

Heart Transplant: The Way of the future or the Past

Written by Dr. Manshadi M.D.
Monday, 16 September 2013 16:59



Max, a computer analyst, comes to the office complaining of worsening shortness of breath, leg swelling, and fatigue. Maria, a housewife, ends up in the hospital with a massive heart attack that leaves her bed bound on intravenous medications to keep her alive. Sandra, a former nurse, ends up with an infection that ends up damaging her heart valve; she has rapid heartbeat and shortness of breath. All three of these patients have one common endpoint. They all ended up with a diagnosis of Heart Failure.

What leads to heart failure and Congestive Heart Failure? Different causes can lead to heart failure. It might be valve disease, muscle weakness caused by a virus. Occasionally it is drug-induced. Sometimes it comes after a heart attack. This leads to shortness of breath with

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walking or lying down. There might be swelling in the legs. One might feel rapid heartbeat, as it has to compensate for being weak. At times, one may simply feel fatigued.

Max ends up getting a heart transplant, Maria ends up receiving a semi artificial heart or a Ventricular Assist Device called Heartmate2, and Sandra ends up with a new valve. All three have extended their lives and are able to continue to enjoy their lives with their families.

Over the years, there has been a significant challenge for heart surgeons to find a perfect technique for transplanting hearts. Once this was successful, they had to overcome another challenge: how to prevent rejection. There has been a significant intrigue throughout the years regarding our hearts.

The heart is the seat of wisdom and intuition, creativity and love, gratitude and faith. In Buddhism, the heart is considered to be the center of consciousness. Aristotle identified the heart as the core of intelligence, sensation and consciousness. Further noting the heart is the first organ to form, according to his study of chick embryos.

Our heart is one of the first organs to form when the human embryo is developing. After just three weeks, the heart is already pumping blood through a network of vessels. It is working to send nutrients to every part of the embryo, so that other organs may develop as well.

It is curious how today, we still attach more meaning to the heart than any other organ. When someone is truly caring, we may say that he has a good heart. When we are emotionally moved by something, our hands often involuntarily touch our own chest above our hearts. The heart is the centerpiece of our body: consider our expressions that incorporate the heart: Heart warming, heartfelt, hearty, and heartthrob.

To get a better glimpse of where we are now with heart transplantation, we need to examine the history. Norman Shumway from Stanford Hospital is considered the father of heart transplantation. Dr. Shumway was the first to do a heart transplant on a dog, but the first heart transplant in humans was performed by Dr. Christiaan Barnard in South Africa on December 3, 1967 using the technique developed by Dr. Shumway. Dr. Barnard's patient lived for only 18 days and died not because of heart failure but rather from pneumonia secondary to immunosuppression given to the patient to prevent rejection.

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Because of advances in immunosuppression drugs the Heart Transplants blossomed from 174 in 1983 to 1,647 in 1988. Currently over 3500 transplants are performed annually throughout the world.

The actual surgery is not complex but does need a team approach. The patient is taken to the operating room and an incision is made along the sternum. The heart is exposed. The sac around the heart is opened and the great vessels are dissected, the failing heart is removed and the new heart is sutured in.

Transplantation is not a cure. There are complications such as infection, organ rejections, and side effects to antirejection medications. Naturally, one would think why not implant an artificial heart. As researchers and surgeons were trying to perfect human donor heart transplants, simultaneously researchers and engineers have been trying aggressively to design a heart that would function without the threat of blood clot formation.

The issue with the artificial hearts are that they are foreign objects that can promote blood clot formation. Yet, they do not have many issues with rejection. There are historical data suggesting some forms of artificial hearts in the 1950s, but they were only heart-lung bypass machines. It basically took over the function of the heart while the surgeons were performing an open heart surgery. On December 12, 1957, Dr. Willem Johan Kolff, implanted an artificial heart into a dog at Cleveland Clinic. The dog lived for 90 minutes. This marked the first time that an artificial heart was implanted in an animal. The first artificial heart to be successfully implanted in a human was the Jarvik-7, designed by Robert Jarvik in 1982. The first two patients to receive these hearts, Barney Clark and William Schroeder, survived 112 and 620 days beyond their surgeries, respectively. The latest artificial heart that has been in use is called Abicor2 and it is made of plastic and titanium and with an internal battery that is rechargeable from the skin. It has a life span of five years and it is only used for patients that are not a candidate for tissue transplants. A 46-year-old Taiwanese American Mr. Yao received the world's first total artificial heart implantation done by Dr. Jeng Wei in Taiwan.

The future models incorporate biomaterial tissue which is a chemically treated animal tissue. Then there are an in between devices called VADs or Ventricular Assist Devices. They are used in patients that have lost a significant amount of heart function but only needs some assist to make the heart function well. Dick Chaney, the former VP, was a recipient of this and subsequently had heart transplant.

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There is a new problem now with the over success of heart transplants is the rise in demand. There are far more patients in need than donors; I feel that with the advent in the advancement in stem cell research the most ideal way to implant organs would be utilizing this technology.

Dr. Manshadi MD, FACC, FSCAI, FAHA, FACP is among the top American cardiologists. He is the author of *The Wisdom of Heart Health*.

The physician is an Interventional Cardiologist who treats patients from prevention to intervention. He is a CMA (California Medical Association) member since 2001. He is a Board-Certified physician with the American Board of Interventional Cardiology, American Board of Cardiology. He combines private practice with Academic Medicine. Presently, he serves as Associate Clinical Professor at UC Davis Medical Center and as Clinical Professor at University of the Pacific among other positions. In addition, he is the Chair of Media Relations for American College of Cardiology, California Chapter. The multi-faceted physician is licensed and certified in nuclear medicine, a subspecialty of radiology. In this regard, he is a member of the American Board of Nuclear Cardiology. It is noteworthy to mention that in his practice, he likes to use innovative tests. If you want to know more about Dr. Manshadi, you can click here.

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