Editorial Cardiac Problems -- The Stem Cell Approach

Dr. Azhar Masud Bhatti
Addl. Director Health Services, EPI Punjab, Lahore
&
Editor in Chief

While cardiovascular diseases can refer to many different types of heart or blood vessel problems, the term is often used to mean damage caused to your heart or blood vessels by atherosclerosis (ath-ur-o-skluh-Ro-sis), a buildup of fatty plaques in your arteries. This is a disease that affects your arteries. Arteries are blood vessels that carry oxygen and nutrients from your heart to the rest of your body. Healthy arteries are flexible and strong.

Over time, however, too much pressure in your arteries can make the walls thick and stiff sometimes restricting blood flow to your organs and tissues. This process is called arteriosclerosis, or hardening of the arteries. Atherosclerosis is the most common form of this disorder. Atherosclerosis is also the most common cause of cardiovascular disease, and it's often caused by an unhealthy diet, lack of exercise, being overweight and smoking. All of these are major risk factors for developing atherosclerosis and, in turn, cardiovascular disease.

Common causes of abnormal heart rhythms (arrhythmias), or conditions that can lead to arrhythmias include:

- Heart defects you're born with (congenital heart defects)
- Coronary artery disease
- High blood pressure
- Diabetes
- Smoking
- Excessive use of alcohol or caffeine
- Drug abuse
- Stress
- Some over-the-counter, medications, prescription medications, dietary supplements and herbal remedies
- Valvular heart disease

In a healthy person with a normal healthy heart, it's unlikely for a fatal arrhythmia to develop without some outside trigger, such as an electrical shock or the use of illegal drugs. That's primarily because a healthy person's heart is free from any abnormal conditions that cause an arrhythmia, such as an area of scarred tissue. However, in a heart that's diseased or deformed, the heart's electrical impulses may not properly start or travel through the heart, making arrhythmias more likely to develop.

Heart defects usually develop while a baby is still in the womb. About a month after conception, the heart begins to develop. It's at this point that heart defects can begin to form. Some medical conditions, medications and genes may play a role in causing heart defects. Heart defects can also develop in adults. As you age, your heart's structure can change, causing a heart defect.

There are many causes of diseases of your heart valves. Four valves within your heart keep blood flowing in the right direction. You may be born with valvular disease, or the valves may be damaged by such conditions as rheumatic fever, infections (infectious endocarditis), connective tissue disorders, and certain medications or radiation treatments for cancer.

The promise of stem cell therapy may have gotten a little closer to reality, with researchers reporting that they've used the cells to help shrink hearts that were dangerously swollen after heart attacks. The approach involves taking stem cells from a heart patient's own Bone Marrow, then injecting them into the patient's Damaged Heart. The result: a significant improvement of heart performance within months, and a significant reduction in both scar tissue and Heart size within a year after the initial therapy.

However, the study is small - a phase one clinical trial involving just eight male patients - and still described as "experimental." But the research team says that if confirmed in larger trials, the approach could be a big advance over current treatments for this type of Enlarged Heart. "The results are very encouraging," said study co-author Dr.Joshua M.Hare, a professor of Medicine and director of the Interdisciplinary Stem Cell Institute at the University of Miami Miller School of Medicine. The therapy has "been under development for about ten years, and finally now we are starting to take a big step forward," he said.

But Hare was also quick to note that much more research and time is needed before the novel treatment could become available to patients. "We can't say whether that'll be in three or seven years down the road. It's hard to speculate precisely. But we're talking sometime this decade," he said.

Hare and his colleagues discussed the findings in the March issue of Circulation Research.

According to the American Heart Association (AHA), Heart Enlargement can result from a number of health complications, including Heart attack, Congestive Heart failure, and a form of heart muscle inflammation known as Cardiomyopathy. Heart valve disease and High Blood Pressure can also contribute to Heart Enlargement as a result of heart muscle thickening.

Right now, according to the researchers, chronic use of medications and/or heart transplant are the only means of reducing the increased risk for death, disability, and

hospitalization that accompanies an enlarged heart. To test the new stem cell approach, the study team focused on eight men with an average age of 57. All had suffered a Heart Attack as far back as 11 years prior to their treatment.

Stem cells from Heart Attack patients helped improved blood pumping ability and restore vitality in cardiac muscle, according to a small trial published.

It is the first time patients have been given an infusion of their own cardiac stem cells in the aim of solving the impact of Heart Failure rather than simply treating the symptoms of it.

The findings are so promising that the study's chief investigator said a potential "Revolution" was in the offing if larger trials succeeded.

Stem cells are infant cells that developed into the specialized tissues of the body.

They have sparked great excitement as they offer hopes of rebuilding organs damaged by disease or accident.

The new study, published online in The Lancer, tested cardiac stem cells on 16 patients who had been left gravely ill as a result of an acute myocardial infection.

The index used for cardiac health is called the left ventricular ejection fraction (LVFV) which calculates the capacity of the left ventricle to expel blood in the space of a heart-beat.

For a person in normal health, the LVFV is 50 percent or higher.

Among the study patients, though, this had fallen to 40 percent or lower. At such a threshold, shortness of breath and fatigue are chronic and often disabling.

The stem cells were isolated from a coronary artery that had been removed when the patients underwent a coronary bypass.

Within four months of treatment, the LVFV rose by 8.5 percent and after a year by 12 percent, four times what the researchers had expected.