

Chronic Intestinal Angina: A Report of Two Patients Treated Successfully by Operation

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INTESTINAL angina is produced by arterial insufficiency involving the celiac, superior mesenteric, and inferior mesenteric arteries. These vessels may be obstructed by either acute or chronic disease. Acute arterial insufficiency is usually due to an embolus or thrombus, whereas the majority of cases of chronic arterial insufficiency are due to arteriosclerosis.²

The successful surgical treatment of intestinal angina due to arteriosclerosis was first reported by Mikkelsen⁴ in 1959. Since then, a total of only 92 cases of successful elective revascularization of the celiac and/or mesenteric arteries has been published.⁷ This paper offers a report of two additional cases of chronic intestinal angina due to arteriosclerotic narrowing of the celiac, superior mesenteric, and inferior mesenteric arteries. Both patients were treated successfully by operation.

Case Reports

Case 1. F. W., a 63-year-old woman, had experienced severe epigastric pain after eating for 1 year. The patient also complained of occasional nausea, vomiting, diarrhea and a 28-pound weight loss since the onset of abdominal pain. There was no history of hematemesis or melena.

The patient was previously hospitalized, 6 months prior to the present admission, for similar complaints. A complete GI series during the previous admission showed questionable scarring in the first portion of the duodenum. A subsequent trial with antacids and antispasmodics failed to affect the patient's symptomatology.

There was a past history of hypertension. Moreover, a review of systems revealed a history of recent periodic attacks of syncope, vertigo, diplopia, and "flashes of light" before the eyes.

Physical examination revealed a thin, almost emaciated, woman who preferred to assume a knee-chest position. The patient was alert and did not exhibit any gross motor or sensory deficit. There was no evidence of jaundice. A systolic bruit was audible over the right carotid bifurcation, the base of the right neck, and the left supraclavicular space. The lungs were clear to percussion and auscultation. There was no cardiomegaly. A normal sinus rhythm was present at 64/min. and blood pressure was recorded as 226/80 mm. Hg in the right arm and 140/90 in the left arm with the patient supine. There were no cardiac murmurs. The abdomen was scaphoid, and there was no tenderness, mass or bruit. Femoral and pedal pulses were present bilaterally and were of good quality.

The initial clinical impression was: Abdominal pain, possibly due to a peptic duodenal ulcer.

A routine blood count, urinalysis, serum bilirubin, and amylase were within normal limits. An upper GI series and cholecystogram did not show any abnormality.

Vascular consultation was obtained because of the possibility of mesenteric arterial insufficiency. The vascular consultant concurred with this tentative diagnosis, and also felt that the patient exhibited signs and symptoms of arteriosclerotic narrowing of the proximal left subclavian artery with vertebral artery insufficiency resulting from a left subclavian "steal."

A retrograde catheter arteriogram was performed by the Seldinger technic, using the right femoral artery. Films demonstrated complete occlusion of the superior and inferior mesenteric arteries. The celiac artery appeared normal (Fig. 1). Efforts to advance the catheter tip into the ascending aorta for filming of the aortic arch were unsuccessful. The aortic arch study was, therefore, obtained by using the open, right, brachial artery catheter technic. Films, with the catheter tip in the ascending aorta, showed complete occlusion of the proximal left subclavian artery with retrograde filling of the left vertebral and distal left subclavian arteries (Fig. 2A & B).

Operation was subsequently performed at which time a 6 mm. dacron graft was inserted (end-to-side) between the abdominal aorta and the superior mesenteric artery immediately distal to the

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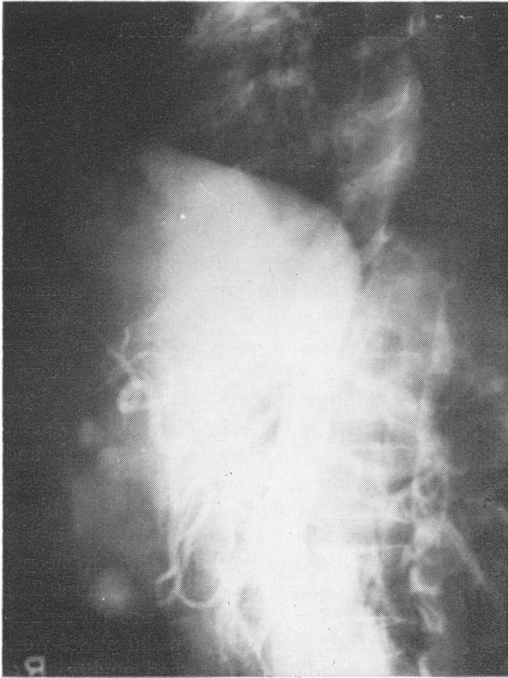


FIGURE 1.

origin of the middle colic artery (Fig. 3). Following this, a good pulse was noted in the graft, the distal superior mesenteric artery, and the vessels in the mesentery of the bowel. In view of the latter, no effort was made to correct the proximal occlusion of the inferior mesenteric artery.

The patient withstood the operative procedure satisfactorily and the post-operative course was uncomplicated. Following discharge from the hospital, she ate freely and proceeded to gain weight. Plans were made for a subsequent operation to correct the left subclavian steal syndrome.

Case 2. D. H., a 50-year-old woman, complained of recurrent, severe attacks of mid-abdominal pain for 4 to 5 months. The attacks of pain occurred approximately 30 minutes after eating; however, there was no history of weight loss. Diarrhea had been present periodically for the previous 2 months. There was no history of nausea or vomiting. There was a past history of arteriosclerotic aortoiliac occlusive disease for which the patient underwent aortoiliac endarterectomy and a bilateral lumbar sympathectomy on October 28, 1968. Recurrent claudication involving the thighs and legs was noted within recent months.

Physical examination revealed a medium-sized woman. There was no jaundice. Good carotid pulses were present, and there was no bruit over the carotid arteries. The lungs were clear to percussion and auscultation. There was no cardiomegaly. A normal sinus rhythm was present at

76/min. Blood pressure was recorded as: 186/90 mm. Hg in the right and left arms with the patient supine. There were no cardiac murmurs. The abdomen was flat and non-tender and a midline incisional scar was present. There was no abdominal mass. A systolic bruit was audible over the right and left lower quadrants of the abdomen. Femoral and pedal pulses were present bilaterally but were diminished, particularly on the right side.

The initial clinical impression was: (1) Abdominal pain, possibly due to a peptic ulcer, gall-bladder disease, or arteriosclerotic occlusive disease involving the celiac artery and/or superior and inferior mesenteric arteries. (2) Recurrent arteriosclerotic aortoiliac occlusive disease.

A routine blood count, urinalysis, serum lipase, and 2-hour urine lipase were normal. A secretin test, quantitative stool analysis for fat, and a urine for porphyrins also did not reveal any abnormality. A complete GI series showed only a small diverticulum arising from the second portion of the duodenum. An abdominal aortogram was obtained by open retrograde catheterization of the left brachial artery under local anesthesia. Films in both anterior-posterior and lateral projections (Figs. 4 and 5) showed severe stenosis of the celiac and inferior mesenteric arteries as well as extensive arteriosclerotic narrowing of the aorta, from a point immediately distal to the renal arteries to the bifurcation, and the left common iliac artery. The right common iliac artery was completely occluded.

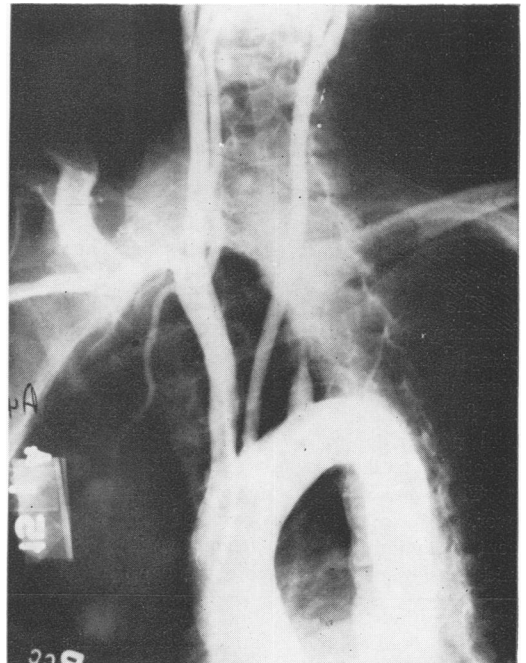


FIGURE 2A.

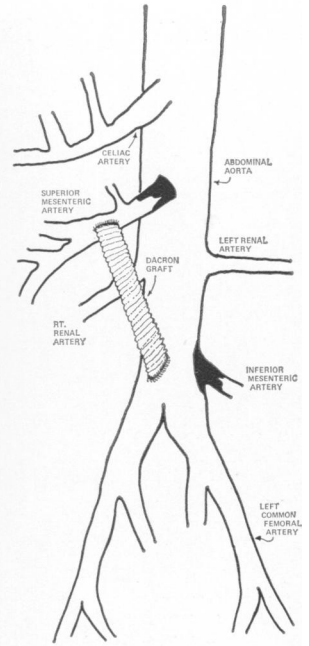
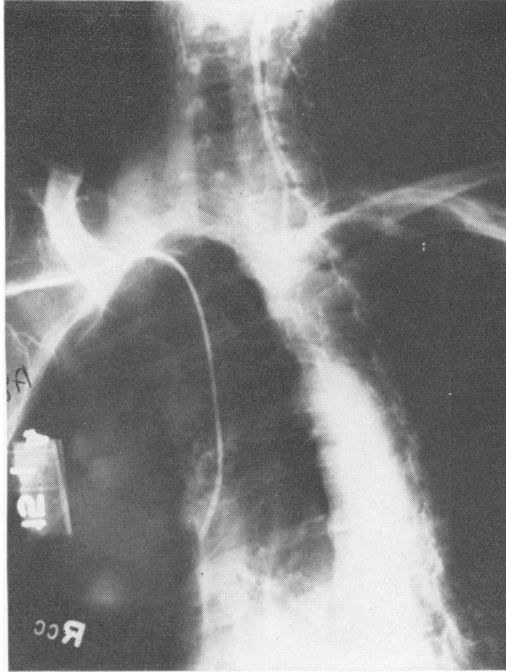


FIG. 2B (left).
FIG. 3 (right).

The proximal superior mesenteric artery and the inferior pancreaticoduodenal branch were large and approximately equal in size. The superior mesenteric artery distal to the origin of the inferior pancreaticoduodenal artery was extremely small. The extensive collateral blood flow via the inferior pancreaticoduodenal artery produced good retrograde filling of the celiac artery and its branches (Fig. 6). This suggested to the radiologist, Dr. Saul Eisen, that the celiac artery might be "stealing" blood from the intestinal branches of the superior mesenteric artery by shunting blood

through the inferior pancreaticoduodenal branch into the low pressure system of the celiac artery and its branches.

Operation was performed, using a left thoraco-abdominal incision. The aortic end of a dacron bifurcation graft was sutured end-to-side to the distal descending thoracic aorta, and the limbs of the graft were sutured end-to-side to the right and left common femoral arteries. The bypass principle was employed to avoid dealing directly with the abdominal aorta, distal to the renal arteries, and the iliac arteries, both of which were markedly

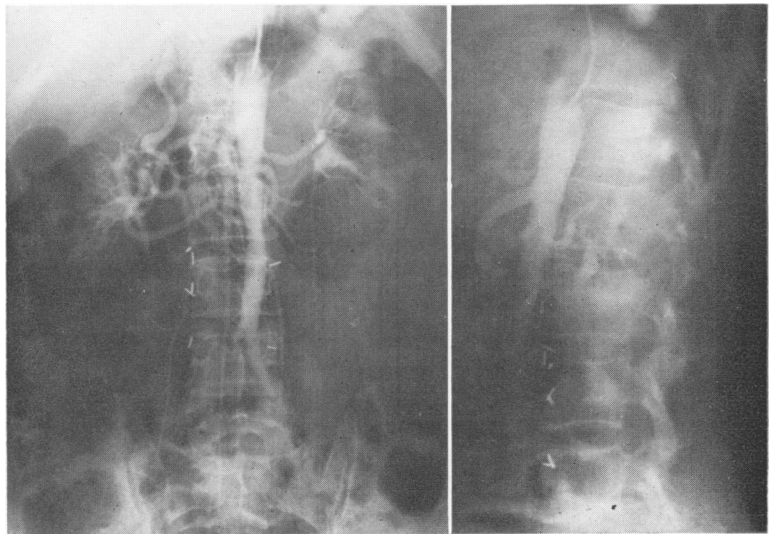


FIG. 4 (right).
FIG. 5 (left).

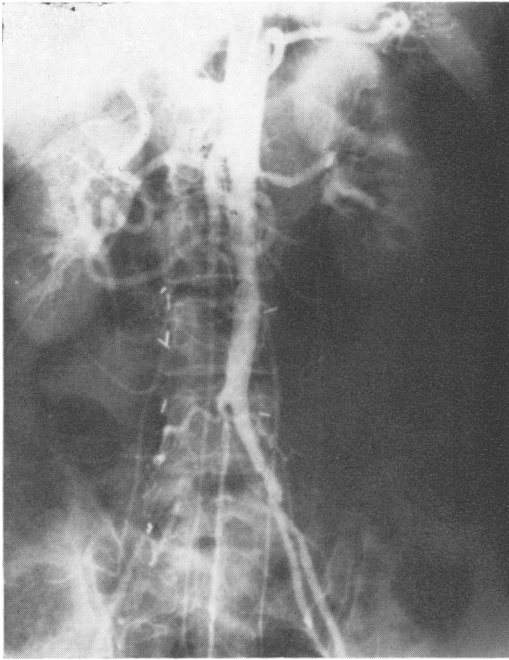


FIGURE 6.

arteriosclerotic and heavily scarred from the previous aortoiliac endarterectomy. Restoration of blood flow to the celiac artery was accomplished by inserting a vein graft, obtained from the left greater saphenous vein, between the aortic end of the dacron bifurcation graft and the celiac artery distal to the point of stenosis (Fig. 7).

The patient withstood the operative procedure well and following discharge from the hospital has not experienced further abdominal pain or claudication in the lower extremities.

Discussion

The mesenteric arterial circulation has been described as a functional unit composed of three major vessels: the celiac, superior mesenteric, and inferior mesenteric arteries.⁶ Communications between these three vessels are usually adequate to supply collateral blood flow. Consequently, in most cases, at least two of the major vessels must be compromised to produce the symptoms of intestinal angina. Intestinal angina may also occur as a result of isolated involvement of the celiac artery.¹ In cases of intestinal angina with involvement of the celiac artery, the "stealing" of blood from the superior mesenteric artery via collaterals, as suggested in Case 2, may be a significant factor in production of symptoms.

The clinical picture of intestinal angina is characterized by the occurrence of generalized abdominal pain 10 to 15 minutes after eating. The pain is usually severe, may radiate through to the back, and last approximately 1 to 3 hours. Some patients are partially relieved of pain by assuming a knee-chest position (Case 1). In an effort to avoid pain, patients with intestinal angina often eat less and frequently lose considerable weight. Malabsorption, secondary to intestinal ischemia, may also account for weight loss, but it is a less important factor than the patient's self-imposed food restriction.² Patients with intestinal angina may complain of nausea, vomiting, and postprandial abdominal distention. In addition, diarrhea or constipation may be present.

Physical examination is usually unremark-

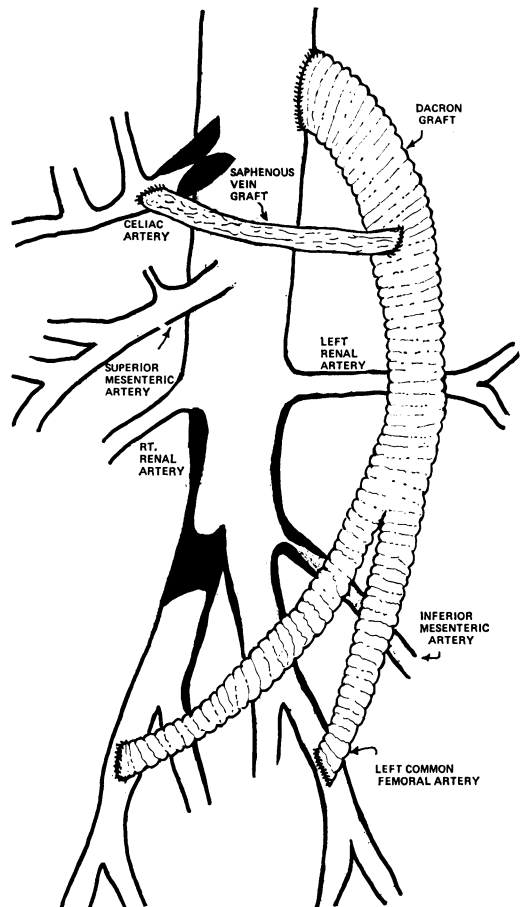


FIGURE 7.

able except for the presence of weight loss and the findings of associated arterial occlusive disease (left subclavian steal syndrome in Case 1 and aortoiliac occlusive disease in Case 2). Unfortunately, there are no reliable physical findings which point to a specific diagnosis of intestinal angina.

Laboratory studies and gastrointestinal x-rays are primarily of value in excluding other diagnostic possibilities. Studies relating to intestinal absorption are often positive for malabsorption, but will not differentiate between intestinal angina and other malabsorption diseases.³

A definitive diagnosis of intestinal angina can only be established by appropriate arteriography of the mesenteric circulation. All three major arteries should be visualized. Since the celiac and superior mesenteric arteries arise from the anterior surface of the aorta, the study must include films taken in the lateral projection in order to outline the origin of each of these vessels.

Surgical restoration of blood flow to the mesenteric circulation is the only effective means for treating patients with intestinal angina. Operation is indicated for all patients with an established diagnosis in order to abolish symptoms and prevent catastrophic intestinal infarction.

Fortunately, the pathologic occlusive process in patients with intestinal angina is usually localized to the first few centimeters of the vessels involved. Therefore, local endarterectomy and/or bypass grafting, using dacron or a segment of saphenous vein, should be employed to restore blood flow. Bypass grafts commonly originate from the abdominal aorta, but may also originate from other vessels or grafts, depending upon the circumstances. In the case with celiac artery stenosis (Case 2), distal attachment of the bypass graft could have been made to the hepatic or splenic arteries if a suitable segment of celiac artery had not been available. In most cases with intestinal angina, restoration of blood flow to one of the three major arteries, even when two or three are involved, usually suffices because of the extensive collateral cir-

ulation ordinarily present. In this regard, operative pressure measurements comparing aortic and visceral branch artery pressure may help in deciding whether single or multiple vessel restorative procedures are necessary.⁵

The operative mortality associated with surgical correction of intestinal angina due to chronic arteriosclerotic occlusive disease of the celiac, superior mesenteric, and inferior mesenteric arteries is approximately 5 per cent with a complication rate of 15 to 20 per cent. With respect to the results of operation, a majority of patients are relieved of symptoms and appear to be protected from fatal intestinal infarction.

Summary

Two cases of chronic intestinal angina due to arteriosclerotic occlusive disease of the mesenteric arterial circulation are reported. The vessels involved were the superior and inferior mesenteric arteries in the first case and the celiac and inferior mesenteric arteries in the second case. Arteriographic findings in the second case, with celiac artery stenosis, suggests that "stealing" of blood from the superior mesenteric artery via collaterals may be a significant factor in production of symptoms. Both patients with chronic intestinal angina were treated successfully by operation using bypass grafts.

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