Cerebral revascularization to a main limb of the middle cerebral artery in the Sylvian fissure

An alternative approach to conventional anastomosis

FERNANDO G. DIAZ, M.D., PH.D., FELIX UMANSKY, M.D., BHARAT MEHTA, M.D., SALVADOR MONTOYA, M.D., MANUEL DUJOVNY, M.D., JAMES I. AUSMAN, M.D., PH.D., AND JOSE CABEZUDO, M.D.

Departments of Neurosurgery and Radiology, Henry Ford Hospital, Detroit, Michigan

Thirteen patients underwent an anastomosis of the superficial temporal artery (STA) or a saphenous vein graft to one of the secondary trunks of the middle cerebral artery (MCA). They included five patients with giant MCA trifurcation aneurysms, four patients in whom an earlier conventional STA-MCA anastomosis had become occluded, two patients who had stenosis of one of the secondary limbs of the MCA, and one patient who had a carotid-cavernous fistula. One patient had a saphenous vein graft from the common carotid artery to a secondary trunk of the MCA to bypass an occluded internal carotid artery and severely stenosed external carotid artery. The primary advantages of this procedure are that a large-caliber anastomosis to one of the secondary limbs of the MCA immediately restores flow into the MCA tree with a larger amount of vessel filling than with a standard cortical bypass, and large vessels can be used for the anastomosis. The disadvantages are that one of the secondary branches of the MCA must be occluded, the cerebral hemisphere around the Sylvian fissure must be retracted, a lumbar subarachnoid drain is needed, and the anastomosis must be performed deep within the Sylvian fissure. The procedure is a satisfactory alternative in cases in which a conventional STA-MCA anastomosis has either failed or would be less likely to succeed.

KEY WORDS • anastomosis • cerebral revascularization • aneurysm • middle cerebral artery • superficial temporal artery • saphenous vein graft

Cerebral revascularization by the anastomosis of an extracranial to an intracranial vessel has been used since it was first described by Donaghy and Yaşargil. Although many applications have been proposed, no definite indications are uniformly accepted. We are reporting our experience with 13 patients in whom a superficial temporal artery (STA) to middle cerebral artery (MCA) anastomosis was completed in a secondary limb of the MCA within the Sylvian fissure. We discuss the principal reasons for its use, the surgical technique, and its advantages and disadvantages.

Clinical Material

Thirteen patients among 313 patients who had STA-MCA anastomosis underwent anastomosis of the STA to one of the secondary limbs of the MCA in the Sylvian fissure (Table 1). We designate as “secondary limbs” the arteries arising from the division of the main trunk of the MCA. They are named superior, middle, or inferior according to their vertical position in the fissure. Five of the 13 patients had giant MCA trifurcation aneurysms, four had undergone conventional STA-MCA anastomosis that had failed, two patients had MCA trunk stenosis, and one patient had a carotid-cavernous fistula. One patient had placement of a saphenous vein graft from the common carotid artery to a secondary limb of the MCA to bypass an occluded left internal carotid artery and a highly stenotic external carotid artery.

Operative Procedure

The STA-MCA anastomosis deep in the Sylvian fissure is performed in the following manner. The patient receives general endotracheal anesthesia and the central venous pressure, intra-arterial pressure, and urinary
output are continuously monitored. A lumbar subarachnoid drain is placed to improve cerebral relaxation. The frontal and parietal branches of the STA are traced on the scalp with Doppler ultrasonography and, after adequate skin antisepsis, an incision is made directly over the largest of the two branches, demonstrated by angiography. All side branches are cauterized and transected, maintaining continuity of the isolated STA branch proximally and distally. After the skin and muscle flaps have been reflected, the STA is gently moved to one side; a free pterional bone flap is then raised and the pterion is completely removed. Hemostasis is achieved, the dura is tacked to the bone, the STA is covered with papaverine-soaked cottonoids, and the dura is opened in a semicircular manner, based superiorly.

The patient receives 25 mg of intravenous mannitol and 40 mg of furosemide. The lumbar drain is opened and the Sylvian fissure is entered in a conventional manner. Care is taken to preserve as many venous connections as possible. The MCA trunk is identified and the secondary branches are carefully dissected at their origin. The secondary vessel with the least number of side branches is chosen and mobilized for the anastomosis. The STA is then clipped proximally, transected distally, and irrigated with heparinized saline. A fish-mouth stoma is prepared at the distal end of the STA in a conventional manner. After the intravenous administration of 250 mg of thiopental and 100 mg of lidocaine, the MCA branch is occluded between temporary clamps. A longitudinal arteriotomy is made in the MCA to fit the size of the STA stoma, and the STA is brought into the Sylvian fissure without torsion. An end-to-side anastomosis is then completed within 30 minutes of occlusion in a conventional manner. The clamps are removed sequentially and, once hemostasis has been achieved, the wound is closed in layers. In general, it has not been necessary to leave the spinal drain in place after the procedure has been completed. All patients receive cephalosporins and dexamethasone for 3 days and aspirin, 650 mg/day, indefinitely. Patients usually remain in the intensive care

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**TABLE 1**

Summary of clinical course in 13 patients in this series *

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>Clinical Findings</th>
<th>Angiography</th>
<th>CT</th>
<th>Indications for Surgery</th>
<th>MCA Branch</th>
<th>Result</th>
<th>Patency</th>
<th>Follow-Up (mos)</th>
<th>Operative Complications</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>32, F</td>
<td>F</td>
<td>transient rt paresthesias</td>
<td>lt ICA occlusion</td>
<td>–</td>
<td>failed STA-MCA</td>
<td>temporal</td>
<td>asymptomatic</td>
<td>patent</td>
<td>46</td>
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<td>2</td>
<td>45, M</td>
<td>M</td>
<td>progressive rt hemiparesis</td>
<td>rt ICA syphon stenosis</td>
<td>rt frontal LDA</td>
<td>failed STA-MCA</td>
<td>frontal</td>
<td>mild rt arm paresis</td>
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<tr>
<td>3</td>
<td>75, F</td>
<td>F</td>
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<td>rt MCA stenosis</td>
<td>–</td>
<td>temporal branch stenosis</td>
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<td>patent</td>
<td>29</td>
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<tr>
<td>4</td>
<td>56, F</td>
<td>F</td>
<td>It focal status epilepticus</td>
<td>rt MCA stenosis</td>
<td>–</td>
<td>frontal branch stenosis</td>
<td>frontal</td>
<td>symptomatic</td>
<td>patent</td>
<td>26</td>
<td>none</td>
</tr>
<tr>
<td>5</td>
<td>66, M</td>
<td>M</td>
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<td>bilat MCA stenosis</td>
<td>–</td>
<td>failed rt STA-MCA</td>
<td>temporal</td>
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<td>patent</td>
<td>26</td>
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<td>F</td>
<td>rt frontal headaches</td>
<td>giant rt MCA aneurysm</td>
<td>rt frontal mass</td>
<td>temporal branch aneurysm</td>
<td>temporal</td>
<td>asymptomatic</td>
<td>patent</td>
<td>22</td>
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<td>M</td>
<td>It parietal headaches</td>
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<td>lt frontal mass</td>
<td>temporal branch aneurysm</td>
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<td>patent</td>
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<td>lt frontal LDA</td>
<td>ven graft</td>
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<td>lt hemiplegia</td>
<td>patent</td>
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<td>rt frontal LDA</td>
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<td>patent</td>
<td>12</td>
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<td>giant rt MCA aneurysm</td>
<td>rt frontal LDA</td>
<td>MCA occlusion post clipping</td>
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<td>patent</td>
<td>10</td>
<td>none</td>
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<td>13</td>
<td>22, F</td>
<td>F</td>
<td>rt carotid injury</td>
<td>rt CCF</td>
<td>–</td>
<td>trapping &amp; EC-IC</td>
<td>temporal</td>
<td>asymptomatic</td>
<td>patent</td>
<td>10</td>
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</table>

* Abbreviations: CCF = carotid-cavernous fistula; CT = computerized tomography; ICA = internal carotid artery; MCA = middle cerebral artery; LDA = low-density abnormality; STA-MCA = superficial temporal-middle cerebral artery anastomosis; EC-IC = extracranial-intracranial anastomosis; CSF = cerebrospinal fluid.
Bypass to main MCA limb in Sylvian fissure

unit for 24 hours before being sent to the regular neurosurgical unit.

Operative Results

Ten patients were completely asymptomatic after surgery, with a mean follow-up period of 24 months (12 to 48 months). One patient (Case 2), who presented with a stroke in progress and a dense preoperative hemiparesis, was left with a mild residual left upper extremity paresis. Another patient (Case 8), who had a severe right hemiparesis and dysphasia before surgery, and whose conventional cortical STA-MCA anastomosis had failed, had extensive involvement of the primary and secondary divisions of the MCA at surgery. After surgery, there was no improvement in her clinical condition and the follow-up angiogram revealed poor filling of the anastomosis. A third patient (Case 9), who presented with progressive right hemiparesis and dysphasia after a left carotid endarterectomy done elsewhere, had failed, had a complete left common and internal carotid artery occlusion and severe right carotid siphon stenosis on admission. A saphenous graft was placed between the subclavian artery and the left MCA. Immediately after surgery, he had a left hemiplegia; a cerebral angiogram revealed the saphenous graft filling the left MCA, but there was a complete right internal carotid artery occlusion. After a prolonged hospitalization he died of respiratory insufficiency.

One patient (Case 7) developed a cerebrospinal fluid (CSF) leak through the wound, with secondary meningitis. The CSF leak resolved with temporary drainage through a subarachnoid catheter placed in the lumbar area, and the meningitis was successfully treated with intravenous antibiotic therapy. Postoperative angiograms showed patency of the bypasses in all cases, and, with the exception of one (Case 8), there was excellent filling of all the branches of the MCA.

Representative Case Reports

Case 10

This 46-year-old woman was admitted with a transient left upper extremity paresis. On examination, she showed a slight residual left upper extremity dyspraxia. Computerized tomography (CT) showed an area of increased density in the Sylvian fissure which, on angiography, was found to be a 2.5-cm right MCA bifurcation aneurysm (Fig. 1). At surgery on August 11, 1983, the inferior branch of the MCA was revealed arising from the dome of the aneurysm. To obliterate the aneurysm completely, it was necessary to clip the aneurysm neck below this branch; therefore, the anterior branch of the STA was anastomosed to the inferior limb of the MCA. The patient had a totally uneventful postoperative course. Repeat angiography on August 17, 1983, showed complete obliteration of the aneurysm and excellent filling of the inferior limb of the MCA via a patent anastomosis. The only additional medication at discharge was dipyridamole (25 mg three times daily by mouth). At last follow-up examination, on January 30, 1984, she was completely asymptomatic and Doppler ultrasonography confirmed excellent flow in the STA.

Case 11

This 62-year-old diabetic and hypertensive man developed a left hemiparesis in June, 1981. A CT scan showed areas of decreased density in the right middle basal ganglia. An angiogram showed a web-like plaque at the right common carotid bifurcation and a possible small-branch occlusion in the right MCA. Oral aspirin (5 gm daily) and dipyridamole (50 mg three times daily) were prescribed. He continued to improve gradually until August 13, 1983, when a right upper extremity paresis and expressive dysphasia developed. On repeat angiography, no significant change in the right common carotid bifurcation was found, but there was complete occlusion of the right MCA with collateral reconstitution through pial collaterals, and 90% stenosis of the left MCA (Fig. 2).

The patient underwent an uneventful left STA-MCA anastomosis on August 16, 1983, and a right STA-MCA anastomosis 7 days later. A postoperative angiogram showed that both bypasses were filling five of the main branches of the MCA. Because of increasing right upper extremity numbness and paresis, he was readmitted on September 22, 1983. Repeat angiography showed complete occlusion of the right STA-MCA anastomosis and a functioning left STA-MCA anastomosis. Complete blood analysis with coagulation studies failed to reveal any reason for the occlusion.

On September 29, 1983, the patient underwent an anastomosis of the anterior branch of the STA to the superior limb of the right MCA. He had an uneventful postoperative course. A postoperative angiogram showed that the orbitofrontal, precentral, central, and posterior parietal branches of the right MCA were filling through a patent STA-MCA anastomosis. He was discharged on oral aspirin (5 gm daily) and dipyridamole (25 mg three times daily). At follow-up examination on November 2, 1983, he was still asymptomatic, and Doppler ultrasonography confirmed that both STA's were patent.

Case 12

This 53-year-old man sustained a major motor generalized seizure 10 days before admission. A CT scan at another hospital showed a large area of increased density in the right temporal region which, on cerebral angiography, was diagnosed as a giant right MCA aneurysm with an intraluminal thrombus.

On admission to our hospital he was neurologically intact, and underwent surgery on October 3, 1983. In order to clip the aneurysm neck satisfactorily, it was necessary to evacuate the thrombus from the aneurysm by temporarily occluding the MCA branches. When the procedure was completed, the superior and inferior
Fig. 1. Angiography, anteroposterior (left) and lateral (right) views, in Case 10. Upper: Preoperative angiograms revealing a 2.5-cm aneurysm arising from the middle cerebral artery (MCA) bifurcation. Center: Postoperative common carotid angiograms revealing filling of the entire MCA tree after the aneurysm had been clipped and of the superior temporal artery-MCA anastomosis in the Sylvian fissure. Lower: Selective postoperative external carotid angiograms showing filling of the temporal trunk of the MCA through a patent anastomosis.
FIG. 2. Case 11. *Upper Left:* Preoperative angiogram, anteroposterior view, showing left middle cerebral artery (MCA) stenosis on August 24, 1983. *Upper Right:* Postoperative angiogram, lateral view, obtained on August 30, 1983, showing a cortical superior temporal artery (STA)-MCA anastomosis. *Center Left:* Preoperative angiogram, lateral view, showing a right MCA occlusion. *Center Right:* Postoperative angiogram, lateral view, showing a right STA-MCA anastomosis on the cortical surface with filling of five branches of the MCA through a widely patent anastomosis. *Lower Left:* Repeat postoperative right common carotid angiogram, lateral view, obtained on September 20, 1983, showing occlusion of the posterior branch of the STA, but a remaining patent anterior branch. *Lower Right:* Postoperative selective right external carotid angiogram, lateral view, obtained on October 7, 1983, showing filling of the MCA tree through a widely patent STA-MCA anastomosis in the Sylvian fissure.
limbs of the MCA tree appeared to be filling without any apparent compromise. Immediately postoperatively, a moderate left hemiparesis and obtundation developed. Repeat cerebral angiogram showed that the right MCA was completely occluded 3 cm distal to its origin, with retrograde reconstitution of the frontal opercular branches through pial collaterals. Xenon-133 regional cerebral blood flow on October 4 showed major asymmetry in the right frontal, temporal, and parietal areas, compatible with MCA occlusion. An immediate operation was proposed to reestablish flow in the MCA with the already prepared STA, but the patient's condition declined. He was treated with intravenous volume expansion and controlled systemic hypertension, and improved gradually over the next few days. On October 10, he underwent anastomosis of the posterior branch of the right STA to the inferior limb of the MCA distal to the occlusion. He had an uneventful postoperative course.

At discharge he had a mild residual left upper extremity dyspraxia. The only additional medication prescribed was phenytoin (100 mg orally three times daily). A postoperative angiogram revealed luxurious filling of the entire MCA territory. At last follow-up examination, on December 1, 1983, his neurological status was normal, and Doppler ultrasonography confirmed a patent STA.

**Discussion**

When cerebral revascularization was described by Donaghy and Yasargil (unpublished data) and by Yasargil, they found that STA anastomosis could be carried out safely to a cortical branch of the MCA under the operative microscope. However, use of this procedure to treat cerebral ischemia has caused considerable debate and concern, and many still doubt its value. The International Cooperative Study group is currently evaluating the possible value of cerebral revascularization in treating cerebral ischemia. We do not intend to describe any indications for this procedure since there is no general agreement in the literature. Instead, we will describe how we use the procedure to treat problems encountered in our daily practice.

Anastomosis of the STA to the MCA can be completed on the cerebral cortical surface with greater than 95% patency and with satisfactory reconstitution of cerebral blood flow into areas of brain that lack normal flow. This procedure has been used for complete internal carotid artery occlusions, in inaccessible areas of internal carotid artery stenosis, stenoses or occlusions of the MCA, giant aneurysms, and carotid-cavernous fistulas. It has also been used in some selected tumors of the cranial base, such as meningiomas involving the internal carotid artery. The success rate for these procedures is uniformly satisfactory.

A saphenous vein graft is an alternative to STA-MCA anastomosis in cases where the STA itself is small or for some reason unavailable. The vein graft is anastomosed proximally to the subclavian artery, the common or the external carotid artery, or to the trunk of the STA, and distally to one of the peripheral branches of the MCA. There are conflicting reports about venous anastomosis. Spetzler et al. reported a patency rate greater than 95% with their procedure, but we have found that the success rate with these cortical anastomoses is only 66%. The difference is size between the distal portion of the vein graft and the angular branch of the MCA is too disproportionate for a good match. The saphenous vein is more compatible in size to one of the secondary limbs of the MCA. In the one case in which we anastomosed the saphenous vein to the superior secondary limb of the MCA, we found no discrepancy in size. The MCA is thicker at its bifurcation and the stoma of the saphenous vein adapts better to this larger than to one of the peripheral cortical branches of the MCA, almost irrespective of its size.

Another alternative to the cortical STA-MCA anastomosis is a bypass between the occipital artery and the MCA. Although the occipital artery is suitable for the anastomosis because it is compatible in size with the MCA, the occipital artery is sometimes not sufficient to reach the angular branch of the MCA so as to complete the anastomosis successfully.

When we dissected 70 unfixed cerebral hemispheres in our laboratory, we found that the limbs of the MCA were suitable for direct microvascular intervention. The MCA had a single trunk in 6% of the cases, bifurcated in 64%, trifurcated in 29%, and quadrifurcated in 1%. In cases of bifurcations, the mean outer diameters of the secondary trunks ranged from 2.1 ± 0.1 to 2.3 ± 0.1 mm, and in cases of trifurcation, they ranged from 1.4 ± 0.1 to 2.3 ± 0.3 mm. The distance from the origin of the MCA to the origin of the secondary trunks was 15 ± 1.2 mm.

Encouraged by the anatomical studies carried out in our laboratory, we realized that an alternative to the conventional STA-MCA anastomosis on the cortex could be an anastomosis completed in the Sylvian fissure with a large vessel. This procedure is applied for very specific reasons and is only considered an alternative to conventional STA-MCA anastomosis since it carries greater potential risks. Prospective patients for this procedure include those in whom a conventional STA-MCA anastomosis has failed. We have had four such patients, three of whom had a successful deep Sylvian anastomosis. In the fourth patient (Case 8) the procedure failed possibly because of the extensive atherosclerotic involvement of her MCA tree. During the operative procedure in that patient the vessels were found to be extremely involved by atheroma and we attempted to place the anastomosis in the vessel with the least involvement. Unfortunately, two subsequent angiograms showed that the atheromatous disease had progressed and the second anastomosis was filling poorly. The patient was given anticoagulant drugs and has since remained asymptomatic.
Another important observation made in Case 8 was that the anastomosis was patent on Doppler ultrasonography before discharge, and yet the bypass did not fill on the angiogram made 3 months later. This appears to result from the widespread atherosclerosis found in the MCA during surgery in that patient. However, in Case 11 the bypass also became occluded 2 weeks after it was shown angiographically to fill the entire MCA tree. The possible causes for delayed occlusion of the bypass include: 1) adventitial or foreign object remnants left within the lumen of the anastomosis, which could serve as a nidus for thrombus formation; 2) endothelial trauma at the clip sites or the anastomotic site; 3) the development of a hypercoagulable state induced by dehydration or medications; 4) or a sustained external compression on the STA causing its eventual occlusion. One must be aware of the potential for delayed occlusion of a previously patent anastomosis, and recognize that if a bypass fills well on angiography there is no guarantee that it will remain patent.

Deep Sylvian anastomosis was also performed in patients with giant aneurysms of the MCA bifurcation, in whom a secondary trunk of the MCA originated directly from the dome of the aneurysm. Complete clipping of the aneurysm would have obliterated a primary division of the MCA. Preserving the origin of this branch would leave a residual portion of the aneurysm sac still unclipped. Glueing or wrapping of the residual portion of the aneurysm would reinforce the residual portion of the sac, but would not insure against future rupture of the aneurysm. Other alternative treatments for these patients included ligation of the internal carotid artery, excision of the aneurysm with direct endoaneurysmorrhaphy and wrapping of the residual reconstructed MCA division, or clipping of the aneurysm below the origin of the secondary MCA trunk without rerouting blood into the distally occluded vessel.

When a secondary limb of the MCA originates from the aneurysm dome, it is probably preferable to complete an STA-MCA anastomosis distally on the secondary branch. The aneurysm can then be ligated below the origin of the secondary branch and the secondary branch can be occluded flush with the aneurysm. This was the primary procedure in four of our patients, all of whom from a vascular aspect were asymptomatic immediately after the procedure. One patient developed a CSF leak and meningitis, which required intravenous antibiotics and lumbar drainage.

In Case 12, an endoaneurysmorrhaphy was performed before the clip was placed on what appeared to be the base of the aneurysm, and the remaining portion of the sac was obliterated. It is possible that the manipulation required to temporarily occlude the MCA during the excision of the aneurysm may have damaged the endothelium and caused its subsequent occlusion, or the clip may have slipped onto the MCA trunk, causing its occlusion. This patient developed a moderate deficit immediately postoperatively, but the deficit improved after volume expansion and controlled systemic hypertension which permitted us to perform a deep Sylvian anastomosis at a later date. The STA-MCA anastomosis had been planned originally at the first operation, but since the MCA was functioning well, it was omitted. Currently, if we were to perform a similar procedure, we would proceed with a prophylactic anastomosis of the STA to one of the secondary branches of the MCA to prevent any loss of perfusion of the MCA after extensive manipulation of an aneurysm.

A deep Sylvian anastomosis can be considered for patients who have stenosis in one of the secondary branches of the MCA, since it would be difficult to determine on the surface of the brain which branch should be used. Since it is not possible to correlate the angiographic location of the MCA branches arising distal to the stenosis with these branches observed on the cortical surface at surgery, it is possible that one could choose the incorrect branch for the anastomosis. Therefore, we believe that it is necessary to open the Sylvian fissure to directly identify which MCA branch is stenosed, and to place the anastomosis directly distal to the point of stenosis.

In the past, carotid-cavernous fistulas have been treated by simple ligation of the ipsilateral internal or common carotid arteries, trapping of the internal carotid artery with or without embolization, simple embolization of the fistula by intraluminal balloon occlusion of the internal carotid artery, or selective occlusion of the fistula by balloon placement in the fistula opening. Other procedures have included placing copper wires into the cavernous sinus via the supraorbital veins or directly, with or without adding galvanic current to enhance thrombosis of the fistula. Perhaps the most widely known procedure is direct occlusion of the fistula by placing a balloon into the cavernous sinus via selective catheterization of the internal carotid artery. This procedure is theoretically the best treatment because it obliterates the fistula opening without blocking the carotid flow. However, failure in balloon placement has been reported, and deflation or displacement of the balloons has been observed. The major disadvantage of the procedure is that it can be performed only in a few selected institutions that have personnel trained in the sophisticated techniques required for the use of balloons. Therefore, alternative procedures with wider application must be developed.

We prefer to combine trapping of the internal carotid artery with a deep Sylvian anastomosis because the fistula can be effectively eliminated by trapping and embolizing the internal carotid artery. Since a large-caliber anastomosis is completed at the MCA bifurcation, the potential danger of cerebral ischemia resulting from ligation of the internal carotid artery is decreased. Dissection of the Sylvian fissure makes the approach to the internal carotid artery easier, and permits anastomosis of STA to a secondary trunk of the MCA. When a deep fissure anastomosis is planned as the
primary procedure, we prefer to use the largest of the two branches of the STA, since we want to bring the largest possible vessel and the greatest immediate flow to the Sylvian vessels.\textsuperscript{3,4} Reestablishing flow immediately, as well as allowing a large volume of blood to flow into this area quickly, should increase the patency of the anastomosis and perhaps reperfuse the ischemic area more rapidly.\textsuperscript{28} The primary disadvantages of this approach include the need to place a lumbar subarachnoid drain, as well as direct manipulation of the brain with brain retraction and consequent cerebral edema. A deep Sylvian anastomosis is not as simple as an anastomosis done on the surface, and the space available to manipulate the instruments is more restricted. Continued suction in the area of the anastomosis is required, and meticulous hemostasis is needed before anastomosis is attempted.

In conclusion, an external artery anastomosis to the MCA in the Sylvian fissure has been performed successfully in 12 of 13 patients. Benefits include the immediate establishment of a large conduit into the secondary limbs of the MCA, with a high degree of patency that has potentially greater possibilities for cerebral protection. Since the secondary MCA trunks are large, anastomosis in the Sylvian fissure is easier than surface procedures; however, the benefit obtained from greater vessel size is diminished by the depth at which the anastomosis must be completed. It is extremely important to have minimal retraction on the brain and maximum cerebral relaxation in order to avoid cerebral edema from manipulation of the brain and from the temporary ischemia required to complete the anastomosis. We believe that the use of diuretic agents and the lumbar subarachnoid drain improves cerebral relaxation and decreases trauma to the brain. We would like to emphasize that an anastomosis in the Sylvian fissure is an alternative to a conventional STA-MCA anastomosis on the cortical surface only in cases in which no other alternative exists. In general, we would not encourage its use as a primary procedure because it requires the temporary occlusion of one of the secondary MCA trunks which could potentially lead to the development of a cerebral infarction. Since this procedure brings a large flow of blood into a previously ischemic area, there may be a higher risk that a hemorrhagic infarction may develop in areas with impaired autoregulation.

References

Bypass to main MCA limb in Sylvian fissure


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Address reprint requests to: Fernando G. Diaz, M.D., Ph.D., Department of Neurosurgery, Henry Ford Hospital, 2799 West Grand Boulevard, Detroit, Michigan 48202.