**Pros and Cons of Artificial Organs**

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 The need for transplant organs outnumbers the supply. Transplants are needed for many reasons, such as chronic diseases and injuries. There is no reliable continuous supply of organs. We must look elsewhere to meet the need. As with any procedure, there are pros and cons to artificial organs.

**Artificial heart:** “Heart failure is the leading cause of death in much of the developed world” (Keen, 2000). Keen (2000) describes how “cardiac [heart] transplantation can only meet the needs of a relatively small number of patients.” Even if the number of donor hearts increases, the supply can’t keep up with the growing rate of end-stage heart failure.

The patient’s natural heart may be failing. The patient may be on a heart-lung machine and unable to live without it. The artificial heart is always available, but donor hearts often are not. Many candidates have only a few months to live. Some of them are not eligible for donor hearts.

The left ventricular assist device (LVAD) is one option. The LVAD strengthens existing heart function, increases energy, prolongs life, and improves quality of life (Rizzieri, Verheijde, Rady, & McGregor, 2008). It allows the patient to recuperate at home until a donor heart is available. Without this device, up to 40% of patients on the transplant list will die while waiting (Keen, 2000). The LVAD adds 1-2 years to the lives of the patient (Rizzieri, Verheijde, Rady, & McGregor, 2008).

While there are many benefits of the artificial heart, there are disadvantages. Some feel that the patient is in no position to make a decision as the only other option is death. Yet death or disabling injury can result from the transplant of the artificial heart. Opponents refer to the Nuremberg Code, which was designed to protect “human subjects during experimental research trials” (Simmons, Fall and Winter 2001, p. 402).

Among other issues is caregiver burden. The emotional, financial and social strain is huge. The caregiver must be on call at all times, trained to respond to emergencies, and know when to seek help. Rizzieri, 2008 also notes that caregivers “experience severe depression, anxiety, and posttraumatic stress disorders lasting as long as 12 months” (Rizzieri, Verheijde, Rady, & McGregor, 2008). There is also a financial burden. There are hospital visits, travel and lost wages for both patient and caregiver (Rizzieri, Verheijde, Rady, & McGregor, 2008).
 Added to this are physical complications with the artificial heart. Patients are prone to infections. During the post-op period the mortality rate is 14 – 27%. Over time the device may malfunction (Rizzieri, Verheijde, Rady, & McGregor, 2008). Patients have increased risk of stroke, cognitive impairment or brain damage.

**Artificial Kidney:** The artificial kidney is dialysis. A membrane cleanses the blood of waste products. The artificial kidney adds years of life. Van Noordwijk, 2001, estimates half a million people worldwide are living on long-term dialysis. Patients can often get this care close to home. It enables the patient to have a life outside of a hospital (The Kidney Foundation of Canada 2009).

The artificial kidney has some drawbacks. Dialysis takes from 4 – 8 hours, three times a week. During this time the patient is hooked up to a machine. All other activities revolve around the dialysis schedule. Patients must follow a strict regimen of medications, dietary changes and fluid restrictions. Otherwise the treatments don’t work. Though there are many centers for dialysis, some patients must travel for treatment in all kinds of weather (The Kidney Foundation of Canada, 2009).

Another con is the ethical dilemma [problem]. How do we decide whether to stop or continue treatment? Stopping dialysis results in death. Do we stop treatment when other health conditions arise? Do we resuscitate these patients in event of cardiac or respiratory arrest (Hermsen & van der Donk, 2009)?

 **Artificial Lung:** While we’ve had success with artificial hearts and kidneys, the artificial lung has not done as well (Go & Macchiarini, 2008). ECMO is one artificial lung option. [ECMO stands for **Extracorporeal Membrane Oxygenation**. **Extracorporeal** means outside of the body. A **membrane** oxygenator is a piece of equipment which acts as a **lung**, providing oxygen to the blood.]

The need for artificial lungs has increased steadily during the last decade (Sato MD, et al., 2007). “The only current treatment for chronic irreversible pulmonary failure is lung transplantation” (Zwishenberger & Alpard, 2002, p. 253).

One con is that it is risky. Patients with artificial lungs must take medicine to prevent blood clots (Zwishenberger & Alpard, 2002). They need multiple blood transfusions and intensive therapy. There is also a risk of infection (Go & Macchiarini, 2008). The low success rate and complications make artificial lungs a less popular option. Japan developed percutanous cardiopulmonary support (PCPS). Unfortunately, it lasts just days or weeks. These problems have kept the artificial lung from becoming a bridge to lung transplant (Nogawa, 2002).

The thoracic artificial lung (TAL) has shown more promise (Sato MD, et al., 2007). These successes have been limited to short term use of the ECMO for up to 3 weeks. This has given doctors time to reverse the lung problem so that the patient can use his own lungs again (Zwishenberger & Alpard, 2002).

Advances in the field of artificial organs are saving many lives. There are pros and cons with each organ to consider prior to treatment. Ethical issues arise as patients needing organs usually have end-stage disease or are critically ill, limiting their options. This is a complex issue that will continue to evolve as new treatment options are developed.