A Case with Spasm of a Saphenous Vein Graft

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Summary

A 54-year-old man developed angina pectoris 18 months after a successful aortocoronary bypass graft. The angiogram demonstrated patent grafts and no significant changes in the native coronary vessels. However, ergonovine maleate provoked spasm in a saphenous vein graft.

Additional Indexing Words:
Angina pectoris Angiogram Ergonovine Aortocoronary bypass surgery

There have been many reports on variant forms of angina pectoris, some of which relate to vasospasm as a cause of angina pectoris or myocardial infarction after successful aortocoronary bypass surgery.1-3 However, most of these reports have described spasm of the native coronary arteries and there have been few reports of spasm of the saphenous vein graft.4-6

Case Report

A 54-year-old man first noticed precordial burning on effort during a morning walk in February, 1984. The burning vanished immediately after he stopped walking. The episode occurred rarely during the next 4 months, however in June, it appeared not only in the morning but also throughout the day whenever he made a strenuous effort. In August, he visited our laboratory to undergo diagnostic angiography. A Master's double two-step test (Fig. 1) showed definite ST depression in the precordial leads. The right coronary artery showed a 90% narrowing (Fig. 2C), the left anterior descending artery (LAD) a 75% narrowing, the 1st diagonal branch a subtotal occlusion, and the circumflex also a subtotal occlusion (Fig. 2A and B). The left ventriculogram showed no significant asynergy (Fig. 2D). He had saphenous vein bypass grafts to the LAD and the posterior descending branch of the right
Fig. 1. Electrocardiogram before surgery. Except for inverted T waves in lead III and biphasic T waves in lead aVp, no abnormal findings are present at rest. Immediately after Master’s double two-step test, the patient complained of heart burning and the ST segments showed definite depression in V3 through V6, I, II, aVl, and aVp.

coronary artery in September, 1984. Angiography performed in November demonstrated patent grafts (Fig. 3) and he remained asymptomatic until March, 1986 when he felt chest burning on effort in the morning, similar to the episode he had experienced in the spring of 1984. An exercise electrocardiogram again showed ST depression in V5 and V6 (Fig. 4). A third arteriogram, in May, 1986 showed the same findings as those obtained in November, 1984. Since the cause of angina and ST depression on exercise could not be explained by routine angiography, 0.2 mg of ergonovine maleate was given intravenously. About 2 min later, ST-segment depression appeared in V5, although the patient had no anginal symptoms. The graft to the LAD near its proximal anastomosis to the aorta showed a spasm encroaching on the lumen by about 90% (Fig. 5B). The native vessels and another graft to the posterior descending artery showed no definite spasm. The spasm and ST-segment depression were promptly relieved by nitroglycerin injection into
Fig. 2. Coronary arteriogram. A and B: Left coronary artery, right anterior oblique view. The left anterior descending artery (LAD) shows a 75% narrowing and subtotal occlusions are present in the diagonal branch of the LAD and the atrioventricular branch of the circumflex artery. C: The right coronary artery shows a 90% narrowing in its proximal segment. Distal segments of the right coronary artery are opacified faintly via collaterals from the circumflex artery (B). D: Left ventriculography, end-systole. There is no asynergy except for very mild hypokinesis in the inferior segment.

the graft to the LAD. Since the final angiogram, he has been receiving 60 mg of diltiazem t.i.d. and has been free of any chest discomfort up to the present.

**DISCUSSION**

Whether spontaneous and ergonovine-induced spasms are the same or not remains unresolved, however, the present patient is thought to have had angina pectoris elicited by spasm of the graft to the LAD because, (1) he had been free of angina for 18 months after the successful bypass surgery and the 3rd angiogram performed after the appearance of angina showed no essential differences from the 2nd angiogram done at a time the patient had been asymptomatic, (2) ergonovine maleate provoked ST depression in the precordial leads similar to that recorded on the exercise electrocardiogram.
performed before the 3rd arteriogram, but did not provoke spasm in the native coronary arteries or in the graft to the posterior descending artery, (3) diltiazem has completely relieved the patient’s anginal symptoms.

Previously reported cases with spasm of saphenous vein grafts had a variant form of angina pectoris prior to the bypass surgery.4)-6) Our case had angina induced by effort and associated ST depression and seemed

Fig. 3. Angiogram 5 weeks after the aortocoronary bypass surgery. Saphenous vein grafts to the LAD (A) and the posterior descending artery (B) are patent.
to have "classical" angina. However, his symptoms occurred only in the morning and "effort-induced spasms" might have played some role in his angina, both prior to and after the bypass surgery.

As saphenous veins are denervated when they are taken from the legs, the cause of their spasm is a mystery. They may be "innervated" long after they are implanted into the aorta (and coronary arteries), or alternatively, some humoral factors may be responsible for the spasms.

**References**

Fig. 5. Third arteriogram. A: The graft to the LAD remains patent. B: After administration of ergonovine maleate, a spasm, encroaching the lumen by 90%, appeared in the graft to the LAD near the proximal anastomosis (white arrow).