The "bonnet bypass"

Case report

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A saphenous vein bypass graft from the contralateral superficial temporal artery to the ipsilateral middle cerebral artery was performed in a patient who required occlusion of his left common carotid artery. This procedure was used because of the unavailability of an ipsilateral donor artery. The bypass is working well 8 months postoperatively.

KEY WORDS □9 STA-MCA anastomosis □9 extracranial-intracranial arterial anastomosis □9 saphenous vein bypass

CASE REPORT

This 55-year-old man presented with an acutely enlarging left neck mass that oozed bright red blood. One year previously he had been treated for squamous cell carcinoma of the tongue. Methotrexate was infused into the lingual artery via a temporal artery catheter, and he then underwent radical neck surgery. The patient did well until the present admission.

Emergency arteriography confirmed the clinical diagnosis of a common carotid artery aneurysm (Fig. 1 left). A polytetrafluoroethylene graft was used to connect the common carotid artery to the internal carotid artery after resection of a large, partially thrombosed aneurysm at the bifurcation (Fig. 1 right). However, the oral cavity was entered when a skin flap was being freed from the densely scarred tissues. This incision was closed, and antibiotics were given intravenously. The patient did well until the 3rd postoperative day, when he developed a pharyngocutaneous fistula that bathed the graft in contaminated secretions.

Excision of the graft was then required to prevent the consequences of graft infection, but during temporary carotid artery occlusion the patient developed aphasia. This complication cleared with restoration of flow. Due to previous chemotherapy and multiple skin rotations, neither the external carotid nor the subclavian artery was available as a donor vessel. Furthermore, the large contaminated neck field precluded the tunneling of any graft in the cervical region on that side. Therefore, a saphenous vein bypass from the contralateral STA to the ipsilateral MCA was performed. The graft was then removed and the proximal and distal ends of the carotid vessels ligated. The cervical fistula healed over a 6-week period.

Eight months postoperatively, patency remains easily evaluated by palpation and has been verified angiographically (Fig. 2). Dependence on the bypass graft is evident by the onset of aphasia with digital graft compression, performed once only. For this reason, the patient has been instructed not to wear a tight-fitting hat. Regional cerebral blood flow mea-
FIG. 1. Left common carotid artery angiograms. Left: Preoperative angiogram demonstrating a common carotid artery aneurysm. The internal carotid artery is narrowed distal to the aneurysm. There is no filling of the external carotid artery except for a severely narrowed inferior thyroid artery branch. Right: Postoperative angiogram revealing good patency of the internal carotid artery after resection of the aneurysm and placement of a polytetrafluoroethylene graft. Arrow depicts the suture line.

measurements have revealed normal perfusion of both hemispheres.

Discussion

This patient's common carotid artery aneurysm was managed in the accepted manner of resecting the aneurysm while assuring the patency of the internal carotid artery. The subsequent contamination necessitated removal of the graft, but insufficient collateral circulation required an alternative means of maintaining perfusion to that cerebral hemisphere.

Much has been written about various revascularization concepts to avoid cerebral ischemia. The STA, the occipital artery, and even the middle meningeal artery have been used as donor vessels. The saphenous vein, radial artery, and a synthetic polytetrafluoroethylene graft have been used in donor grafts. These grafts have originated from the ipsilateral external carotid artery, the common carotid artery, or the subclavian artery, but in this patient these vessels were unavailable. Therefore, we performed a contralateral STA to ipsilateral MCA bypass. A distinct advantage over other vein bypasses is that by being adjacent to the skull throughout its course, the distal and proximal ends are not distorted by any head movement. This "bonnet bypass" has worked remarkably well, and can be recommended for the rare patient in whom no alternative revascularization procedure is feasible.

References

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**Fig. 2.** Right external carotid artery arteriograms. *Left:* The proximal saphenous vein graft anastomosis can be seen at the crotch of the superficial temporal artery bifurcation. *Upper Right:* Later exposure showing the saphenous vein graft over the top of the skull. *Lower Right:* Still later phase demonstrating the saphenous vein down the left side and beginning to fill the left hemisphere branches.


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