Artificial Hearts and their Side Effects
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Before World War II heart surgery was not considered an option for treatment. Because of the massive scale of injury from shell fragments and bullets there was plenty of patients willing to undergo experimental treatment. Over time advances were made and in 1967 the first heart transplant was preformed in South Africa, the patient died eighteen days later from pneumonia because of the powerful drugs used to suppress rejection.

Rejection is caused when antigens trigger the white blood cells, lymphocytes, to produce antibodies. Depending on the antigen, different lymphocytes are activated to produce antibodies. The B cell lymphocytes produce antibodies in the blood that remove antigens by causing them to clump. T cell lymphocytes assist the B cells by causing direct destruction of antigens.

When you undergo a heart transplant a patient has to expect at least two episodes of rejection. Most of these episodes can be controlled by medication. In order to minimize these episodes medications have to be taken on time and in the proper doses. The main medications used by heart transplant patients are immunosuppressive drugs. These powerful drugs suppress the immune system, which leave patients vulnerable to many other infections.

Some of the common drugs are Cylosporine that inhibit the immune system’s T-cells (both the t-helper and T-suppressor are affected) and it also inhibits interleukins. Prednisone reduces inflammation as well as depressing the immune system. Tacrolimus also inhibits the T-lymphocytes activity. And CellCept is a powerful immunosuppressant that inhibits both T-cell and B-cells.

The first total artificial heart was implanted in a patient in the 1980’s. It was called the Jarvik-7 and was designed as a bridge for a transplant. The pump lasted far longer and had far lesser problems than anticipated.

Patients accepted the device much better than expected even though it was loud and bulky with forceful pumping.

They are now trying to develop an electric heart that will not be rejected. Since there will be no chance for rejection there would be no need for anti-rejection drugs which free patients from many of the side effects that they would suffer from with the human heart transplant. But patients with an electric heart will have to use anti-coagulation. Other advantages of the electric heart are that they are available anytime, which could be very beneficial to many people. The main reason for this is that donated hearts are on the decline because of fewer homicides, automobile accidents, and helmet laws, which reduce motorcycle fatalities.

In the future genetic engineering is the next step in battling organ rejection. Researchers are experimenting with ways to insert human genes into animal organs so the body will recognize them as “human.” FDA scientists are studying the way individual genes “turn on” as they develop. Scientists are trying to find out how viruses activate each other and how viruses can be used safely to deliver genes for new therapies. Gene therapies and their role in xenotransplantations are still in their beginning stages of development FDA scientists still have a long way to go before anything is available for common use.

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