Artificial Heart: I- THE PAST

Early Clinical Applications of Assisted Circulation and Total Artificial Heart

The LVAD system was created at Baylor University College of Medicine in Houston, 1961-62 (Liotta). Today the implantation of LVAD is a well-established clinical procedure as:

1- A bridge for Cardiac Transplantation.
2- A bridge for Myocardial Recovery.

First Clinical Application with an Intrathoracic Pump

In the evening of July 19, 1963 E. Stanley Crawford and Domingo Liotta implanted the first clinical LVAD at the Methodist Hospital in Houston, bypassing the LV from the LA to the DTA. The pneumatic powered intrathoracic pump implanted through a left thoracotomy was regulated to bypass with 1,800 to 2,500 mL of blood/min. The pulmonary edema cleared. However the anuria persisted. After 4 days of mechanical support, the pump was discontinued. The patient in coma before LVAD support continued in coma and died.

First Clinical Application of a Paracorporeal Pump

On July 21, 1966 Michael E. DeBakey and Domingo Liotta implanted the first clinical LVAD in a paracorporeal position at the Methodist Hospital in Houston, bypassing the left ventricle from the LA to the ascending aorta in a patient in cardiogenic shock postcardiomyopathy. The patient developed neurological and pulmonary complications and died after few days of LVAD mechanical support.

In October, 1966 DeBakey and Liotta implanted a LVAD from LA to the right axillary artery. After mechanical circulatory support for 10 days the patient recovered, thus constituting: The First successful use of LVAD for Postcardiomyopathy Shock.

Liotta-Crawford LVAS (July 19, 1963).

Drawing of the 19 July 1963 clinical prototype that was developed by Domingo Liotta at Baylor University, Houston. The pump is shown in diastole. The actual clinical prototype is at the Smithsonian Institution, Washington, DC. 1= left atrium; 2= inlet valve; 3= housing of Silastic, reinforced with Dacron fabric; 4= air chamber; 5= blood chamber; 6= outlet valve; 7= descending aorta; 8= plastic tube (internal dimension, 4mm) for air supply. From THI Journal 29, 2002:229.

References


Historical Operation. The first one in medical history. Total heart replacement with an Artificial Heart (orthotopic position). On the left, Dr. Liotta; in the center of the picture, the empty pericardial sac of the patient, Mr. H. Karp. On the right, the hands of Dr. Cooley holding Mr. Karp’s heart and the artificial heart just before implantation. Texas Heart Institute, Houston (April 4, 1969). Corner picture: Dr. Cooley is holding both the removed artificial heart and the donor heart. (April 7, 1969).

Left, Dr. Liotta is talking to Mr. Karp and Dr. Cooley is observing (April 5, 1969). Right, Mrs. Shirley Karp and Mr. Haskell Karp (April 5, 1969).

First Clinical Implantation of a Total Artificial Heart

In the afternoon of April 4, 1969 Denton A. Cooley and Domingo Liotta replaced a dying man’s heart with an orthotopic mechanical heart at the Texas Heart Institute in Houston. After 64 hours the pneumatic powered artificial heart was removed and replaced by a donor heart. Thirty-two hours after transplantation the patient died of what was later proved to be an acute pulmonary infection, extended to both lungs, caused by fungi.