New Treatment for Coronary Artery Disease

By squashing plaques with a balloon, medical scientists seem to be able to clear blocked arteries

A new treatment for coronary artery disease is now being tested and the results, so far, look extremely promising. It is possible that at least 10 percent of the 100,000 people who have coronary bypass operations each year may be able to have a far simpler treatment instead—one requiring 2 days rather than 2 weeks in the hospital and costing $1,000 rather than $12,000 or more.

In late 1977, Andreas Grüntzig of University Hospital in Zurich and his colleagues introduced the treatment. Already it has been tested on about 300 patients in the United States and Europe. The treatment consists of simply inserting a balloon into a blocked coronary artery, inflating the balloon, and squashing the atherosclerotic plaque against the artery wall. After a few seconds, the balloon is deflated and removed. The patient is awake the entire time and feels no pain. If the treatment is successful, and so far it seems that it often is, the patient no longer has chest pains from coronary artery disease and the blood flow to his heart is markedly improved.

The idea of enlarging obstructed arteries did not originate with Grüntzig. It goes back 15 years to the work of Charles Dotter of the University of Oregon and Melvin Judkins, presently at Loma Linda University in California. These researchers used catheters of increasing sizes to push back, like a snowplow, plaques in the large arteries of the legs. Their technique never caught on in this country, but thousands of such procedures were done in Europe with relatively good results. The method is technically difficult, however, and seemed hard to apply to the coronary arteries, which are smaller than those of the leg and follow circuitous paths rather than straight ones.

Grüntzig conceived the idea of using a balloon to push back plaques, reasoning that it might be gentler and more precise than catheters (it is important not to injure the healthy artery wall adjacent to the plaques) and that it might be especially useful for blocked coronary arteries. The key to Grüntzig's success is that he uses a polyvinyl chloride balloon that will not expand farther along the artery no matter how much pressure is applied to force the plaque against the artery wall. Once compressed in this way, the plaque usually does not bounce back. Grüntzig at first reported a 64 percent success rate but now says that, with better patient selection, his success rate is 90 percent.

Although heart specialists are excited and somewhat amazed by Grüntzig's method, they are also a bit wary of it. "We want to avoid what happened with bypass surgery," says Michael Mock of the National Heart, Lung, and Blood Institute (NHLBI). In coronary bypass operations, a vein from the patient's leg is grafted onto his coronary artery to shunt blood past an obstructed area. Mock explains that bypass surgery was widely accepted when it was introduced in 1968, but few investigators made any attempt to keep track of how good it was. Since the bypass was so popular, it soon became very difficult to argue that perhaps it does not prolong patients' lives any more than drugs do. And there was a great deal of resistance to the current clinical trials that are comparing bypass surgery to drugs for patients with coronary artery disease.

But the balloon technique will be different, Mock says. Last March, under the auspices of the NHLBI, a voluntary medical registry was set up. So far, nine medical centers have agreed to cooperate and ten more plan to join in. The aim is to keep careful records of investigators' experiences with the new technique: which patients are most likely to be helped, how long patients' arteries stay clear, how much experience a doctor needs to learn the techniques. The registry, says Kenneth Kent of the NHLBI is "the best way to accumulate data from many centers doing the procedure on relatively few patients." Apparently, it is unusual to start monitoring a new method so early in the game. Says Mock, "This is the first time we tried to get on a new technique so soon."

In the 18 months since Grüntzig first introduced his technique, much has been learned. It has been found, for example, that patients with blocked left main coronary arteries probably should not undergo the procedure. Their survival rate seems better if they have a bypass operation. Also, patients with calcified plaques do not do well. The balloon cannot compress these plaques. Those who do best, Mock says, are patients with a single lesion in their anterior descending artery, which is the artery that supplies most of the heart muscle with blood. Although it is too soon to know what the long-term results will be, 90 percent of the patients who underwent the procedure at least 1 year ago still have good blood flow through their treated arteries and have had no recurrence of chest pains or heart dysfunctions.

Of course, the method is not absolutely free of risk. When the balloon procedure is done, a surgeon must be ready, an operating room must be vacant, and a supply of blood must be on hand in case an emergency bypass becomes necessary. About 5 percent of all patients end up on the operating table, Kent estimates. Generally, the patient who must have surgery complains of chest pain after the procedure and his artery is seen to be completely blocked. Three of the 300 patients who had the balloon treatment died, two of them after emergency bypass surgery.

Kent speculates that there are two reasons why arteries may be blocked following the balloon treatments. The plaque itself could have fractured. Or the artery wall could have been torn by the balloon. Then blood could flow behind the wall and, like a flap, a piece of the wall could block the artery.

Despite all the enthusiasm it has generated, Grüntzig's method could eventually be discarded as one in which the benefits are not worth the risks or in which the long-term results are not acceptable. But as of now, researchers are optimistic. Although still a research technique, the new method gives every indication that it will eventually come into general use.—GINA BARI KOLATA

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