Biomedicine

Deborah Franklin reports from Miami Beach at the meeting of the American Heart Association

Synthetic arteries 'naturalized'

Surgeons seeking the best way to reroute blood around clogged or damaged arteries generally prefer natural tubing — a short length of the patient's own vein that has escaped the disease. When a patient's need for healthy graft material outstrips the supply, synthetic tubing can be used, but it has proven to be a poor second choice in smaller arteries, such as those of the lower leg, where blood flows fairly slowly and resistance in the vessels is high.

There is a strong need to improve the "replacement parts" for patients with blocks in these small arteries, says Peter Libby of Tufts University and New England Medical Center in Boston, because impaired circulation can produce disabling pain or ulcers in the legs that heal slowly because of the reduced blood supply. "These patients may have to spend months at rest or in bed and some eventually require amputation of the leg," he says.

Libby and colleagues at Tufts, as well as several other research teams, have been testing ways to make the man-made blood vessels more like nature's own. The most recent work from Tufts suggests that seeding the Dacron tubes with endothelial cells, taken from the lining of the patient's healthy blood vessels, produces a fairly smooth surface that resists clotting and hence could lengthen the life of the grafts.

The Tufts team implanted both seeded and unseeded grafts in six baboons, and removed them for comparison five weeks later. Four of the six showed a clear-cut difference in the amount of clotted matter clinging to the graft lining, Libby reports. In the unseeded grafts, an average of about 46 percent of the inner surface was covered with blood clots — tangled webs of primarily platelets, red blood cells and proteins. Clumps of clots were present in the seeded grafts too, but only over about 6 percent of the surface area. The remainder of the surface was carpeted with endothelial cells, which are known to produce compounds important in the regulation of clotting (SN: 5/27/78, p. 346).

Malcolm Herring of Indiana University School of Medicine in Indianapolis tested similarly seeded grafts in the femoral arteries of 19 human patients and checked for clogging of the grafts in the 18 months that followed. Among nonsmokers, seeded synthetic grafts remained significantly clearer than unseeded grafts, Herring told SCIENCE NEWS, though the grafts of smokers showed no such differences. Exactly how smoking aggravates clotting in the grafts is still unclear, the researcher says.

One of the next important steps, Herring and Libby agree, is to find ways to grow a more even and complete endothelial lining within the vessels. Libby stresses that, while modifications in the synthetic arteries may improve surgical repairs to extend the life of a limb, the solution to peripheral vascular disease still lies primarily in prevention. "This is not a panacea," he told SCIENCE NEWS.

Heart disease visited upon daughters

A woman whose mother or father suffered a heart attack before the age of 60 may run nearly three times the risk of developing coronary heart disease herself when compared to daughters of parents with relatively healthy hearts, a study at Brigham and Women's Hospital in Boston suggests. Graham A. Colditz and colleagues surveyed 117,156 U.S. women between the ages of 30 and 55 in 1976 who were at that time free from heart disease, including 31,101 who said that at least one parent had experienced a heart attack. Four years later, 133 of those with a positive family history had signs of heart disease themselves, compared with 141 of those whose parents had not had heart attacks.

The parent's age at the time of the attack also seemed to be important, Colditz told SCIENCE NEWS; after the age of 60, a parent's attack had less predictive value for daughters. While similar findings have been well documented in men, few prospective studies of women have been done, he says.

Joanne Silberner reports from Atlanta at the meeting of the American Academy of Ophthalmology

Taming a killer

The domestication of the botulinum toxin continues. Use of minute amounts of the deadly poison to treat crossed eyes has become accepted medical practice, and now botulinum is being unleashed on blepharospasm — uncontrollable, forceful blinking that can result in functional blindness. An estimated 12,000 or more people in the United States are blepharospasm victims.

Surgery on the nerves or muscles isn't always effective. In search of a simpler alternative, Alan B. Scott of the Smith-Kettlewell Eye Research Foundation in San Francisco, who worked out the botulinum-crossed eye treatment, has been using the toxin successfully in blepharospasm victims. And now Texas researchers report success with the technique.

In a 10-minute procedure, 26 volunteers with blepharospasm were injected in the eyelid with tiny amounts of the toxin, which blocks nerve impulses by adhering to nerve-muscle junctions. "Twenty-five of the 26 responded very nicely," says John W. Shore of the Wilford Hall USAF Medical Center at Lackland Air Force Base in Texas. "However," Shore says, "the injection is not a cure. The effect wears off over a variable period of time, from three weeks to six months." Repeat injections stopped the severe blinking, but whether people can tolerate the toxin over the course of years remains to be seen.

From eye pressure to nerve damage

Glaucoma, an eye condition that results in degeneration of the optic nerve, was for years defined as high pressure in the fluid within the eye. "That was simply because we had an instrument that could measure it," says George L. Spaeth of the Wills Eye Hospital in Philadelphia.

"Ninety-five percent of people with 'high' pressure in the eye don't get glaucoma," he notes. "And one-third of glaucoma patients don't have high pressure." Spaeth predicts that in the future, tests measuring visual field loss, rather than pressure, will be used.

In the meantime, the newly evolving notion of glaucoma as a disease of nerve damage rather than of eye pressure alone doesn't really change the way it is treated. "The only way we can treat glaucoma now," says Spaeth, "is to lower the pressure [with surgery or drugs]." What the new concept does, he says, is change the endpoint: Rather than lowering eye pressure to a specific numerical level, ophthalmologists should lower it to the point where nerve damage stops.

Treating preemie eyes

With more premature babies surviving, ophthalmologists are seeing more of an eye condition called retinopathy of prematurity (ROP), which is marked by scar tissue formation within the eyeball. But a treatment that initially looked good — vitamin E therapy — is losing its glow.

Hopes were that vitamin E, an antioxidant, would protect preemies' eyes (SN: 12/19 & 26/81, p. 393). But in a one-year test with 328 preemies, David B. Schaffer and Lois Johnson of the Children's Hospital of Philadelphia and colleagues found no significant ocular benefit in giving extra doses of vitamin E. And in a 287-baby study, Arthur L. Rosenbaum and colleagues at the University of California at Los Angeles found no significant decrease in retinopathy, but they did find a greater incidence of retinal hemorrhage in the treated babies.

Vitamin E is not yet down for the count. Researchers from the Baylor College of Medicine in Houston who reported the initial positive results say the vitamin is still proving effective.

ROP can be caused by the oxygen therapy given to preemies to assist their underdeveloped respiratory systems. With more careful oxygen monitoring, ROP had until recently been on the downswing.