

Arrow Lionheart – Implantable Heart Assistance Device

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The Arrow Lionheart is the first fully implantable heart assistance device to be powered by a method of wireless electric transmission to reach clinical trials in humans. It is not an artificial heart, but is a left ventricle assist system (LVAS) for severe heart failure patients who are not eligible for a heart transplant.

The Lionheart is based on a system of work that was started by Dr. William Pierce. Dr. Pierce founded the artificial organs program at Penn State. A separate design team from Penn State developed the Lionheart LVAS. The main leaders of the design team consisted of Dr. Gerson Rosenberg, PHD, a professor of bioengineering, and Dr. Alan Snyder, and Dr. W.J. Weiss, who are surgery professors at the college of medicine. Additional members of the design team were materials, energy and fluid flow researchers.

The Lionheart LVAS pumps when a metal plate presses on a plastic blood sac, forcing the blood out of the device and back into the patient's natural circulation. The metal plate is driven by a miniature electric motor and a controller that reacts to the patient's blood flow needs.



The Lionheart has both internal rechargeable batteries and two external battery packs worn on the belt. Should the patient want to unhook the external battery

packs (to take a shower), the internal batteries can supply power for 20 minutes before they need to be recharged.

Clinical trials under direction of Dr. Walter Pae Jr. and Arrow International, clinical trials have been going on in Europe since October 1999. As of Dec. 2000, 10 patients have had the implant. Based on the information I read, there has been no deaths and no device failures. The FDA has approved the first series of trials in the US. The US clinical trials are sponsored by Arrow. The Penn State Milton Hershey Medical Center is one of the clinical trial sites.

Advantages of the Arrow Lionheart. Fully implantable components eliminate the currently required lines through the skin. This eliminates a potential source of infection and improves mobility. Since the Lionheart assists in the heart's pumping but does not replace the heart, it limits the chance of rejection.

References:

[Http://www.hme.psu.edu/lionheart](http://www.hme.psu.edu/lionheart)

[Http://www.psu.edu/ur/archives/intercom_2001/Feb15/lionheart.html](http://www.psu.edu/ur/archives/intercom_2001/Feb15/lionheart.html)

[Http://www.whitaker.org/news/lvad-fda.html](http://www.whitaker.org/news/lvad-fda.html)