

# Heart To Heart

With Philip S. Chua, M.D.

## Heart Bypass Today

Coronary Artery Bypass Surgery (CABG) is one of the most common and safest operations performed today around the world. Once a medical condition purely treated with oral medications alone, angina pectoris (chest pains due to blockages in the coronary arteries of the heart), or including some types of myocardial infarction (heart attack), are now managed more effectively with angioplasty or bypass surgery. These cutting-edge scientific technologies which came about in the early 60s, are simply mind-boggling and a life-saver for millions around the globe today. About 365,000 CABG procedures are performed each year in the United States alone. Data from the World Health Organization show that 16.6 million people worldwide die from cardiovascular diseases annually, 7.1 million of these deaths are from heart attack.

### The Anatomy

The heart is located in the middle anterior chest, right behind the breastbone and between the left and the right lung cavities. Its size is about that of a clenched fist. In adult, it weighs about 11 ounces (310 grams). It has 4 chambers (two upper, called atrium, and two lower, named ventricles). This tireless muscular organ beats an average of 70-80 a minute, or about 110,000 times a day, pumping more than half a million liters of blood in 24 hours to supply the entire body of essential life-sustaining oxygen and nutrients. In a 70-year life span, that translates to almost 3 trillion heart beats. The cardiac muscles (especially the left ventricle, the main pumping chamber) that contract unceasingly and work that hard get their oxygen and nutrition from the 1 – 4 mm coronary arteries that supply them. These are the left main and right main coronary arteries which are branches of the aorta, the largest artery in the body that is connected to the heart as an outflow trunk, which also continues on down to the abdomen and forks at the level of the umbilicus (belly button) to supply blood to the pelvis area and the left and right legs. The left main coronary artery divides into two branches, the Left Anterior Descending (LAD) that supplies blood to the left ventricle of the heart, and the Circumflex (Cx) which feeds the back of the heart. The right coronary artery (RCA) supplies the right side of the heart. When these 3 arteries have significant stenoses (blockages) and are bypassed, the surgery is called Triple Coronary Artery Bypass Grafting, or Triple CABG (pronounced like cabbage).

### The Cause

The obstruction in the coronary arteries is caused by arteriosclerosis (hardening of the artery) brought on by (1) smoking, (2) lack of exercise, and (3) diet loaded with saturated fats and cholesterol, like pork, beef and eggs and other dairy products, including regular milk. In the year 2000, smoking killed 5 million people worldwide, and 3 million died due to diseases related to obesity and overweight. Heart Disease is a worse killer than cancer. To some degree genetic predisposition plays a role in coronary heart disease. Common aggravating factors are hypertension (high blood pressure) and diabetes mellitus. Since whole milk is also loaded with fats, skim milk is now a very popular choice by the health-conscious for its protein and calcium milk contents. If those 3 risk factors mentioned above are eliminated by practicing and maintaining a healthy lifestyle, the chances of developing heart attack, stroke and cancer are minimized.

## **The Mechanism**

Like the toilet drain or the pipe of the kitchen sink, our arteries could accumulate so much junk (arteriosclerotic plaques) as months and years go by. Eventually, significant stenoses occur and the inner lumen (channel) of the various coronary arteries. Since the caliber of these arteries is only about the size of a round toothpick, it is easy to imagine how rapidly obstruction to blood flow can occur. As a matter of fact it is amazing that the stenoses take years to obstruct the arteries. As the cholesterol/fat deposits on the inner wall of these arteries progressively build up, the caliber of the arteries gets narrower and narrower, until the channel is totally blocked. The circulation to the muscles of the heart is then severely reduced, if not totally cut off, depriving the muscle tissues of the essential oxygen and nutriment. When this happens, severe chest pains and/or heart attack ensues.

## **The Beginning**

The build-up of arteriosclerosis begins in early childhood, not a few weeks or months or years before the symptoms of chest pains or heart attack or stroke develop. It is quite scary and disconcerting to note that autopsies on most children, ages 5 and older, who had died of accidents or other illness, already reveal a thin coat or layer of arteriosclerotic plaques on the inner walls of their coronary (and other) arteries. Since they do not smoke, and are very active, running and jumping around tirelessly almost every instant, getting vigorous physical exercise, and are not yet encumbered with stress that confronts adults, the only culprit remaining to account for the premature arteriosclerosis is the diet. Are we feeding our infants and children an unhealthy diet with too much fat and cholesterol, like hamburger, fries, pizzas, eggs, bacon, sausages and other items made of pork and beef, ice cream and milk shakes, and other junk foods? While genetics play a role in the onset and progress of arteriosclerosis, the ultimate result and adverse health effects are greatly

**“neutralized” by the environmental factor of a health lifestyle. Prevention is still the best way to slow down and minimize arteriosclerosis and the aging process, ward off cardiovascular diseases and cancer, and maximize the natural potential longevity among all of us.**

## **The Latest Treatment**

**Besides medications, PTCA (Percutaneous Transluminal Coronary Angioplasty) with stenting and/or Coronary Artery Bypass Grafting (CABG) are the other treatment regimen available in today’s state-of-the-art medical/surgical armamentarium, with most gratifying outcomes. When the blockages in the coronary arteries are too severe for angioplasty, bypass surgery is the best option.**

**Prior to 1964, PTCA and CABG were not available yet, and coronary patients were under the mercy of ineffective (band-aid) medications, and many of them needlessly and prematurely dying of heart attack. My own father succumbed to acute myocardial infarction in 1962 at the young age of 46. He didn’t have a chance. He would have been benefited by angioplasty and/or heart bypass, had those procedures been available two years earlier.**

**Heart patients today are indeed luckier, with all the available modalities of therapy and the rapid introduction of improvements on the various treatment regimens. Example of this is the drug-eluting (drug-coated) stents (mini-tubular spiral wire-mesh used to brace and prevent re-collapse of the artery that was opened by angioplasty) which was approved by the US-FDA April 24, 2003. While at lot more expensive, this new stent is supposed to be superior to the uncoated stainless steel stent in reducing re-stenosis (re-blockage) rate. Of the 800,000 angioplasty performed in the United States each year, about 30% of angioplastied artery gets blocked up again within 6 months to a year. The other valuable development is the introduction of OPCAB (Off-pump Coronary Artery Bypass), a minimally invasive beating-heart surgery, where the bypass grafting is done without the usual or conventional technique of stopping the heart during surgery. The Laser TMR (Transmyocardial Revascularization), which is an option for the advanced or end-stage coronary artery disease where bypass grafting can no longer be done, is another advance in the management of coronary artery disease.**

## **A Study Comparison**

**In the September 16, 2003 issue of Circulation, Dr. William S. Weintraub, professor of medicine at the Emory University School of Medicine and his colleagues reported the outcomes of their randomized study on 988 patients, treated with either PTCA with stenting (in 488) or heart bypass surgery (in 500), comparing the patient benefit from either modality. Another similar study was published in Lancet. These two reports revealed that bypass surgery was superior to angioplasty with regards to the greater relief of chest pains, better physical endurance of the**

patients after the procedure, and in the over-all quality of life for the patient. All this suggests that the bypass grafts implanted during surgery allow for a better blood flow to the heart muscles, and they remain patent (open) more so, and longer, compared to arteries ballooned-open by angioplasty and stent. However, for most (not all) single-vessel disease, especially those with very discreet (localized, not extensive) blockage, angioplasty and stent is the more accepted option. For left main coronary artery stenosis (widow-maker lesion that often causes sudden death), bypass surgery is the indisputable and realistically most prudent therapy of choice. While the mortality rate of untreated severe coronary blockages varies anywhere from 20% to 80% (depending on the severity on the coronary obstruction and left ventricular integrity), the risk of angioplasty with stent or heart bypass surgery is between 1%-3% on the average.

## **Prevention is prudent**

Just like many illnesses, coronary heart disease or heart attack is best prevented. A healthy lifestyle alluded to above, plus regular medical check-up, is the key. If chest pains or shortness of breath occur following even minimal activities, medical consultation is mandatory. Where indicated, a stress test and/or coronary arteriography (cardiac catheterization) are valuable tests to determine with 100% certainty if significant coronary artery blockages (or heart valve pathology) are present or not. When performed, these tests could be life-saving.

**So, take good care of your heart. It's the only one you've got!**