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Your blood vessels need a doctor, not a plumber

For the past 50 years, physicians have, for the most part, misunderstood the mechanism of coronary artery disease, which is the leading cause of both morbidity and mortality in our civilization. The blood vessels were likened to pipes. The misunderstanding was initiated and strengthened by coronary artery angiography. This is dye injected into the artery by a thin tube which was the principle method

for assessing the health of the arteries. The pictures (images) of the disease unfortunately led them to believe that the coronary blood vessel disease was that of the lumen or space within the blood vessel through which the blood flows. However, it was not the lumen, but the wall itself that was diseased. The technical term for



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narrowing of the inside of the blood vessel is stenosis. Large cholesterol plaques (atheroma) remain silent for decades because they do not critically constrict the inside of the blood vessel. During this time, there is enlargement of the *outside* of the blood vessel due to change of geometry. This remodeling process protects the inside surface of the blood vessel through much of the life of the plaque and then, suddenly, disaster happens.

Erroneously, we assumed the arteries with high grade stenosis tended to have a clot due to low blood flow, thus causing the heart attack, or, in the brain, a stroke.

The true understanding is that cholesterol within the plaque or lipid core, as it is technically called, is extremely procoagulant. This is walled-off from the blood flow by a fibrous cap. It is the integrity of this cap that determines whether or not this individual will have an acute coronary syndrome. The latter refers to chest discomfort related to the heart that may or may not go into a full-blown heart attack.

There is a continuous war

going on in our bloodstream between the procoagulant factors that cause the blood to clot and the anticoagulants, which, in healthy people, allow our blood to flow instead of turning into one big clot. However, there are various events throughout our lives that will cause a breakdown of this process and a local clot could occur.

For the last decade we have known that most heart attacks happen in people who have less than 50 percent narrowing of the blood vessel. Even though there is a decrease in blood supply to the heart or brain from this narrowing, the real problem is that the fibrous cap becomes less sturdy at its margin, and a break, rupture or fissure occurs, allowing the markedly procoagulant core material to leak into that vessel, causing a sudden clot, and then an acute coronary event.

Sometimes this acute coronary or brain syndrome resolves and the chest pain disappears without a heart attack, and the transient ischemic attack without a stroke, but at other times, it does not resolve and a heart attack or stroke ensues.