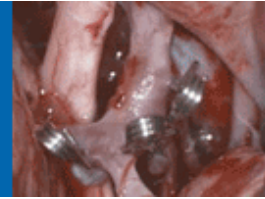


Cerebrovascular News

Published by the AANS/CNS Section on Cerebrovascular Surgery

Editor: Robert M. Friedlander, MD, MA

Fall 2002



Chairman's Message

By [Robert E. Harbaugh, MD, MA](#)

My Chairman's Message for the spring issue of this publication contained the following quote: "Perhaps the most pressing issue at present is the participation of vascular neurosurgeons in randomized trials of surgical versus endovascular treatment for patients with intracranial aneurysms. We need to be diligent in our review of the various trial proposals to assure that the trials will help us meet the objectives of the SCVS to promote and assure the advancement of knowledge in the area of cerebrovascular surgery."



Robert Harbaugh, MD

This issue has become even more important in light of recent developments in the International Subarachnoid Aneurysm Trial (ISAT). Patient accrual in this randomized trial of endovascular versus surgical treatment for patients with intracranial aneurysms has been stopped. Although no data have been published for review, the word on the street is that the trial was stopped because of significantly higher morbidity at one year in the surgical group. Expedited publication of the data is anticipated. Of course, a thorough review of the ISAT methodology and data will be needed. However, we also need to think critically about what kind of trial needs to be done to determine the best treatment for an individual patient harboring an intracranial aneurysm. I would like to devote the majority of this message to a discussion of this issue.

Let me clearly state my prejudice in this matter. I believe that any short duration trial that purports to show that endovascular or surgical treatment of intracranial aneurysm is "superior" is likely to be misleading and will cause more harm than good for aneurysm patients. What we really need to know is which treatment--endovascular, surgical or combined--most benefits a given patient for the duration of his life. To do this we will need to evaluate many patients for many years following treatment. Let us postulate that the procedure-related morbidity of microsurgical aneurysm treatment is higher than the procedure related morbidity of endovascular treatment. This may be related to a relatively small number of endovascular specialists who have great experience or to an inherently greater risk of open surgical procedures regardless of the specialist's experience. However, we don't really know the long-term efficacy of either aneurysm clipping or coiling for preventing subarachnoid hemorrhage (SAH). If clipping is considerably more efficacious, then it may be the preferred treatment even if the procedure-related morbidity is higher.

Achilles Papavasiliou, MD, James McInerney, MD, Darby Pope, MD, and I recently completed a formal decision analysis of the treatment of unruptured aneurysms (presented at the AANS meeting in Chicago). Our baseline case cohort consisted of patients, age 40, who were neurologically well and who harbored intracranial aneurysms amenable to either surgical or endovascular treatment. We assumed that the annual risk of rupture for aneurysms chosen for treatment was 1.46 percent. Surgical treatment had a procedure related morbidity and mortality of 11.1 percent and was 95 percent effective for preventing future SAH. Endovascular therapy had a procedure-related morbidity and mortality of 5.6 percent, and was 75 percent effective for preventing future hemorrhages. Actuarial risks were obtained from U.S. Health Statistics tables, a standard discount rate for later years of life was used and the

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utilities of outcomes categories were obtained using a standard gamble methodology on a risk averse, medically sophisticated group of physicians, nurses and medical students. Using the assumptions stated above, our decision analysis model indicated that for our 40 year-old patient cohort, the greatest number of quality adjusted life years would accrue to those patients treated microsurgically. The greater efficacy of surgery more than offset the higher surgical morbidity. However, the crossover point at which surgery became the preferred option did not occur until 10.5 years of follow-up. In other words, if the numbers in our model are correct, a randomized study of such patients would need a greater than 10-year follow-up on all patients to document the benefit of surgical treatment. A shorter study would have been misleading.

Let me clearly state that I am not sure whether or not the efficacy rates in this model are correct. Does surgery really reduce the annual risk of aneurysm rupture from 1.46 percent to 0.07 percent, and does coiling really reduce the annual risk of rupture from 1.46 percent to 0.4 percent? I don't know. The point is that no one knows if these numbers are correct or not. To find out we will need to do truly long-term studies. Based on our decision analysis modeling, a trial of endovascular versus surgical treatment for unruptured aneurysms would need to be carried out for approximately 20 years to show an unambiguous benefit for surgical treatment if clipping is 20 percent more efficacious than coiling at preventing SAH. Although this seems like an unreasonably long time, we must remember that our 40 year-old patients, 20 years from surgery, still have life expectancies of 15 years. We are trying to find an effective treatment for preventing SAH for decades, not months.

In conversations with some of my colleagues I have heard the statement that "The NIH will not fund studies for longer than three years, so it is necessary for us to do shorter studies." The appropriate response is, "If a short-term study is likely to yield misleading data, the honest investigator should have the intellectual integrity to refuse to participate, regardless of how much money and prestige a grant represents." Be assured that the SCVS will vigorously support a grant that adequately evaluates the relative risks and benefits of microsurgical and endovascular therapy for intracranial aneurysms. We will be equally vigorous in our opposition to studies that we think are likely to yield misleading data.

I also want to report on the financial status of the SCVS. In my first message I promised that the SCVS leadership would exert due diligence to assure that we are meeting our fiduciary responsibilities. I am happy to report that the budgets for fiscal year 2002 and 2003 look very good. Starting with this issue of *Cerebrovascular News*, we will no longer be printing and mailing a hard copy to the SCVS members. The newsletter will be published online and an e-mail announcement will be sent to all SCVS members to notify them of its availability. Those who want to print a hard copy from their computer can do so. This change will save the section about \$25,000 annually. I believe these funds can be used more wisely to benefit our members and the specialty of cerebrovascular surgery by contributing to the AANS/CNS Washington Committee, funding research awards and fellowships and sponsoring numerous other activities. Of course, it will be a loss that my words of wisdom and stunning photograph (autographed glossy available on request) will not appear in every neurosurgery office mailbox, but this is a loss I think we can deal with.

The section's 2002 annual meeting in Dallas was a great scientific and financial success. Congratulations to Robert Rosenwasser, MD, who chaired the meeting, and to Gregory Thompson, MD, the Scientific Program chair. We hope to duplicate this success with the 2003 meeting in Phoenix Feb. 16-19. Dr. Thompson is the Annual Meeting chair and Harold Pikus, MD, is the Scientific Program chair. They are planning a superb meeting with a variety of special courses, a stimulating and exciting scientific program and enjoyable social events. Don't miss this meeting!

Notes From the Editor

[By Robert M. Friedlander, MD, MA](#)

Beginning with the current issue of *Cerebrovascular News*, we will publish an "online" newsletter instead of a printed one. This change will result in substantial savings to the AANS/CNS Section on Cerebrovascular Surgery (SCVS) and will allow for reallocation

of newsletter funds to other educational and scholarly endeavors. As you will begin to appreciate with the current issue, an online-only publication will allow for more efficient linking and improved functionality. An e-mail notice will be sent to all AANS, CNS and SCVS members once the newsletter is ready and a link will be provided to access the newsletter. The target date of publication will continue to be three to four weeks prior to the AANS, CNS, and SCVS annual meetings.

Endovascular Corner Debuts

A new section titled "Endovascular Corner" has been incorporated into the current issue of *Cerebrovascular News*. This section aims to highlight new techniques or interesting neurointerventional approaches for the treatment of complex neurovascular cases. If you wish to contribute an article for this section, please forward it electronically to my attention at rfriedlander@rics.bwh.harvard.edu. The deadline for consideration for this section will be two months prior to the three annual meetings. [In the current issue, Kai Frerichs, MD, describes an interesting use of stents in a case of carotid transection.](#)

Readers Contribute to What Would You Do?

The "What Would You Do?" section continues to attract attention. Experts provide their opinions regarding the decision-making and rationale behind the management of complex cerebrovascular cases. Opinions are selected with the goal of broadly sampling the various levels of experience and practice biases. In this issue, Roberto Heros, MD, Murat Gunel, MD, and Ian Ross, MD, provide expert opinions regarding a therapeutic dilemma in a patient harboring an AVM with an associated feeding artery aneurysm.

Contributing your opinion to the new case is streamlined in the online version of the newsletter. The [interactive form](#) allows you to provide your thoughts in just minutes. Cases may be submitted for consideration as a "What Would You Do?" case up to two months prior to the three annual meetings.

Controversy in Clinical Trials:

Microsurgical Versus Endovascular Aneurysm Treatment

The design of clinical trials comparing open microsurgical and endovascular treatment of aneurysms remains a topic of utmost importance to our subspecialty. The crux of the matter is defining the appropriate final output of the studies as well as the pathology to be evaluated. Should the standard be one-year morbidity and mortality with little regard to long-term efficacy? Or should it be a long-term, combined output measure of morbidity and mortality as well as long-term efficacy? The answer at the surface appears to be rather straightforward. Surprisingly, trials are being conducted as well as others planned that propose as an endpoint morbidity and mortality at one year. Such design is outrageous and appears to lack critical insight and consideration. It is critical to combine our efforts as neurovascular surgeons to exert our influence for the proper performance of clinical trials for the treatment of aneurysms. SCVS Chairman Robert Harbaugh, MD, presents an eloquent and insightful discussion regarding these issues in his [Chairman's Message](#).

I again thank the [contributors](#) of the current and past issues of the *Cerebrovascular News*. I welcome your comments and contributions.

Secretary's Notes

[By Philip E. Stieg, PhD, MD](#)

The AANS/CNS Section on Cerebrovascular Surgery (SCVS) continues to grow in numbers, pursue its academic activities, and expand its relationship with other groups such as the American Society of Interventional and Therapeutic Neuroradiology (ASITN) and neuroscience critical care. Cerebrovascular fellowships have been coordinated under the Senior Society's auspices and will be overseen by the Committee on Accreditation of Subspecialty Training (CAST). The SCVS will be integrally involved in the evaluation of all fellowship applications. It is recommended that all fellowships must be 12 months in length. CAST will contact the section to identify individuals from its membership who will serve as evaluators of the fellowship applications. SCVS members will constitute two-thirds of the review panel. The

section's leadership strongly urges all programs that wish to have fellowships to seek accreditation through the Senior Society.

The SCVS also continues to expand its outreach. It will be nominating an individual for an appointment to the Stroke Council. In addition, discussion is ongoing between the SCVS and the ASITN regarding joint initiatives. An Executive Council between both groups has been organized, and the SCVS members involved include Robert E. Harbaugh, MD, Robert H. Rosenwasser, MD, H. Hunt Batjer, MD, Philip E. Stieg, MD, and Warren R. Selman, MD.

The section looks forward to the Drake Lecture, which will be given by M. Gasi Yasargil, MD, at the annual meeting of the Congress of Neurological Surgeons. There will also be a symposium on "knowing when not to operate." Most importantly, the CNS has changed the content of the cerebrovascular sessions so that there will not be overlap, and the membership will be able to attend all the SCVS activities.

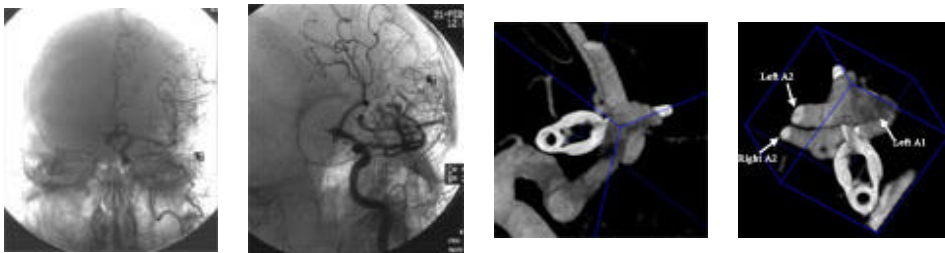
The joint SCVS and ASITN meeting will occur from Feb. 16 to Feb. 19, 2003. Directed by Gregory Thompson, MD, the meeting promises to be intellectually stimulating. There will be special courses covering critical care, endovascular approaches, acute stroke, and skull-based approaches. This meeting will also take place in conjunction with the Annual Stroke Meeting of the American Heart Association.

There continues to be considerable discussion about a study looking into clip versus coil. The SCVS is playing an active role in organizing the study, and we will certainly keep you informed of any further development.

What Would You Do?

A patient is referred to your office for a consultation. Seven months prior to this visit, the patient suffered a Hunt-Hess grade III subarachnoid hemorrhage (SAH) from a ruptured anterior communicating artery aneurysm. He was operated on at another institution and the procedure was described as uneventful. He was discharged on post-SAH day 12 to a rehabilitation facility for short stay. He has completely recovered and has returned to his previous occupation as an attorney (or college student).

A first post-operative angiogram was obtained six months after the presentation that revealed a residual versus new lesion left A1-A2 junction. Of note, the patient has a hypoplastic right A1. No other vascular abnormalities were noted. The preoperative angiogram is not available. The patient does not smoke, is not hypertensive and is otherwise in good health. What would you do?



Take a few moments to submit your response to this edition of What Would You Do? This case closes on November 15, 2002.

	20	40	60	80
1) No follow-up needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>				
2) Imaging at regular intervals:				
<hr/>				
Angiogram	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>				
MRI/MRA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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CTA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Treat now.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Treat only if it grows.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Clip.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Coil.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Describe your practice:				
<input type="radio"/> General Neurosurgeon				
<input type="radio"/> Primarily Vascular Neurosurgeon				
<input type="radio"/> Vascular Neurosurgeon and Interventional Neuroradiologist				
<input type="radio"/> Interventional Neuroradiologist				
<input type="radio"/> Other	<input type="text"/>			

What Would You Do? Results and Expert Opinions

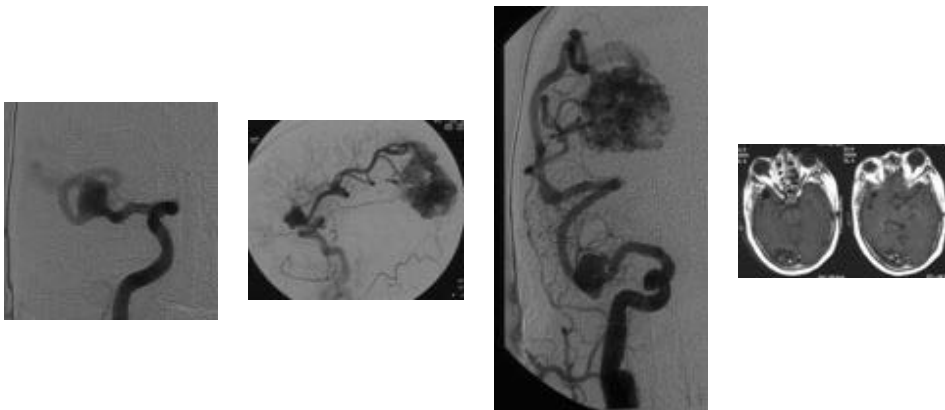
By [Malini Narayanan, MD, MS](#) and [Robert M. Friedlander, MD, MA](#)

Please note that the discussion of the results to this and all "What Would You Do" cases does not represent the opinion of the AANS/CNS Section on Cerebrovascular Surgery nor does it represent standard of care. No formal medical recommendation regarding any specific case can be provided by the below summary of opinions.

The Case

This case was presented in the Spring 2002 issue of *Cerebrovascular News*, available at http://www.neurosurgery.org/cv/newsletter/spring02_cv.pdf.

A patient is referred to see you after enrolling as a volunteer for a brain MRI. The study revealed an occipital AVM. An angiogram was obtained demonstrating a 3 cm right occipital AVM with a feeding multilobulated MCA aneurysmal dilatation. There is no evidence of venous outflow compromise or intranidal aneurysms. She has a long history of smoking and occasional headaches. She is otherwise healthy. What would you recommend?



Please describe the sequence of events that you would recommend to a patient at the age of 20, 40, 60 or 80 years old.

1. No follow-up needed.
2. Angiogram at set intervals.
3. MRI at set intervals.
4. Treat the aneurysm before treating the AVM.
 - a. Clip/wrap
 - b. Bypass
 - c. Coil embolize
5. Embolize the AVM.
(Assume that it is not completely embolized.)
6. Operate on the AVM.
7. Operate on the aneurysm at the same time as the AVM is treated.
8. Radiosurgery.
9. Delayed angiogram.

The Results

For patients 60 years old or younger, most responders chose to treat both the aneurysm and AVM (84 percent) in a three-stage procedure consisting of the following order: 1) clip/wrap aneurysm; 2) embolize AVM; and 3) operate on the AVM. Five percent chose to operate on the aneurysm at the same time as the AVM. Imaging (MRI/angiogram) in lieu of operative treatment was reserved for the 60 and 80 year-old age groups.

For treatment of the AVM, in the age groups of 20, 40, and 60 most responders (89 percent) chose to embolize prior to operative treatment except for two responders. Below the age of 40, five percent of responders chose radiosurgery; the percentage increased to 22 percent for the 60 year-old group.

For the 80 year-old group, most responders chose no follow-up (63 percent) followed by follow-up with an MRI (26 percent), operative management (five percent), and radiosurgery (five percent).

Expert Opinions

[Roberto C. Heros, MD](#); [Ian Ross, MD](#); and [Murat Gunel, MD](#), contributing

This patient is asymptomatic and has a large, relatively complex aneurysm of the right MCA, which is one of the main feeding vessels to a likewise asymptomatic small (3 to 3.5 cm) AVM of the occipital lobe. We are presented with four different age situations; 20, 40, 60 and 80.

We can begin by the 80 year-old patient's treatment, which I think is relatively straightforward. I would simply do nothing for that patient.

I also find it a bit simpler to deal with the 20 or the 40 year-old patient. At either of these ages, since the patient is healthy, I believe that both lesions should be treated. This is justified by the natural history. Even though the AVM has not bled, it does have a three percent to four percent chance of hemorrhage per year, which is the same that it would have if the AVM had bled at some point more than six months ago; therefore, except for the psychological impact on the patient (having had a hemorrhage, patients are more inclined to understand that they have something serious in the head that needs to be taken care of even at some risk), it makes little difference to know that the patient has not bled before.

The issue of the natural history of the aneurysm is a bit more complex because we know less about the natural history of an aneurysm on a feeding vessel to an AVM than we do about the natural history of other aneurysms. We do know that a few of these get smaller or even go away if the AVM is treated. However, we also know that some bleed and some do go on to enlarge and later rupture if the AVM is treated and the aneurysm is left alone. Therefore, my inclination is to treat this aneurysm the same way that I would treat another aneurysm of that size and in that location in a patient of that age regardless of the AVM.

I would treat the aneurysm first even though I would not plan to embolize any of the middle cerebral branches to the AVM and therefore, the issue of having to pass a catheter through that area is not an issue at all. However, I still worry about the possibility of the aneurysm bleeding after treating the AVM and therefore, I would take care of the aneurysm first. The aneurysm could be treated by endovascular means or by surgical means. If the aneurysm were elsewhere, particularly at the basilar tip, I would try endovascular therapy first. However, this is a very peripheral aneurysm in the middle cerebral with a relatively broad base. With proper exposure, we would have excellent surgical access to the aneurysm with control of the MCA trunk and its divisions. In addition, we would be able to look at the aneurysm and mobilize it from all different directions. I think we would have a better chance of clipping this aneurysm and preserving both exiting divisions with a direct surgical approach than with an endovascular approach, but of course, many of my endovascular and some of my microsurgical colleagues may disagree.

At some point after the patient recovers, I would treat the AVM. One could argue for radiosurgical treatment of the AVM, which certainly could be covered with a radiosurgical field. However, that would leave the patient at risk of hemorrhage during the time before obliteration, and I suspect that with an AVM of this size, the risk of obliteration would be at best 75 percent (some may argue 80 percent). Therefore, in the healthy 20 or the 40 year-old patient, I would opt for open surgical treatment preceded by embolization of the posterior cerebral feeding pedicles (probably one session would suffice) that I suspect feed the AVM, although the vertebral angio is not shown. The middle cerebral feeding pedicles would be accessible at the surface and there is not only no need to embolize these pedicles, but it would be meddlesome and subject the patient to the significant risk of embolization, which even in expert hands is not insignificant (about a five percent risk of serious problems in general for embolization of AVMs in expert hands is what I carry as a general impression from the literature). The presumed posterior cerebral feeders may reach the AVM from deep and may be difficult to access early during the surgical act without retracting the occipital lobe, which may be dangerous in view of arterialized veins that may be draining in that region. Obviously, if there are no posterior cerebral feeders (which I would find hard to believe), then I would approach the lesion without embolization at all. The lesion is superficial and the patient would have to be told that there is a significant risk of a partial field cut, but in my opinion, such partial field cuts are very well tolerated. The major risk would be a complete hemianopsia, which of course, is not so well tolerated, but I think the risk of this is relatively small.

The case of the 60 year-old patient is more difficult. Here the health and the general physiological status play a big role. Clearly, if this were a relatively "unhealthy" 60 year-old who would not be expected to live to become an octogenarian, I would do nothing and treat her expectantly as I would the 80 year-old for as long as she remained asymptomatic. If she were a healthy, physiologically fit 60 year-old, I would treat her with an "in-between" level of aggressiveness. I would treat the AVM with radiosurgery and hope that it goes away after two or three years and that with that, the aneurysm would preferably shrink, but at least stay the same size, in which case I would do nothing about the aneurysm. Clearly, that patient would have to be followed with serial imaging. If the aneurysm were to grow in follow-up, I would treat it. I would probably choose a relatively "conservative" attempt at endovascular therapy that would occlude most of the aneurysm, but leave enough base patent to make sure that there is no compromise of the divisions. I would be less concerned about leaving some residual neck after endovascular treatment in a 60 year-old than I would on a 20 or 40 year-old.

If in follow-up the AVM did not disappear after radiosurgery, I would do nothing at this age and would continue to follow him and hope that in some fashion, the radiation has conferred some degree of "protection" for which, of course, there is no support in the literature. Obviously, if he were to have a hemorrhage from either the aneurysm or the AVM, then the responsible lesion should be treated vigorously as indicated above for the 20 or 40 year-old.

I did not say anything about a bypass because my feeling is that one way or another, we would be able to clip this aneurysm. However, if at surgery in the 20 or 40 year-old person, I were to find that because of atherosclerosis or calcium at the base or because of the configuration of the outflow of the divisions, I could not clip it satisfactorily even with an aneurysmorrhaphy, then I would try to clip it in such a way

as to save at least one division and do a bypass to the other division (whether a long or a short vein graft or a side-to-side anastomosis of the distal divisions would be performed would depend on the local anatomy after complete exposure of the distal divisions in the distal sylvian fissures). Obviously, if the aneurysm cannot be clipped preserving either division, then I would do a high flow (vein) bypass to either an M2 or M3 branch and place a proximal clip on the MCA distal to the perforators, ensuring that there would be adequate communication between the division to which the bypass was done and the other division along the base of the aneurysm.

--[Roberto C. Heros, MD](#), Miami, Fla.

We are presented with a woman, a heavy smoker, who harbors a wide-necked right MCA bifurcation aneurysm upstream from an approximately 3 cm occipital AVM, both incidental. Her risk of cerebral hemorrhage is probably greater than the arithmetical sum of the risk associated with each one. There is little doubt in my mind that, in the 20 and 40 year-old, the AVM should be excised and, probably, the aneurysm treated. The 60 year-old presents a bit of a dilemma, and the decision-making should hinge largely upon her overall level of health and expected longevity. The 80 year-old, unless of a remarkable constitution, should, I think, be left alone.

The fact that this lady smokes is important. While there is no level-one evidence proving that cerebral aneurysms and subarachnoid hemorrhage are more prevalent in smokers, clinicians have noticed an association for years. This patient would probably lower her risk of aneurysmal growth and rupture, and possibly of AVM rupture, by simply quitting smoking.

If the patient stopped smoking, it is possible that removal of the AVM would be sufficient to protect her from future brain hemorrhage. The literature does not support the notion that proximal "flow related" aneurysms (i.e. ones well upstream from the AVM) will regress with removal of the AVM, but it is intuitive that there will be less hemodynamic stress on the aneurysm and that it will therefore be less likely to grow and bleed. This aneurysm appears to be less than 10 mm, but not by much. Given its location downstream from the Circle of Willis, however, a solitary aneurysm of this size is probably not high risk for bleeding.

For a 40 or 60 year-old, I might consider giving the patient the option of having the AVM removed and watching the aneurysm, provided she stopped smoking and the aneurysm is less than 10mm. If she refused to stop smoking, or the aneurysm is bigger than it looks on the images provided, I would probably treat the aneurysm surgically. This is not an aneurysm best treated with coils; its neck looks too wide for a safe treatment with current technology. I doubt that 3-D imaging would change my mind on this.

If the patient were 20 years old, I would suspect that she has thin-walled, constitutionally weak vessels. Either that, or she is particularly sensitive to the connective tissue weakening effects of tobacco smoke. Regardless, I would recommend surgically exploring the aneurysm before treating the AVM in this younger patient. I worry that I might find a very thin-walled aneurysm, with thin walled M2 branches. Hopefully the vessels would be reconstructable. I might consider wrapping them with gauze to reinforce the area for the long term, even if I were able to achieve a reasonable clip reconstruction.

The final question is: how should the AVM be treated? Before undertaking an assault on this malformation, it essential that the operator examine the vertebral and left carotid angiographic studies. This AVM almost certainly has contributions from the PCA, and also possibly from the ACA.

Although the AVM is close to or in eloquent visual cortex, I think that radiosurgery should only be offered if the patient refuses operation. This AVM looks surgically straightforward, and the morbidity of surgery should be less than that for radiosurgery. It is our policy to angiographically explore most AVMs preoperatively with a microcatheter and embolize them if it looks safe. The goal is not cure. Preoperative embolization, however, will often make AVMs easier, and safer, to resect. Sometimes the simple obliteration of a deep feeder can greatly facilitate surgery. One caveat here,

however, is the MCA aneurysm. Careful attention to the navigation of this area by the microcatheter will be essential to ensure that the aneurysm is not entered and ruptured by it. Even without preoperative embolization, I think that this AVM should not present too many difficulties for the experienced neurosurgeon.

--[Ian Ross, MD](#), Jackson, Miss.

We are presented with a female patient with incidental finding of a multilobulated right MCA aneurysm and a 3 cm occipital AVM. The aneurysm is located proximally on the feeding vessel at an otherwise typical location. Aneurysms associated with AVMs are well-recognized entities, complicating the management of these patients. Prior to making treatment decisions, we need to consider the natural history of these lesions. Among the two, the aneurysm rupture carries a significantly higher morbidity and mortality compared to AVM hemorrhage, and the risk of intracranial hemorrhage from either source is higher in female patients, especially smokers with smoking being an independent risk factor. In most patients who present with hemorrhage, the aneurysm is the usual source.

It is important to recognize the different types of aneurysms associated with AVMs, as this has implications on not only the natural history but also on treatment alternatives. Even though different classifications exist, aneurysms associated with AVMs can simply be divided into three types: intranidal, flow-related, or unrelated to the AVM nidus. Among these, intranidal AVMs appear to carry the highest risk, but they also respond to treatments aimed at AVMs such as embolization or radiosurgery. In the case that we are given, the aneurysm is located proximally on the feeding artery, at a typical MCA location. This has two consequences:

1. This aneurysm, unlike the aneurysms located close or within the nidus, is unlikely to get smaller following the treatment of AVM.
2. This aneurysm's natural history is more dangerous than the natural history of AVM with these pedicle aneurysms being frequently associated with hemorrhage.

Based on these reasons even though treating both lesions in a single operation is the best option, if this is not possible, the aneurysm treatment has to be the priority. This can be accomplished either by surgical or endovascular means. Based on the location and shape of this particular aneurysm (minus the availability of detailed views) my personal preference in this case would be open surgery for a patient 20, 40 or even 60 years old, pending an open discussion with the patient. Careful perioperative management during aneurysm surgery with particular emphasis on blood pressure control and fluid management is critical to avoid hemorrhage from the AVM.

Following the treatment of the aneurysm, the treatment options for the AVM include expectant management, or embolization followed by microsurgery (versus radiosurgery). This AVM appears to be at the high size limit of radiosurgery, and therefore would have less than ideal cure rate. For a 20, 40 or a healthy 60 year-old my suggestion would be embolization followed by surgery. For an 80 year-old, expectant management might represent the least risk.

--[Murat Gunel, MD](#), New Haven, Conn.

2002 AANS Meeting in Chicago

[By Murat Gunel, MD](#)

The 2002 Annual Meeting of the American Association of Neurological Surgeons was held in Chicago April 6-11. The meeting started with the practical clinics during the weekend. The first session related to cerebrovascular surgery was Cerebrovascular Disease 2002, directed by Ralph G. Dacey, Jr., MD, and Daniel L. Barrow, MD. This was followed by courses on Sunday, including Multidisciplinary Management of Cerebrovascular Critical Care (directors Perry A. Ball, MD, and Joshua B. Bederson, MD) and Technical Management of Intracranial Aneurysms (Arthur L. Day, MD, Steven L. Giannotta, MD, Robert A. Solomon, MD, and Dr. Dacey), focusing on specific sites

and complication management.

Monday morning started with breakfast seminars and throughout the meeting these outstanding seminars covered every aspect of cerebrovascular disease ranging from prevention and management of ischemic strokes to multidisciplinary management of aneurysms, AVMs, dAVMs, carotid disease along with the asymptomatic vascular lesions.

Controversial case discussions by experts in the field on Tuesday morning allowed participants to hear complementary, sometimes controversial treatment alternatives for difficult cerebrovascular cases. The seminar by Robert F. Spetzler, MD, How I Do It: Vascular Microsurgery, was an especially well-attended one. Neil A. Martin, MD, Christopher S. Ogilvy, MD, H. Hunt Batjer, MD, and Eric S. Nussbaum, MD, discussed the perioperative management of subarachnoid hemorrhage to improve the post-operative outcomes. Wednesday morning seminars included the familiar "coil versus clip" topic, with lively discussions along with one on the controversies in the management of intracerebral hematomas.

On Monday, following the presidential address, the first paper was given by Christian Raftopoulos, MD, PhD, from Belgium, who presented data suggesting that surgical clipping might give better results than coil embolization based on 84 unruptured aneurysms.

The first cerebrovascular scientific session was held on Tuesday afternoon and included three important papers on carotid disease. Hideaki Onda, MD, presented the results on genome wide linkage analysis of intracranial aneurysms, suggesting a locus on 7q11. These outstanding presentations were followed by Dr. Giannotta, who gave the Donaghy Lecture, Cerebrovascular Surgical Skills: Learning Them, Teaching Them. A special symposium was dedicated to the management controversies of unruptured aneurysms. While Dr. Batjer presented the surgical perspective, David G. Piepgras, MD, defended the conservative approach. Of note were the new results, soon to be published, from the prospective arm of the unruptured aneurysm trial which showed a much higher rate of rupture in 7-9 mm aneurysms than previously reported. Robert E. Harbaugh, MD, pointed out the importance of long-term follow-up in his discussion of management outcomes.

During the second cerebrovascular session on Wednesday morning, the emphasis was on aneurysms. Among the papers that were discussed, two of them discussed various treatment strategies for basilar tip aneurysms. The presentation by Bob S. Carter, MD, focused on distal aneurysms, and Patrick P. Han, MD, talked about the current indications of intracranial stents.

The meeting concluded on Thursday. Dr. Barrow moderated a breakfast seminar on the advanced techniques and complications in aneurysm clipping, whereas Yoko Kato, MD, directed one on posterior circulation aneurysms.

We look forward to seeing you at the CNS meeting in Philadelphia for other outstanding cerebrovascular sessions.

Preview of the 2002 CNS Annual Meeting in Philadelphia

By Robert M. Friedlander, MD, MA

The 52nd Annual Meeting of the Congress of Neurological Surgeons delivers an exciting and diverse cerebrovascular agenda. The meeting will take place at the Pennsylvania Convention Center Sept. 21-26, 2002. Appropriate with the location, the theme of the meeting will be "Discovery, Leadership, Freedom." A total of up to 28.5 continuing medical education hours may be earned in conjunction with the meeting.

On Sunday there will be three special courses with a cerebrovascular emphasis entitled Surgical and Endovascular Treatment of Aneurysms, Microvascular Reconstruction, and Critical Care for Neurovascular Disorders. These extremely well-organized didactic courses are highly recommended. Early registration is encouraged

in order to secure a space.

The morning session on Monday will include two plenary lectures with cerebrovascular relevance. L. Nick Hopkins, MD, and Robert F. Spetzler, MD, will deliver lectures entitled Discovery of a New Discipline: Endovascular Neurosurgery and Discovering the Novel Surgical Approach, respectively.

On Monday afternoon, the first focused cerebrovascular session will take place. The highlight of this session, as well as one of the highlights of the meeting, will be the Charles Drake Lecture, to be delivered by M. Gazi Yasargil, MD. His lecture is entitled Microsurgical Operations for the Treatment of Intracranial Aneurysms. An opportunity to ask questions of Dr. Yasargil will follow his lecture. The Galbraith Award will be presented in this session. This year's recipient is Richard E. Clatterbuck, MD, from the group of Rafael Tamargo, MD. The title of Dr. Clatterbuck's work is Controlled Release of the Nitric Oxide Donor DETA-NO Prevents Cerebral Vasospasm Following Experimental Subarachnoid Hemorrhage.

On Tuesday afternoon, the second focused cerebrovascular session will take place. An interesting combination of clinical and scientific presentations will be delivered.

On Wednesday morning, Emeritus Special Lecturer Bennett M. Stein, MD, will speak about The Neurosurgeon as the Renaissance Man in the Modern Era. In the same morning session, Cameron G. McDougall, MD, will deliver a lecture titled The Modern Neurovascular Team.

In the afternoon, the third and final focused cerebrovascular session will take place. The highlight of that session will be a symposium titled Patient Selection for Cerebrovascular Surgery: Aneurysms and Vascular Malformations (When Not to Operate). Dr. Spetzler and H. Hunt Batjer, MD, will present Cavernous Malformations: Brian Stem and Cavernous Malformations: Brain and Cerebellum, respectively. Arthur L. Day, MD, will present Cerebral Arteriovenous Malformations, and Duke S. Samson, MD, will present Cerebral Aneurysms. This interesting and most insightful session will be followed by open paper presentations.

In addition to all these events, throughout the three days of the meeting there will be a total of 11 luncheon seminars focusing on cerebrovascular disease.

We look forward to seeing you at this most interesting meeting.

Program updates, registration and additional information are available at <http://www.neurosurgery.org>.

Endovascular Corner

Case Illustration: The Use of Stents in a Traumatic Carotid Transection

By Kai U. Frerichs, MD

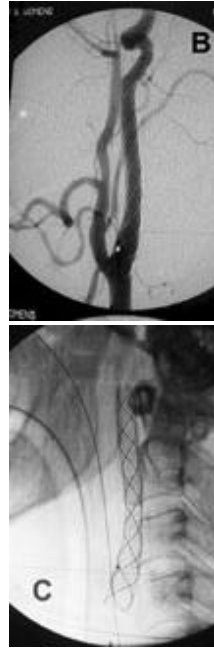
Carotid stenting for atherosclerotic disease involves the use of "open" stent designs. Covered stent grafts have been used for various indications in the coronary arteries and periphery (biliary duct, bronchi, etc.) and may be useful in select neurointerventional applications. We recently reported the case of a woman with a carotidocavernous fistula, which was cured by placement of a covered stent graft across the direct supply from the cavernous internal carotid artery.

This 40 year-old male was involved in a high-speed motor vehicle accident and sustained multiple facial, long-bone and pelvic fractures. An expanding neck hematoma was noted mostly on the right side. A computed tomography angiogram showed irregularities of both internal carotid arteries. An emergent carotid and cerebral arteriogram was performed. The right common carotid artery angiogram was consistent with a

Click image to view larger picture.



transection of the cervical internal carotid artery with preserved antegrade flow (Figure A, arrow, lateral projection). No active extravasation was seen at the time of the angiogram. In addition, a dissection of the left internal carotid artery at the cervical petrous junction was noted without significant luminal compromise. Initially, a self-expandable stent was placed on the right side that failed to repair the transection. A self-expandable covered stent graft (Wallgraft, Boston Scientific Inc.) was then placed within the previously placed stent with complete restoration of the normal appearance of the cervical internal carotid artery (Figure B). The unsubtracted view of the stent graft is shown in Figure C. The patient has since recovered from his systemic injuries and is neurologically intact.



This case illustrates the usefulness of covered stent grafts in the effective, yet minimally invasive treatment of traumatic carotid injuries such as transections or dissections with pseudoaneurysms.

Technology Report

Transcranial Doppler Ultrasound Detection of Cerebrovascular Reserve: A Technique for Assessing Stroke Risk in Asymptomatic Carotid Stenosis

By [E. Sander Connolly, Jr., MD](#)

The North American Symptomatic Carotid Endarterectomy Trial (NASCET) and Asymptomatic Carotid Stenosis (ACAS) Trial have clearly established the efficacy of carotid endarterectomy for stroke prevention in patients with symptomatic and asymptomatic high-grade carotid artery stenosis. Despite this fact, many practitioners remain critical of the small benefit surgery affords certain asymptomatic patients. For instance, the relative risk reduction for elderly asymptomatic women may be as low as 16 percent. Since the publication of the ACAS trial, several groups have examined the possibility of stratifying asymptomatic patients according to the risk of subsequently developing symptoms. Higher- and lower-risk categories would identify patients who are more likely to benefit from endarterectomy or medical management respectively. Transcranial Doppler (TCD) ultrasonography, with carbon dioxide or Diamox challenge was developed as an accessible, inexpensive way to determine the autoregulatory reserve capacity within the middle cerebral artery. While perhaps less accurate than positron emission tomography-oxygen extraction fraction (PET-OEF) or stable Xenon computed tomography (CT) (Pindzola RR et al *Stroke* 32:1811-7, 2001; <http://stroke.ahajournals.org>), several groups have recently shown this simple test to be very useful in identifying high-risk asymptomatic patients.

First writing in 1996, Gur and colleagues (*Stroke* 27:2188-90; <http://stroke.ahajournals.org>) followed 44 ACAS-eligible patients for two years. They demonstrated that no patient with normal TCD reactivity, before and after one gram of Diamox, proceeded to become symptomatic. By contrast, 7 percent of those with impaired reactivity suffered a stroke and 9 percent suffered either a transient ischemic attack (TIA) or stroke. The overall risk of the 44 selected patients was similar (2.3 percent per year) to rates seen in the original ACAS study. Subsequently, Silvestrini et al. (*JAMA* 283:2122-27, 2000; <http://jama.ama-assn.org>) followed 94 patients with asymptomatic stenosis for an average of 29 months. They demonstrated a three-fold increase in the combined risk of stroke and TIA among those with abnormal cerebrovascular reactivity as measured by TCD with breath-holding index (<0.69 n=40, 14 percent per year versus =0.69 n=54, four percent per year). More recently, Markus and Cullinane examined Doppler reactivity with 8 percent carbon dioxide inhalation (*Brain* 124:457-67, 2001; <http://brain.oupjournals.org>). Their study was performed with similar follow-up, and controlled for other risk factors (contralateral occlusion, ipsilateral radiographic infarction, and cardiovascular risk factors). They demonstrated that reactivity less than 20 percent was both strongly predictive of any stroke (p<0.00001), as well as ipsilateral stroke and TIA (p<0.015). Interestingly, the yearly stroke risk for patients with impaired reactivity was roughly the same regardless of the TCD method employed (8 percent carbon dioxide versus breath holding).

In contrast to patients with carotid occlusion, the mechanism of stroke in those with carotid stenosis is felt to be primarily embolic. This contention is supported by data derived from TCD high intensity transient signal (HITS) analysis in the middle cerebral artery. Asymptomatic embolization is shown to be an independent predictor of stroke in patients with symptomatic or asymptomatic carotid stenosis (*Stroke* 30:1440-3, 1999; <http://stroke.ahajournals.org>). Nevertheless, data from TCD reactivity studies suggests that exhausted reserve is an additional factor. Some have proposed that hypoperfusion leads to impaired clearance of emboli, but this theory has yet to be confirmed.

Future investigations will certainly need to focus on the combined predictive strength of HITS analysis and reactivity studies. In addition, the limitations posed by TCD reactivity testing (deficiency of regional specificity; 8 percent to 10 percent lack usable temporal window, etc.) must be compared with its relative benefits (less costly than PET-OEF, Xenon CT, single-photon computed tomography [SPECT], and magnetic resonance imaging [MRI] and lacks the radiation exposure associated with several of these).

Resident Research Award in Cerebrovascular Disease*

The AANS/CNS Section on Cerebrovascular Surgery congratulates Malini Narayanan, MD, Brigham and Women's Hospital, as the 2002 recipient of the Resident Research Award in Cerebrovascular Disease.

Award details include:

- Up to \$15,000 Support of Specific Research Proposal
- Residents in North American Training Programs
- Research Related to Cerebrovascular Disease

Application Deadline: March 1, 2003

For information and the online application, go to <http://www.neurosurgery.org/sections/grants/index.asp#residentcv> or contact:

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**Funded through the AANS/CNS Section on Cerebrovascular Surgery*

Cerebrovascular Funding Opportunities Are a Mouse-Click Away

A central resource for cerebrovascular funding sources sponsored by the American Academy of Neurological Surgeons Section on Cerebrovascular Disease is currently available online.

This Web site, continually updated with new funding possibilities, is under the direction of Robert Dempsey, MD, at the University of Wisconsin. Subscribers to the Web site receive automatic e-mail messages with links to access new opportunities or changes made to previously posted opportunities.

The address is <http://funding.neurosurg.wisc.edu>.

AANS/CNS Section on Cerebrovascular Surgery

Membership Recruitment

By Frank Culicchia, MD

The purpose of the AANS/CNS Section on Cerebrovascular Surgery (SCVS) is to advance education, research, and patient care in the area of cerebrovascular disease. Through its activities and educational programs, the SCVS strives to promote awareness among all neurosurgeons of opportunities for clinical practice and research in the area of cerebrovascular surgery to improve and advance patient care.

The section's leadership has established relationships with other specialties involved in the management of cerebrovascular disease to provide a broad focus in advancing cerebrovascular surgery. This is most evident at the annual meeting of the SCVS. Held in conjunction with the American Society of Interventional and Therapeutic Neuroradiology, the annual meeting focuses upon discussions, presentations, and practical courses of the most advanced methods of treatment, as well as those under development in the specialty of cerebrovascular surgery. Involvement of critical care, cerebrovascular anesthesiology and cerebrovascular neurology brings together an integrated team at our annual meeting, truly advancing education and stimulating research.

Membership allows for discounted registration to the annual meeting, an online newsletter, and e-mail updates on developments within the field of cerebrovascular surgery. The success and the strength of the AANS/CNS Section on Cerebrovascular Surgery to improve care to our patients lies within its membership. Browse the Web page www.neurosurgery.org/cv. Download, complete and return the application at www.neurosurgery.org/cv/cvapp.pdf (PDF 68KB) to become a member.

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Membership Chair	Frank Culicchia, MD
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Newsletter Mission Statement

The newsletter is distributed to all members of the AANS/CNS Section on Cerebrovascular Surgery. The purposes of the newsletter are to:

- Promote communication among section members.
- Promote communication among the section's Executive Council and the members.
- Promote coordinated activities and a common purpose within the section.
- Inform the membership of research, educational, and employment opportunities.
- Inform the membership of new technical developments in the treatment of cerebrovascular disease.
- Promote research, patient care, and educational activities of the section.

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Letters to the Editor

One of the main purposes of *Cerebrovascular News* is to promote communication among members of the AANS/CNS Section on Cerebrovascular Surgery. Your insights, questions, and comments increase the section's value for everyone. Please send your input to Robert M. Friedlander, MD, MA, editor, *Cerebrovascular News*, at rfriedlander@rics.bwh.harvard.edu.

Thank You, Sponsors

The AANS/CNS Section on Cerebrovascular Surgery and the American Society of Interventional and Therapeutic Neuroradiology wish to thank the following companies for their generous contributions to the section's 2002 Annual Meeting.

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