LIGATION OF COMMON FEMORAL ARTERY ABOVE THE AXILLOFEMORAL BYPASS ANASTOMOSIS

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THE PRINCIPAL disadvantage of axillofemoral bypass is poor long-term patency (1). The present study was undertaken to determine whether ligation of a bypassed stenotic common femoral artery would increase flow in the bypass graft, presumably improving graft patency.

MATERIALS AND METHODS

Left carotid-femoral bypass was constructed with a 6-mm Gore-tex graft in 10 adult mongrel dogs (Fig 1). Carotid-femoral rather than axillofemoral bypass was constructed because flows cannot be directly measured through the Gore-tex graft with the electromagnetic flowmeter. Pressure was measured in the common carotid artery proximal to the graft, and in the common femoral artery distal to the stenosis and the graft. Total graft blood flow was determined by measuring a blood flow in the common carotid artery proximal to the graft with an electromagnetic flowmeter. The common carotid artery was ligated distal to the anastomosis so that all blood flow through the common carotid would go through the graft. Total femoral artery flow was measured on the common femoral artery distal to the graft. Femoral flow minus graft flow was assumed to represent ileofemoral flow. A screw clamp was placed on the common femoral artery proximal to the graft to precisely control degree of stenosis.

Blood flow and arterial pressure were recorded through the graft and femoral artery under the following conditions: 1) Proximal femoral artery open and graft occluded, 2) proximal femoral artery open and graft open, and 3) proximal femoral artery occluded and graft open. After measuring basal blood flow and arterial pressure as described here, a gradient of 20-35 mm Hg was produced across the femoral artery by tightening the screw clamp with the graft occluded to simulate a moderate ileofemoral stenosis. Flow and pressure measurements were repeated after clamping the common femoral artery proximal to the graft. To simulate a high-grade ileofemoral stenosis, a gradient of 60-85 mm Hg was created by further tightening the screw clamp on the femoral artery. Flow and pressures were again recorded.

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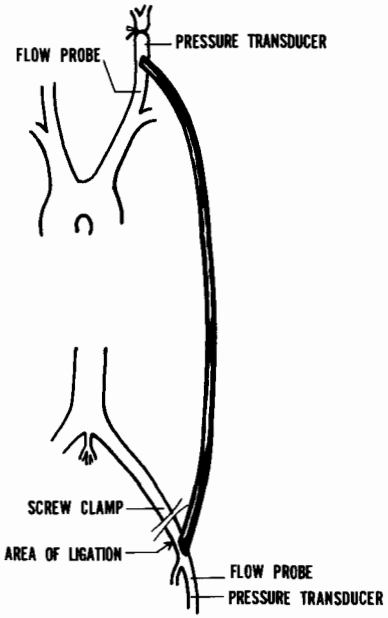

Figure 1.

Table 1

	Proximal femoral artery open, graft occluded	Proximal femoral artery open, graft open	Proximal femoral artery occluded, graft open
		Low-grade stenosis	
Femoral flow (ml/min)	88 ± 17.4	166 ± 42.4	169 ± 42.9
Graft flow (ml/min)	0	84.5 ± 12.4*	145.2 ± 19.4*
Femoral pressure (mm Hg)	84.5 ± 4.8	112.5 ± 4.2	111 ± 4.9
Graft pressure (mm Hg)	112 ± 5.1	112.5 ± 4.2	112.5 ± 4.2
		High-grade stenosis	
Femoral flow (ml/min)	36 ± 7.9	182 ± 44.1	168 ± 44.5
Graft flow (ml/min)	0	130 ± 17.6	136 ± 18.8
Femoral pressure (mm Hg)	52 ± 3.9	108.5 ± 6.8	108.5 ± 6.4
Graft pressure (mm Hg)	119 ± 5.1	114 ± 5.04	114 ± 5.0

Values are ± SE. *Significantly different ($P < 0.001$).

RESULTS

Results are shown in Table 1. In the dogs with moderate stenosis, mean graft flow increased dramatically (from 84.5 ml/min ± 12.3 to 145.2 ml/min ± 19.4, $P < 0.001$) with ligation. In the dogs with the severe stenosis, mean graft flow increased only slightly (130 ml/min ± 17.6 to 136 ml/min ± 18.8, $P < 0.10$ but > 0.05) with ligation.

CONCLUSIONS

Graft flow is an important prognostic factor in predicting long-term graft patency (2,3). We have demonstrated that ligation of a moderately stenotic bypassed vessel significantly increases the flow in a long bypass graft. The increase in flow of a bypass around a severe stenosis is less pronounced because competitive flow through the artery is already minimal (4). These data suggest that immediate axillofemoral graft patency should be improved by ligation of a bypassed stenotic vessel.

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