After 2500 artificial hearts implanted only in Europe. Until now it has been only implanted in patients with very severe heart failure, almost terminal.

The use of artificial hearts (a device that replaces the functions of the heart) is increasing worldwide, and in fact, they have already been used in 26 patients in Spain and in 2500 in Europe.

While this practice gives rise to exciting medical possibilities, it also raises some ethical issues that we addressed in a previous article (see HERE). We will now update the latest findings on this practice.

Technically, artificial hearts consist of a continuous flow pump that can pump approximately 10 litres per minute from the left ventricle. The healthy heart can pump around four.

These hearts have a wire that exits the body at the belly button and connects to a small computer powered by 2 batteries, which last for between 8 and 10 hours; their half life is around 10 years.

Artificial hearts are placed inside the chest and connected to the heart in order for it to pump the blood to the aorta. The surgical procedure is not very long — around 2 hours — and has now been substantially simplified, as only two small incisions are required: one at the lower end of the heart and another near the aorta.

There is no doubt that the artificial heart is a major medical advance for patients who require transplant and who, for some reason, especially due to a lack of donor organs, are unable to have one.

The future of the artificial heart was very well described in the opening speech at the Inaugural Session of the 2016 course of the Royal Academy of Medicine of Valencia (Spain) held on 14th January 2016, in which Dr. Anastasio Montero, a leading heart surgeon at La Fe University hospital in Valencia, reviewed the history of the artificial heart and its future.

When talking about its use, he highlighted the complications that can be associated with it, especially infections, thromboembolic problems and mechanical device failures.

A technical problem that can arise is the possible displacement of the external wire for charging the batteries, so an immediate goal is to try to implant them inside the body and charge them through the skin. Another difficulty is the size of the artificial heart, which is still substantial, as it is a pneumatic pump system with a large energy supply that is not easy to transport.
One specific field of use is paediatric heart surgery, which presents the special difficulty of the size of the current devices if compared with the child's body.

In the aforementioned speech, professor Montero says that these difficulties could be rectified in the coming years, and that it could become a standard technique in patients with heart failure.

A positive aspect of the use of this artificial heart is that it has substantially improved the survival of patients in whom it has been implanted.

**Bioethical assessment**

From an ethical point of view, the use of the artificial heart should be subjected to the same criteria as any other surgical intervention, i.e. there must be proportionality between the risk for the patient and the benefits that may be obtained. Given that, at present, it is only implanted in patients with very severe heart failure, almost terminal, its use presents no ethical difficulties, in that it may prolong survival, although unfortunately, for now, the results are not too promising.

Justo Aznar MD PhD