Renewed hope for regenerative stem cell cardiac therapies

Four clinical trials bring the latest adult stem cell therapies to Cincinnati

For more than 20 years, medical researchers have envisioned a day when the human heart could be stimulated to repair the damage of heart attacks and the longer-term deterioration caused by heart failure. Several early attempts to develop adult stem cell therapy, some involving studies dating back to the early 1990s, failed to produce breakthrough treatments. Now, a new wave of clinical trials brings new hope to the field of regenerative cardiac therapy.

The Carl and Edyth Lindner Research Center participates in four important clinical trials that explore potential regenerative treatments for post-heart attack care, medically refractory angina and advanced heart failure.

“Regenerative therapy offers tremendous potential. Several approaches are beginning to show benefit in specific patients and will help expand the portfolio of treatments available to patients with advanced cardiac disease,” says Dean Kereakes, MD, medical director of The Christ Hospital Heart and Vascular Center and the Lindner Research Center.

Normally, adults are limited in their ability to produce new myocardial cells and to replace damaged heart tissue. Patients with heart failure may benefit from medicines and procedures that support the function of the remaining viable myocardium. More advanced cases may require either a heart transplant or the implantation of a left-ventricular assist device (LVAD).

Should they continue to prove successful in larger-scale clinical trials, regenerative therapies offer the possibility of repairing or restoring cardiac function. These treatments could significantly impact both quantity and quality of life. Moreover, cell therapies can be administered via minimally invasive, catheter-based techniques, thus making the treatments available to a much wider range of patients than other more complex surgical procedures.

“I think we are entering an exciting new phase,” says Eugene Chung, MD, director of outcomes for The Christ Hospital Heart and Vascular Center. “The newer concepts offer sophisticated ways to entice the body into healing itself. Thus regenerative therapy has the potential to fill a void between conventional medical treatments and transplantation.”

These clinical trials are available through the Lindner Research Center:

**Amocyte PreSERVE trial for heart attack survivors**

This therapy, developed by New Jersey-based Amocyte, LLC, a NeoStem, Inc. company, offers to help people who have recently (within 5-11 days) suffered a significant heart attack by administering their own stem cells to preserve heart muscle and prevent subsequent major adverse cardiac events.

The process involves collecting millions of CD34+ stem cells selected from a small sample of bone marrow and then infusing these cells into the damaged area of heart tissue via the coronary artery during a heart catheterization procedure. Investigators believe this therapy may increase microvascular blood flow in the myocardium (heart muscle) via neangiogenesis (development and formation of new blood vessels), thereby reversing post-heart attack induced ischemia (restriction of blood supply) and rescuing tissue from hibernation and preventing eventual cell death (apoptosis).

**Baxter trial for medically refractory angina**

The RENEW study collects endothelial progenitor cells (CD34+ cells) from the patient’s own blood to be used as a therapy for those who continue to suffer angina symptoms despite taking the maximum tolerated doses of their anti-angina medications.

**Aastrom trial for heart failure**

This cellular therapy is delivered directly to heart tissue via the NOGA® MyoStar™ injection catheter. This therapy involves collecting a small amount of bone marrow from the patient, then using a patented process to multiply targeted types of cells, including CD90+ mesenchymal cells, CD14+ monocytes and alternatively activated macrophages. The process can multiply these cells up to 300 times the levels normally found in bone marrow.

Aastrom believes the multiple cell types in ixmyelocel-T, which are normally found in bone marrow, but in different quantities, possess several functions required for tissue remodeling, reduction of inflammation, and promotion of angiogenesis.

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**Juventas trial for heart failure**

This clinical trial examines the potential value of a novel approach to stem cell therapy developed by Cleveland-based Juventas Therapeutics. Instead of harvesting and re-injecting stem cells into damaged heart tissues, this treatment involves boosting the body’s natural ability to attract stem cells to the site of organ damage. The XV-100 treatment injects DNA that encodes for Stromal-cell Derived Factor 1 (SDF-1), which promotes cardiac repair by stimulating blood vessel growth, prevents programmed cardiac cell death, and attracts circulating stem cells. The treatment involves using the BioCardia helical infuion catheter to inject the SDF-1 gene in as many as 15 locations in the hearts of patients with advanced heart failure.

The clinical trial will involve patients with advanced heart failure who meet several criteria.

**Mid-stage research**

Except for the Baxter study (a Phase II study), these clinical trials are considered Phase II research studies, which means the treatments have demonstrated safety during Phase I trials involving small numbers of patients.

Phase II studies generally expand the numbers of patients involved in testing while investigators determine ideal dose levels and further test for safety and efficacy. Before new treatments can win U.S. FDA approval, they must also complete larger-scale Phase III clinical trials to confirm safety and effectiveness. For these four regenerative therapies, the Lindner Research Center expects to enroll six to 10 patients per clinical trial. Study results will likely be available by later 2012.

“The important message for patients with advanced heart disease is to not give up hope,” Dr. Chung says. “So much change has occurred in recent years. It’s very important for patients to continue to educate themselves, and they are counting on their physicians to play a very important role in helping them understand all of their options.”

For more information about our current clinical trials, call 513.585.1777. Each clinical trial has specific criteria for participation.