Non-cooperative patients participated passive range of motion exercise programme, as for cooperative patients did active assistive or active exercise and isometric exercise considering to their muscle strength. The extremities that had ECMO cannula were moved very carefully to not cause circulatory problems and decannulation. As long as their muscle strengths developed, progressive resistive exercises were added physiotherapy programme. Electrical stimulation for quadriceps femoris was one of the way to prevent muscle disuse atrophy. Arm ergometer was cycled to active patients in bed. Breathing exercises, bronchial drainage techniques, incentive spirometer were methods which we taught to extubated patients. The patients who required mechanic ventilator and had tracheostomy cannula were weaned from ventilator time to time and breathing exercises were practiced. The patient with avalon cannula was able to sit edge of the bed, stand and use a bedside stationary bicycle and also our pediatric patient was able to sit edge of the bed and stand under the supervision of ECMO Mobilization Team. The team consisted of a physiotherapist, a perfusionist, a doctor, a nurse, a nurse practitioner. Patients had the femoral vein cannulation were not mobilized considering the cannula stabilization.

Conclusion: Exercise training is essential in lung transplant candidates and recipient to maintain their well-being. Physical therapy, including mobilization, can be achieved safely in ECMO patients.

Keywords: Extracorporeal membrane oxygenation, physical therapy, lung transplantation