Vascular Misconceptions Hamper Diabetic Foot Tx

BY MARK S. LESNEY
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WASHINGTON — Occlusive small vessel disease in patients with diabetes does not exist, and belief in this condition has often interfered with successful treatment of the diabetic foot.

This "nonexistent disease" provides an easy explanation for wound care practitioners who have patients with a palpable pulse, but with ulcers that do not heal; it also provides an excuse for vascular surgeons who have performed what appear to be successful bypasses that still have no effect on wound healing. They can say "it's not going to work because the blood has nowhere to go," and then withhold treatment from other patients in the future based upon this mistaken belief, according to Dr. Anton Sidawy who spoke at a meeting sponsored by Georgetown University Hospital, Washington, D.C.

"Unfortunately, this misconception caused a lot of legs to be amputated," added Dr. Sidawy, who is chief of surgery at the Veterans Affairs Medical Center in Washington.

In 1964, researchers did a randomized study and found no differences in the presence of this so-called occlusive material between healthy patients and those with diabetes. Other researchers did arterial casts and vasodilation experiments and also found no occlusive disease. "Thus there is no more occlusion in the distal arteries and capillaries of the diabetic patient compared to nondiabetic patients," he said.

However, there is an actual small vessel disease, Dr. Sidawy stated. It is not an occlusion—the lumen remains open—but it involves a thickening of the capillary walls that leads to a problem in the exchange of nutrients. However, the transport of oxygen is not impaired; thus, a bypass can still be of benefit.

Diabetes patients do, in fact, more frequently have occlusive disease, compared with nondiabetics, but it is not occlusion in their distal circulation; instead, it is an occlusion of the tibial arteries that Dr. Sidawy and his colleagues have come to consider to be fairly characteristic of these patients. This very anatomy allows a bypass of the occluded area all the way down to the nonoccluded feet.

One explanation of this frequency of occlusion, he pointed out, relates to the fact

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that diabetes patients have an independent risk for atherosclerosis, which current theories believe to be signaled by the proliferation of smooth muscle cells.

Blood vessels in type 2 diabetes patients (the most common type seen in current practice) are constantly bathed by high glucose and insulin, primarily because these patients have higher resistance to insulin, which contributes to the accumulation of both glucose and insulin in the blood.

This phenomenon led to Dr. Sidawy's group asking whether there was any interaction between this high glucose and the high insulin to cause atherosclerosis. As they amputated legs from diabetes patients and those with prediabetes, they took out the complete tibial arteries, separated the smooth muscle cells, and exposed them to different concentrations of glucose and different concentrations of insulin.

The vascular smooth muscle cells proliferated in the presence of differing concentrations of both insulin and glucose separately. Proliferation also increased more as glucose was increased up to 200 mg/dL for each level of insulin (100 ng/mL vs. 1000 ng/mL).

So glucose and insulin act together to cause the proliferation of smooth muscle cells, Dr. Sidawy said, which may help to explain some of the added risk of atherosclerosis and tibial occlusion in these patients.

Dr. Sidawy emphasized that despite factors promoting atherosclerosis in patients with diabetes, recent studies have shown that these patients may actually have better early patency rates after bypass than do nondiabetic patients, and he reiterated how successful bypasses can be at healing ulcers and saving limbs.

Dr. Sidawy reported no relevant financial relationships to disclose. ■