Biomedicine

Joanne Silberner reports from Washington, D.C., at the American Heart Association meeting

Away go troubles, down the drain

The heart, basically a pump with some complicated support systems, is prone to one of plumbing's banes – clogged pipes. John B. Simpson, a cardiologist at Sequoia Hospital in Redwood City, Calif., has come up with what he hopes will prove the ultimate plumber's helper – a device that shaves the fatty deposits of atherosclerosis from the inner walls of arteries.

The process is called transluminal atherectomy, and Simpson says it could one day provide an alternative to bypass surgery and balloon angioplasty.

In the last six months he has used the shaver to pare plaques from large arteries in the legs of six individuals, all of whom are now doing fine, he reports. If the leg-work continues to go well, says Simpson, a smaller shaver may be used on coronary arteries in a year.

The device looks like a cleverly modified, miniature *Roto-Rooter* and is snaked to the clogged area. The shaver itself is housed in a tube that has been partially cut away. When a tiny balloon on the opposite side of the tube is inflated, any fat deposits protruding from the arterial wall will bulge into the bore of the tube, where they can be neatly sliced off and packed into a storage area on the far side of the tube. Because the blade is encased in a tube, the shaver can't nick arterial walls, Simpson says.

Comments David P. Faxon of Boston University Medical Center, "The concept has some attractive features." Unlike balloon angioplasty, in which a balloon inflated in the artery tears, splits and stretches the plaque, the shaver removes the plaque and leaves a smooth wall, which may prevent the renarrowing that often occurs with angioplasty. It will also provide a way to monitor exactly what sort of material makes up the plaques, and whether drugs and other treatments change that.

But the device needs to prove itself. "If it has advantages," Faxon says, "we won't know until it's tested against other techniques."

Bypassing women

In comparison to men, women have it good when it comes to heart disease – they have less of it. But when it comes to treating coronary atherosclerosis, they have it bad – more women die during bypass surgery, a common treatment for severe atherosclerosis, than men.

Delos M. Cosgrove and his colleagues at the Cleveland Clinic think the problem is that women are generally smaller than men.

Of 7,105 patients who had bypass surgery at the Cleveland Clinic between 1980 and 1982, 0.5 percent of the men died, compared with 1.7 percent of the women. Eight other studies have found a combined mortality rate of 1.7 percent for men and 4 percent for women, he says.

Analyzing 4,452 patients, Cosgrove found the key factor was body surface area. "It's not sex that's a problem," he says. "It's size." A small man would have the same prognosis as a small woman when compared with a larger man or woman.

One factor may be the vessel used for grafting, Cosgrove suggests. While the bypass procedure as originally designed used a large vein from the leg, many surgeons now believe an artery from the chest makes a better graft. But the artery is smaller than the vein, making the procedure more difficult, especially in smaller individuals, Cosgrove says.

Cholesterol's slippery slope

Analysis of six years of data on 356,222 men shows that the heart disease-blood cholesterol relationship is not a "threshold phenomenon." Instead, the risk of heart disease rises with increasing cholesterol. People with cholesterol levels as low as 180 milligrams per deciliter are at increased risk, but not to the degree of people with cholesterol levels over 220, says Jeremiah Stamler of Northwestern University Medical School in Chicago.

In the 40- to 44-year-old age group of MRFIT (Multiple Risk Factor Intervention Trial), for example, the six-year heart attack rate in the 20 percent of men with the lowest cholesterol levels was 1.3 deaths per 1,000 men. For the next 20 percent, with levels of 182 to 202, the rate was 2.3 and it steadily climbed to 8.6 in the highest 10 percent.

Though there are still many researchers who do not appreciate the strength of the relationship, the MRFIT data should nail it down, Stamler says. "It was a strong and unequivocal relationship of serum cholesterol to risk, for both cigarette smokers and nonsmokers, for both men with normal blood pressure and men with high blood pressure," he says. "In every one of those groups, this relationship held consistently, systematically and without contradiction – and in every one of them it was continuous, strong and graded."

You don't need to become a complete ascetic in order to lower your cholesterol levels. Scott M. Grundy of the University of Texas Health Science Center at Dallas and his colleagues rotated nine men through two-month stints on each of three diets – the American Heart Association diet, in which a maximum of 30 percent of the calories come from fat; a 40 percent fat diet; and a 20 percent diet. The subjects' average cholesterol level was 210 mg/dl on entry.

In all the men, the blood levels of total cholesterol and of the "bad" form of cholesterol, LDL-cholesterol, fell to around 175. "There were no significant differences [in cholesterol levels of the men] on these three diets," Grundy says. "Perhaps there is more flexibility in substituting dietary constituents for saturated fat in the diet. At least for the general public it would seem that severe fat restriction is not necessary to achieve an optimal reduction in levels of LDL-cholesterol and an optimum change in lipoprotein levels." Grundy has previously reported that monounsaturated fat, the primary constituent of peanut oil and olive oil, is better than polyunsaturated fat in holding cholesterol levels down (SN: 4/6/85, p. 216).

What to eat? A suggestion from Stamler is bound to please the folks in Little Italy and Chinatown – "a combination of the best of the Mediterranean and the Far East."

If I only had a heart

The Wizard of Oz was able to give the Tin Man something he didn't have – a heart – and cardiac surgeons have been able to give a handful of people a working artificial heart. But while artificial hearts may adequately pump blood, or in the case of the Tin Man make a ticking sound, they can't do something that natural hearts do – produce a hormone called artrial natriuretic factor (ANF). Discovered in 1981, ANF is involved in the regulation of blood pressure and of salt and water balance. "The artificial heart, and perhaps the transplanted heart, may not be able to stimulate and release such hormones," says Michael J. Brody of the University of Iowa in Iowa City.

What sort of problems that will pose remains to be seen. "The good news is the body is usually able to find a second way to provide a physiologic response," Brody says.

The difficulty in determining the effect of ANF deficiency and the need for supplementation comes from the difficulty in finding an animal model, notes Steven Atlas of Cornell University. The problem is removing the source completely – the atria, or storage chambers, of the heart – without killing the animal. "The complete absence of atria hasn't been achieved experimentally," he says. The answer may come when antagonists to the hormone are found.