



Pulmonary artery pressure technologies for remote monitoring of chronic heart failure [DG10087] A systematic review and economic model

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Plain Language Summary: Remote monitoring of chronic heart failure using pulmonary artery pressure (PAP) sensors

Key messages

- CardioMEMS and Cordella are pressure monitors (sensors) that are implanted into the artery in the lungs to help manage heart failure from home
- CardioMEMS lowers hospital admissions for heart failure; impact on deaths is less certain. Cordella may lower hospital admissions and deaths, but evidence is weaker.
- Both devices are safe and reliable with few problems and people found the sensors easy to use
- CardioMEMS is not likely to be a good use of NHS money. It is not known whether Cordella is a good use of NHS money.

What is chronic heart failure?

Chronic heart failure (CHF) is a condition where your heart can't pump blood around your body as well as it should. Symptoms of CHF can include breathlessness, tiredness, swelling of legs, feeling light headed and fainting.

CHF is usually diagnosed by a doctor based on your signs and symptoms, physical examination and assessments. CHF needs to be monitored to check symptoms aren't getting worse and to make sure you get the best treatment.

One of the early signs of CHF getting worse is a change in pressure in the arteries that carry blood from the heart to the lungs. A small implanted device (sensor) can be used to detect changes in pressure in the lungs (called pulmonary artery pressure). These devices send information to an external monitor in the person's home that can then be seen by the CHF team from their clinic. This helps doctors check how a person's heart is doing while they're at home.

What did we want to find out?

We wanted to know whether use of these pressure sensors will mean people get better treatment and have fewer visits to hospital. We also wanted to know whether introducing these sensors is a good use of NHS money. We were interested in two different sensors – CardioMEMS and Cordella.

What did we do?

We looked at existing research and created models to study both the health benefits and costs of using the CardioMEMS and Cordella pressure sensors to see how well they work and if they are good value for money.

What evidence did we find?

We found 11 studies (published across 60 reports) about implantable devices that monitor pulmonary artery pressure:

- Three studies looked at how well CardioMEMS works by comparing it to standard heart failure care.
- Three studies looked at Cordella. Everyone in these studies received the device but there was no comparison group. One of these studies was first designed to compare Cordella with standard care, and it provided a small amount of data on this.
- We also included three more studies that looked at how well CardioMEMS worked as a device — for example, whether it could be successfully implanted and whether it kept working over time.
- Two studies gave information on what it was like for patients to use the devices.

Main results

We found that:

- People with CardioMEMS had fewer admissions to hospital. There may also be fewer deaths, but the evidence is less certain.
- Cordella may also lower hospital admissions and deaths, but the evidence is weaker and less reliable.
- Some people using CardioMEMS reported better quality of life, but the results were mixed.
- Implanting the devices was usually successful and once implanted both devices worked well, with very few failures.
- Most people used the devices regularly, although this was measured differently across studies.
- People using CardioMEMS had more medication changes and contact with healthcare professionals, suggesting doctors were using the data to change care.
- CardioMEMS may not be good value for the NHS unless it can improve people's quality of life in the long-term as well as reducing hospital stays, or if the cost of monitoring it is lower.
- It is not clear whether Cordella is good value for the NHS or not.

What are the limitations of the evidence

Overall we found very few studies that looked at CardioMEMS or Cordella. The studies which compared CardioMEMS against usual care were mostly well done and gave us more confidence in their results. However, some studies had issues, like being open-label (patients and doctors knew who was using the device) or not fully explaining how patients were chosen, and some were missing results for some participants, which could affect the results. The studies on Cordella mostly did not have comparison groups and were smaller, making it harder to be confident about their findings. Because there are no direct comparisons between the two devices, it's hard to say which one works better overall. There was also no cost data for Cordella.

There is little information about how the devices work in people from different ethnic backgrounds or with other health conditions. It's not clear whether CardioMEMS or Cordella help people live longer, or how much they improve quality of life over the long term.