had some improvement and the fourth remained unchanged. The persistence of residual defects after operation was confirmed by postoperative aortograms. In the other four patients, operation included, in addition to division of the diaphragm, a resection of the stenosed celiac segment and arterial repair. All four patients are well and arteriograms demonstrate a normal celiac lumen.

Addendum

Since the preparation of this manuscript we have operated upon 3 additional patients with atypical abdominal pain and celiac stenosis secondary to diaphragmatic compression. Arterial reconstruction with the hypogastric artery was utilized in 2 patients, while in a third, who had an unsuitable hypogastric artery, the saphenous vein was substituted. All 3 patients have been relieved of symptoms thus far.

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Discussion

Dr. John Earle Connolly (Los Angeles): There are many aspects that I would like to discuss but I think that the most important one is diagnosis, and I would limit my discussion to mesenteric artery blocks due to arteriosclerosis. Of course, it is easy, as the authors have stated, to make the diagnosis when you have the classical findings of pain after eating, weight loss, and diarrhea, and an epigastric murmur. However, marked narrowing of the celiac and superior mesenteric artery take-offs may be present when these symptoms and signs are not.

The size of the central anastomotic artery connecting the inferior mesenteric artery and the superior mesenteric artery on a lumbar aortogram can be very helpful, I think, in the diagnosis of intestinal ischemia in those cases without symptoms.

(Slide) This slide demonstrates the size of the central anastomotic artery on the aortogram of a normal patient. (Slide) in this slide you see an aortogram demonstrating an enlarged central anastomotic artery occurring in a patient with intestinal ischemia. The lateral aortogram in this patient shows marked narrowing of the origins of the celiac and superior mesenteric arteries. (Slide) Now, for comparison, here is a greatly enlarged central anastomotic artery that we have seen in about a dozen cases now in routine aortograms over the past 3 years. This type of patient invariably has marked narrowing of the superior mesenteric and celiac axis take-offs also, but in our experience does not have any symptoms of intestinal ischemia.

Actually, this patient with the greatly enlarged central anastomotic artery was an obese woman. Our belief is that this artery, the central anastomotic artery, is able to dilate and elongate enough in some instance to take over the blood supply of the two stenotic arteries. Such patients then have no symptoms of ischemia.

It is important to recognize the presence of such an enlarged artery on a lumbar aortogram before you do a sympathectomy or ilio-femoral reconstructive procedures, because such procedures will shunt blood away from the mesenteric circulation and into the peripheral circulation.

We recently have described this phenomenon both in humans and in animals, and have coined the term *aortoiliac steal* to describe it. The tip-off to avoid intestinal ischemia in such patients is to be aware of this large central anastomotic artery. If you see it on routine P-A aortogram, you had better get a lateral projection. Reconstruction of either the superior mesenteric or the celiac artery take-offs may be necessary then, either before aortoiliac surgery in such patients, or at least in the early postoperative period.

And, finally, a point about urgency once you have made the diagnosis of intestinal ischemia, with narrowing of the celiac and superior mesenteric arteries. We have had two patients on the operative schedule for reconstruction of a stenotic superior mesenteric artery who prior to the time of surgery acutely infarcted their small bowel. So I think that operation is urgent once the diagnosis of stenosis of the superior mesenteric artery take-off in a symtomatic is made.

DR. W. DEAN WARREN (Miami): I think one of the most interesting requests I had as Chairman of the Local Arrangements Committee came by way of a call from Jack Wylie in San Francisco. He said, "Dean, are you in charge of the local arrangements at Boca Raton?"

I said, "Yes. Why?"

He said, "Well, I have a patient in Miami I wish you would admit, evaluate, do aortography on, and then complete writing our paper."

The real reason for my discussion is to emphasize the beautiful result obtained in a patient with very severe vascular disease. This gentleman had had endarterectomy of the celiac axis, the superior mesenteric artery, both right and left renal arteries, and resection of an abdominal aortic aneurysm during a single operation. He was restudied at Jackson Memorial Hospital and I was tremendously impressed at the rehabilitation afforded this gentleman. He had been virtually incapacitated by pain, and of course had the life-threatening lesion of an abdomial aortic aneurysm. All of this had been corrected in a single operative procedure.

The patient could not recall the exact length of the operative procedure, but did say that it was less than a week. He is doing extremely well and is quite vigorous. I think this is a tremendous tribute to the magnificent vascular service of the University of California.

DR. EDWIN J. WYLIE (Closing): I am particularly grateful to Dr. Warren for providing us with follow-up studies of our patient, who later moved to Florida. This case illustrates the significance of lesions in the superior mesenteric artery. Dr. Warren charitably omitted to tell you that this patient's celiac artery was found to be reoccluded at the time he made his study. Blood supply to its branches was provided by the gastroduodenal anastomosis with the now patent superior mesenteric artery. It is apparent that the adequacy of the superior mesenteric artery prevented symptoms in this patient.

One major question is still unanswered: how do we explain the symptoms in patients with compression of the celiac axis although other visceral branches of the aorta are patent and collateral flow to the branches of the celiac axis is demonstrated? Furthermore, the pain symptoms presented by these patients, which are sometimes sufficiently severe to require opiates for relief, and are remediable by the operation Dr. Stoney described, are dissimilar in type and onset from those of classical abdominal angina.