

Medtronic

Cardiac Resynchronization Therapy

Cardiac resynchronization therapy (CRT) is a treatment for heart failure that uses an implantable device to improve the pumping efficiency of the heart.

In healthy people, the four chambers of the heart contract in synchrony to move blood through the body (people experience this as their heartbeat). In many patients who have heart failure, the electrical impulses that coordinate the contractions of the heart's chambers may be impaired.

- As a result, in up to 30 percent of people who have advanced heart failure – or 10 percent of all people with heart failure – the two lower chambers (ventricles) no longer contract at the same time. This may worsen the symptoms of the disease, which include shortness of breath, fatigue, and swelling of the feet and ankles.

In CRT, a stopwatch-sized device is implanted in the upper chest in an attempt to resynchronize the contractions of the ventricles by sending tiny electrical impulses to the heart muscle:

- Resynchronizing the contractions of the ventricles can help the heart pump blood throughout the body more efficiently and reduce the symptoms.
- CRT, also known as biventricular pacing, is intended to complement standard drug treatment and dietary and lifestyle modifications.

Is Surgery Required to Implant a CRT System?

A specially trained cardiologist or cardiovascular surgeon implants the CRT system. The devices are implanted under the skin in the chest area:

- Three thin insulated wires (leads), with tiny electrodes on their distal ends, are maneuvered through veins from the device to the heart.
- One lead is placed to touch the inner wall of the right atrium, another to touch the inner wall of the right ventricle, and the third lead is threaded through the coronary sinus and placed to touch the outer wall of the left ventricle.
- The implantation procedure is typically done with local anesthesia, so the patient remains conscious. However, the procedure takes longer than a regular pacemaker implantation because of the need to implant the third lead to pace the left ventricle.
- A typical duration, depending on physician experience and patient anatomy, is between two and three hours. Patients usually stay in the hospital overnight.

What Are the Potential Benefits of This Therapy?

For those patients with heart failure who have electrical conduction problems of the heart, resynchronization therapy improves the flow of blood from the heart and throughout the body, which may result in improved symptoms, reduced hospitalizations, and reduced mortality.

The Medtronic-sponsored REVERSE (Resynchronization Reverse Remodeling in Systolic Left Ventricular Dysfunction) Trial demonstrated that CRT devices are associated with low mortality and heart failure hospitalization rates over five years, post-implant. The study showed:

- CRT results in significant structural changes to the heart in patients with mild disease (at two years following implant), and also had positive, enduring long-term effects.
- The benefits of CRT persisted, indicating that the device therapy reduces disease progression in patients with mildly symptomatic (New York Heart Association/NYHA-designated Class I and II) heart failure for at least five years following implant.

- Patients whose CRT was immediately activated at the beginning of the trial experienced a five-year mortality rate of 13.5 percent and a death plus heart failure-related hospitalization rate of 28.1 percent.

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