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Heart failure: Cannulation strategies of extracorporeal membrane oxygenation (ECMO)

ECMO (Extracorporeal Membrane Oxygenator) combines a centrifugal pump with a hollow fiber or membrane oxygenator and provides hemodynamic improvement and cardiac and respiratory support with up to 6 l/min nonpulsatile flow. ECMO can be used in a central configuration with the outflow from the distal ascending aorta and inflow from the right atrium, or in a peripheral configuration, involving femoral or subclavian artery and femoral vein. The central approach is generally used following unsuccessful weaning from cardiopulmonary bypass. Peripheral cannulation is generally used for acute cardiac or respiratory failure from nonsurgical causes. Usually, peripheral cannulation is performed percutaneously using the Seldinger technique. Cannulas range from 17 to 21 Fr for arterial cannulation and from 25 to 29 Fr for venous cannulation. Perfusion of the lower limb must be achieved using a 6 Fr cannula inserted into the superficial femoral artery. Otherwise, an 8 mm Dacron graft may be sutured to the femoral or subclavian artery and the outflow cannula inserted inside. This allows the perfusion of the limb. One disadvantage of the peripheral cannulation is the inability to effectively decompress the left ventricle if there is a total absence of left ventricular function. Therefore, a transseptal drainage or venting from the left ventricle or left atrium or pulmonary artery must be instituted. Herein, the different cannulation strategies of ECMO are discussed.

Biography

Marco Picichè (MD, Ph.D.) graduated with a degree in medicine from the University of Florence in 1995 and completed his cardiac surgery residency at the Tor Vergata University of Rome in 2000, both summa cum laude. He held regular teaching appointments at the university of Montpellier school of medicine, obtained certification by the French Board in cardiac surgery (Paris, 2007), earned his research master in surgical science (Paris, 2007), and received a university diploma in vascular surgery (Paris, 2007). In Canada he authored a research project on the occlusion of the internal mammary arteries as an alternative method of myocardial blood supply (2008, Laval University). In May 2009 he had the honor of opening the 44th Congress of the European Society for Surgical Research with a lecture on "The history of surgical research." In September 2011 he received a doctor of philosophy (Ph.D.) in therapeutic innovations from Paris-Sud University. He is the Editor in Chief of the book : « Dawn and evolution of cardiac procedures : research avenues in cardiac surgery and interventional cardiology » (Springer-Verlag publishing house, September 2012). He patented a new surgical instrument. Currently he is a cardiac surgeon in Italy.