

‘F’ is for Failure - Heart Failure

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With this issue, we resume our “Heart News for You” series. If you missed any of the earlier issues, A for Antiplatelet Therapy, B for Blood Pressure, C for Cholesterol, D for Diet, D for Diabetes and E for Exercise, we invite you to read them on our web site at www.heart.arizona.edu.

About 5 million people in the United States have heart failure, and the number is growing. Each year, another 550,000 people are diagnosed with the condition. Heart failure contributes to or causes about 300,000 deaths each year.

Heart failure does not mean that the heart has stopped or is about to stop working. It means that it cannot pump out enough blood to keep up with the body’s demands for energy and oxygen. Heart failure can result from genetic predisposition or from injury, such as a heart attack, too much strain on the heart due to years of untreated high blood pressure or a diseased heart valve.

As the heart muscle weakens, it needs to pump faster to keep blood flowing to the body. In many cases of heart failure the left ventricle has trouble ejecting the blood properly into the body’s circulation. As a result, blood tends to pool and back-up in the pulmonary (lung) circulation, causing fluid to leak into the lungs, a condition called pulmonary edema. This is what the patient experiences as shortness of breath.

Heart failure comes in stages, as illustrated by the “Heart Failure Pyramid” (right). The pyramid shows that while patients with severe, end-stage heart failure are at the tip, the number of people afflicted with heart disease becomes ever larger the further you go toward the bottom.

Stage A includes those conditions that predispose to structural heart disease, which can lead to heart failure. This stage emphasizes the fact that heart failure usually can be prevented by controlling its risk factors.

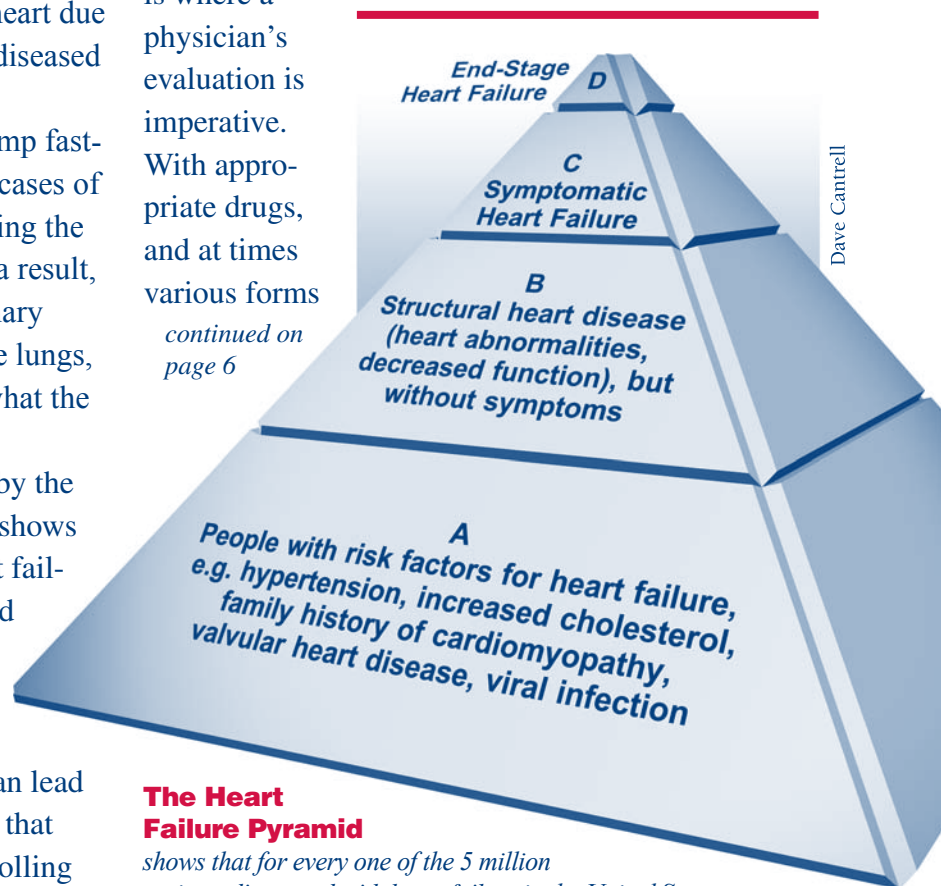
Stage B includes those individuals affected by struc-

tural heart disease, such as an enlarged heart, leaking or blocked heart valves, a previous heart attack, inherited abnormalities or infectious damage of the heart muscle. All of these are significant problems, but not compromising the heart’s pumping ability enough to cause symptoms yet.

Stage C, symptomatic heart failure, includes patients with enough heart dysfunction to result in symptoms. Symptoms are caused by a decreased forward blood flow to the body, characterized predominantly by weakness and/or fatigue, or by the backing up of fluid in the lungs, causing shortness of breath, and/or backing up of fluid in the body causing congestion of the liver and/or swelling of the legs – usually beginning with ankle “edema” or swelling. Obviously many causes of weakness, fatigue, shortness of breath and ankle swelling are not due to heart failure, and this is where a physician’s evaluation is imperative.

With appropriate drugs, and at times various forms

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The Heart Failure Pyramid

shows that for every one of the 5 million patients diagnosed with heart failure in the United States, there are several who do not experience any symptoms but are at risk of developing the disease later in life.

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of pacemaker therapy, heart function in stage C patients can be dramatically improved.

Stage D is called “end-stage heart failure.” Patients who have reached this stage may require more dramatic measures, such as cardiac transplantation at one end of the spectrum and palliative care on the other. Although dramatic, end-stage heart failure is just the tip of the pyramid – a constant reminder of the imperative to identify individuals in stages A, B and C and initiate therapy to prevent the progression of the disease. As someone once said, “An ounce of prevention is worth a pound of cure.”

Heart failure is an increasingly common medical condition in both men and women. Although it can occur at any age, a major risk factor is age. This is emphasized by the statistic that heart failure increases with age and is now the most common Medicare hospital discharge diagnosis.

There are two general types of heart failure, “systolic” and “diastolic.” Systole refers to the period of time when the heart contracts, and diastole to the period when the heart relaxes – diastole is Greek and means “drawing apart.” The heart muscles are drawing apart as they relax after contraction.

In “systolic heart failure,” the heart muscle is weak and does not contract well, so the heart does not pump normally. With “diastolic

heart failure,” the heart muscle contracts normally but does not relax normally. As a consequence, it takes higher pressure to fill the heart, resulting in fluid backup in the tissues, for example the lungs and/or the legs. Therefore, common symptoms of both systolic and diastolic heart failure are shortness of breath and swelling of the ankles. Decreased forward blood flow is another hallmark of heart failure, leading to fatigue.

Systolic heart failure may occur after a heart attack (myocardial infarction), in which part of the heart muscle is damaged by a blocked coronary artery and becomes a scar. Since a scar does not contract, this weakens the heart. Individuals with very small scars may not ever have

a problem, but most individuals with heart damage will undergo changes, referred to as “remodeling,” in which the heart enlarges to compensate for the defect, losing its ability to contract normally.

Although therapeutic advances over the past three decades have helped our understanding dramatically and have improved our approach to treatment of heart failure, there is much to learn. By their continued focus on the microstructures, cellular and intact myocardial function, by drug testing and continued investigation of electrical therapies, Sarver Heart Center members are continuing to prevent, cure, or improve the quality of life for the increasing number of patients with heart failure. ♥

Lot of With a Little Help From Our Friends: Fighting Heart Disease through Innovative Research

The success of the Sarver Heart Center rests on the three pillars of academic medicine – patient care, education and research. Thanks to the ongoing support from our donors, the Center is able to award more than \$100,000 each year to innovative research projects. Following are the awards and this year’s recipients, many of them excellent young scientists, highly motivated and poised for significant discoveries.

Steven M. Gootter Investigator Award for the Prevention of Sudden Cardiac Death

Established by Joe and Paulette Gootter and the Steven M. Gootter Foundation, in memory of Steven, whose life was cut short tragically by sudden cardiac arrest.

First Recipient: Richard D. Lane, MD, PhD, professor of psychiatry, psychology and neuroscience at the UA

Project: Neurophysiologic trigger of heart rhythm disturbance in the context of emotional stress and coronary artery disease.