

Artificial Heart Devices

In its never ending pursuit of advancement, science has reached a crucial biotechnological plateau, the creation of artificial organs. Such a concept may seem easy to comprehend until one considers the vast knowledge required to provide a functional substitute for one of nature's creations. One then realizes the true immensity of this breakthrough. Since ancient times, humans have viewed the heart as more than just a physical part of the body. It has been thought the seat of the soul, the source of emotion, and the center of each individual's existence. For many years, doctors and researchers left the heart untouched because they thought it was too delicate, too crucial to withstand the rigors of surgery. However, the innate human desire to achieve brought about the invention of the artificial heart. The potential for such inventions are enormous. According to the American Heart Association, there are between 16,000 and 40,000 possible recipients of artificial heart devices under the age of sixty-five. If perfected, it would enable us to save thousands of human lives.

In considering the full impact of artificial heart devices on society, we must not narrow our thinking to include only the beneficial possibilities. There exist moral, ethical, and economic factors that accompany these new innovations to humanity. Who will receive these brilliant inventions? Obviously not all of the patients will get transplants, so selection criteria must be established. The high price of artificial heart devices and their implantation will eliminate some candidates. Unfortunately, this is not fair. The rich, in essence, can buy life, whereas the poor are abandoned to die in a diseased state. A thorough analysis of the implications of the implantation of such devices reveals not only selection and economic consideration, but mortality and ethics as well. Many contest that it is simply wrong to tamper with the ways and creations of nature. By prolonging life through unnatural means we are defeating nature's foremost tenet of the "survival of the fittest." We are preserving the weaker gene pools and contributing to the deterioration of the human species. These and other considerations play a vital role in determining the artificial transplants actual benefit to the contemporary world and the world of tomorrow. A full-scale incorporation of the artificial heart devices technology into the medical world could have serious consequences, all of which must be considered before such a rash step is taken.

Artificial heart devices are indeed a biotechnical wonder. Although they are not yet perfected for permanent implantation, they are the most reliable substitutes for bad heart parts until other functional, transplantables can be located. The Jarvik-7 was the first artificial device heart which was created by Symbion Incorporated. This system was used to replace the heart of Dr. Barney Clark, the first artificial heart patient. The device lasted for one-hundred and twelve days before Mr. Clark sank into an agony of complications and died. The Jarvik-7 was implanted four more times to replace failing hearts, with similar results, before the federal authorities halted the procedure.

Other devices have made progress since the Jarvik-7. One of the more successful inventions is the left ventricle assist device (LAVD). This device incorporates a host of hard won technological advances. Perhaps the most important is its "bio-compatible" materials, which have allowed the LAVD to function without problems for well over a year in a patient's body. The LAVD has been implanted in more than seven hundred people for up to seventeen months, as they have awaited human heart transplants (Stipp 38).

It is difficult to fathom the great scientific ingenuity that was required to develop these devices. However, we must not be blinded from seeing the whole picture. In assuming its role as a boost to humanity, these inventions bring many concerns. The issue of selecting patients for implantation is an important one. There are three alternatives for selecting patients who should have priority to receive artificial heart devices. The first decision-based medical criteria,

which seems to make the most sense. This method is meant to choose the ideal patient; the patient who can reap the most benefits not only for himself, but for researchers. Therefore, researchers look for a subject who will yield the information sought and thus produce the gains of new knowledge and therapies. In choosing a subject in this manner, researchers are governed by a principle of nonmaleficence, which means they can do no harm solely in order to further the experimental aspect of the operation. This rule prevents the "mad scientist" mentality from taking hold in experimental research. As Claude Bernard, the father of experimental research stated: "The principle of medical mortality consists in never performing on a man an experiment which might be harmful to him in any extent, though the result might be highly advantageous to science and to the health of others"(Holland 14). It would also seem logical that the decision be based on medical need, but practicality rules these out since many candidates have roughly equal needs for artificial heart devices.

A second method of selecting patients is ranking them based on their "social worth." This method would reward those who have benefited the community and demonstrated dedicated social productivity. After all, if someone has helped society, he or she is entitled to their fair return. Although this alternative is based on fair morals, it may meet the problem of social value. Two people might be valuable to society completely different ways, and which one is to receive priority. This also contradicts the American principle of the equality of all human beings, regardless of social contributions. The third method, random selection, may be used to select candidates with equivalent needs for artificial heart devices. Random selection may be accomplished either by lottery or by queuing, which is exemplified by the adage "first come first served." This method seems fair until one considers that one has led criminal lives or have done poorly by society may come out on top. This is definitely not justice. So how should we select patients for implantation's of artificial heart devices? Perhaps the selection process cannot be simply narrowed down to a single criterion, but combinations of several could be used to determine who deserves these transplants the most.

As depicted above, the selection of patients is a serious issue in the realm of artificial heart devices. Once a candidate has finally been chosen, however, how is he or she to finance such an elaborate surgical operation? The price for an implant of such complexity is extremely high. The estimated price for an LAVD is about fifty- thousand dollars(Stipp 41). This figure does not include hospital bills for the care and the board of the patient. This is an extravagant amount which most people simply cannot pay. Perfection of artificial heart devices will naturally lead to a widespread demand for the inventions, but still many will be unable to afford it. A total incorporation of heart transplants into the field of medicine would force insurance companies to expand their coverage. The population would benefit from this expansion, as would the insurance companies, since they would surely sell more health insurance plans because of the increased demand. Some believe that the implantation of artificial heart devices will strengthen the case for the national health insurance.

Another question to be considered is whether or not it is worth the high cost to have the operation. The common response is to say that a price cannot be put on life, but can we honestly say it is worth thousands of dollars to prolong someone's life for an indefinite length of time? The price may be indeed be too high to postpone what might be a destined fatality. One could spend fifty thousand dollars to have an implant placed in his eighty year-old father's chest, only to witness the death a month later. After all, it is natural for people to die. We all have a destiny which looms over us, over which we have no control. The patient himself must ask if it is worth the money to prolong his life, but to have his quality of health diminish greatly. With today's technology, an artificial heart recipient's mental state may become very distraught. Thoughts of death hover over his head, as he can never predict when the device may fail.

The use of artificial heart devices as a viable technique will undoubtedly raise many legal and ethical questions. Before completing the discussion of

artificial heart technology, these questions must be addressed. An important requirement for the surgical operation is that the surgeon must receive the informed consent of the patient. The patient must be aware of the nature of the operation and its dangers, and still be willing to go through with the procedure. However, a real life scenario may occur which does not allow for the patients consent. For example, suppose a patient is on the operating table undergoing bypass surgery and sudden complications occur involving heart failure. The doctor uses his best judgment to find the only way to save the patient's life; he inserts an artificial heart device. The physician may be endangering the patient's life by removing the natural heart and inserting an artificial device. However, the transplant without informed consent should be considered as an emergency medical operation. Possibly the patient's family should be the consenting party. This sounds like a suitable solution, but factors such as greed may interfere with the family's decision. If the patient has a large life insurance plan, his beneficiaries may consent to the artificial implant since it would greatly improve the risk to the patient's life.

The perfection of artificial devices for the heart will definitely have a great impact on society. This can be classified in two major ways: financial problems and population problems. Of course, increased use of artificial heart devices in medicine is going to increase the financial burden on society. The potential gains will be substantial when the lives of many productive individuals can be saved. The extent of the financial burden depends largely upon the number of patients who benefit from the artificial valve, the availability of the device, and improvements in its efficiency and dependability. In the long run, worldwide utility of the artificial valve technology would increase the world population. Overpopulation is already the root of many of the world's crises.

The many debates concerning artificial heart implantation as a medical technique each have their own significance, and each deserves thorough consideration. Before we rush headlong into complete employment of the devices in medicine, we must evaluate the moral, social, ethical, arguments. Hopefully we can reach a decision that blends all of the aforementioned considerations into a harmonious existence, working to the maximum benefit of society.

