

# Cerebrovascular News

Published by the AANS/CNS Cerebrovascular Section

Editor: Murat Gunel, MD



Spring 2004

## From the Chair

[Warren R. Selman, MD](#)

### Don't Touch My Hat

*Conventional Wisdom Seems Compelling,  
but May Obscure Clear Vision*

"Well you can have my girl, but don't touch my hat."  
*Lyle Lovett*

As suggested in this homespun bit of wisdom by contemporary singer-songwriter Lyle Lovett, that which we value is always relative. It is, however, only natural to keep "them" from getting what is "ours." "Ownership" is a difficult issue with respect to patient management, and one that raises several questions. Can a group of physicians or a specialty truly own a technique? Does a technique belong to the pioneers of its development? Does it belong to those with access to the greatest number of patients? Rather than respond to these questions, the important questions to consider are who should be treated, who should render treatment, and which method is appropriate.

Consider the case of endoscopic surgery. Urologists were using the cystoscope to examine the bladder long before anyone contemplated using it to peer inside the deepest recesses of the brain. In fact, a urologist from Chicago, Victor Darwin Lespinasse, performed the first documented endoscopic neurosurgical procedure in 1910, using a rigid cystoscope to fulgurate the choroid plexus for treatment of hydrocephalus in two infants, one of whom died immediately.<sup>1</sup> Fortunately, Lespinasse abandoned neuroendoscopy for other scientific interests such as testicular transplantation for "rejuvenation," as he believed that "a man is only as old as his glands." That, however, is another story, and I will leave you to ponder how he convinced the donors to give of themselves.

*Skills to use an instrument or technique should not be the sole criterion for determining its optimal use in the treatment of diverse disorders.*

This brief glimpse into the past clearly demonstrates that possession of the skills to use an instrument or technique should not be the sole criterion for determining its optimal use in the treatment of diverse disorders. The same remains true for catheter expertise and cerebrovascular disease. Although there are those who believe that possession of catheter skills alone is a sufficient circumstance for treatment of any type of vessel



Warren R. Selman,  
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disorder in any organ, I would strongly urge that this logic not be applied to the treatment of cerebrovascular disorders. The interests of the patient are best served by having care delivered by individuals who obtain training from those with documented expertise in a recognized neuroscience program and who have an abiding interest in the blood vessels and the brain. In this respect, cerebrovascular neurosurgery, interventional neuroradiology, and neurology all have a natural alliance. We should continue to stand together in support of defining optimal training guidelines for developing expertise in the management of cerebrovascular disorders with endovascular techniques.

In 1999, the AANS, CNS, CV Section, and ASITN worked diligently to obtain the approval of the Accreditation Council for Graduate Medical Education for a new fellowship, Endovascular Surgical Neuroradiology. As noted in the recommendations outlined by Higashida and colleagues in their special report, a resident was to obtain hands-on experience by being involved in "at least 100 catheter-based diagnostic angiograms."<sup>2</sup> Few would challenge the idea that quality of training and the principles outlined in this document must be preserved. The adoption of these recommendations, which were developed after careful and thoughtful consideration for the purpose of ensuring quality, must not be rushed or circumvented. It is, however, important to note that the current ACGME fellowship guidelines do not include a requirement for the performance of a specific number of diagnostic angiograms prior to entering endovascular surgical neuroradiology training. It is clearly possible to adhere to the quality standards outlined in the special report, yet be more innovative in taking advantage of the advancements that have been made both in catheter-based technology and educational opportunities, in the end providing training for cerebrovascular neurosurgeons that is commensurate with the experience and goals of the trainee.

*Cerebrovascular neurosurgeons will carry on a proud tradition of innovation and excellence.*

I have had the good fortune to work with extremely gifted interventional neuroradiologists. Through many years of close cooperation we have learned to act as one unit. I firmly believe this is a good model of practice. But I also believe, with resolution just as firm, that the development of the modern day cerebrovascular chimera - the endovascular microneurosurgeon who is equally skilled and facile with both techniques - must be pursued with unwavering determination. It is my hope that the existence of this new breed of cerebrovascular neurosurgeons and our goal of developing additional means of training them is not viewed as a challenge or a threat to either microneurosurgeons or interventional neuroradiologists, but rather that the dichotomy between treatment practitioners will disappear and neurosurgical cerebrovascular specialists will be identified by the disease and the patient treated, not by the training path or technique employed.

I am honored to have had the opportunity to serve as chair of the Cerebrovascular Section. I am indebted to those who have helped me throughout this year, and wish to express my appreciation to my fellow officers and members of the Executive Council whose motivation, dedication, and hard work are responsible for the vibrancy of our section. I am proud to be associated with this organization, whose efforts will ensure that future generations of cerebrovascular neurosurgeons will carry on a proud tradition of innovation and excellence.

## References

1. Cohen AR, Perneczky A: Endoscopy and the management of third ventricular lesions, in Surgery of the Third Ventricle, ed. Apuzzo, MLJ: Baltimore: Williams and Wilkins, 1998, 889-936.

2. Higashida RT, Hopkins LN, Berenstein A, Halbach VV, Kerber C. Program requirements for residency/fellowship education in neuroendovascular surgery/interventional neuroradiology: a special report on graduate medical education. *AJNR Am J Neuroradiol.* 2000 Jun-Jul;21(6):1153-9. [PubMed](#)

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## Notes From the Editor

[By Murat Gunel, MD](#)

### Extending the Excellence: *Cerebrovascular News*

First and foremost, I would like to take this opportunity on behalf of the neurovascular surgery community to express gratitude to Robert Friedlander, MD, for all of his hard work as the editor of *Cerebrovascular News* for the past three years. As the associate editor for the past year, I shared some of the responsibility in the production of this newsletter, and it was quite clear to me how dedicated he was to this task. Through his hard work, this newsletter has significantly increased its impact. Second, I would like to thank Bob Harbaugh, MD, Warren Selman, MD, and Phil Stieg, MD, respectively the past, current and future chairs of the Cerebrovascular Section, for selecting me as the next editor.

As you know, hard-copy distribution of this newsletter has ceased, and it is now published exclusively online. Any feedback as to how its online readership can be improved would be appreciated.

Contributions from members, colleagues and readers are welcome. Our field is changing rapidly and there has never been a time presenting more of an imperative that we stay abreast of the latest techniques and technologies. Furthermore, the collaborative discussions of interesting dilemmas, challenges and controversies presented in these pages serve to enrich our profession, ultimately benefiting our patients.

Some areas for discussion in this newsletter forum are the announcement of ongoing clinical trials, early results and progress from these trials, and clinical alerts as soon as they are available. Please inform me of your participation and invitations in any or all of these areas, which certainly would be of much interest to many of our readers. Also, your thoughts or ideas about how to best present this colloquium in an accessible and organized fashion are welcome.

Furthermore, please send your interesting and challenging cases for the [What Would You Do](#) feature, e-mail your comments, and describe the topics and scope of articles you would like published in *Cerebrovascular News*. Your thoughts about meetings, seminars or other online publications that might be of use to you in your clinical and academic endeavors are invited as well.

We need to support and bolster our membership, so you are invited you to please read the [section](#) in this issue read the section in this issue written by Frank Culicchia, MD,

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membership chair of the Cerebrovascular Section. The participation and membership of our endovascular colleagues particularly is encouraged. The significance of the name change from the Section on Cerebrovascular Surgery to the Cerebrovascular Section is evidence of our section's commitment to the education and discussion of endovascular treatments.

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## What Would You Do?

Contributed by [Felipe Albuquerque, MD](#)

To contribute a case to the next issue, click [here](#).

A 56-year-old man presented with severe headache and sudden loss of consciousness. He was intubated in the emergency room where he was noted to flexion withdraw his upper extremities and extend his lower extremities. He demonstrated a dense upgaze palsy. Otherwise, the patient's medical history was unremarkable. Because of hydrocephalus detected on his admission computed tomography scan (Figure 1), an external ventricular drain was inserted. He remained unchanged neurologically except for a reduction in his upgaze palsy. Cerebral angiography in a posteroanterior (Figure 2) and lateral projection (Figure 3) demonstrate a wide-necked basilar apex aneurysm measuring approximately 2 cm. Consultation with both the cerebrovascular and endovascular services was obtained.

Fig. 1

Fig. 2

Fig. 3

Click image to view larger picture.

## What would you do?

Please take a few moments to submit your response to this edition of What Would You Do? This case closes on July 15.

Indicate which of the following treatment options you would choose for patients age 20, 40, 60 or 80.

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20    40    60    80

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**1. Surgical exploration and clip ligation without cardiac standstill.**

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**2. Surgical exploration and clip ligation with cardiac standstill.**

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**3. Endovascular exploration with coil embolization alone.**

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**4. Endovascular exploration with balloon-assisted coil embolization.**

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**5. Endovascular exploration with stent-assisted coil embolization.**

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## What Would You Do? Results and Expert Opinions

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 Cerebrovascular Section nor does it represent standard of care. No formal medical recommendation regarding any specific case can be provided by the below opinions.

### The Case

This case was presented in the Winter 2003 issue of *Cerebrovascular News*, available at <http://www.neurosurgery.org/sections/cv/newsletter/winter03/whatwouldyoudo.html>.

Case contributed by [Arun Amar, MD](#), and [Murat Gunel, MD](#)

The patient is a 40-year-old, right-handed male who presents with a several month history of progressive numbness and weakness in the right arm and leg. The onset of symptoms was gradual. There were no episodes of incontinence. In July 2003 he underwent magnetic resonance imaging of the spine, which revealed a solid, intramedullary lesion at the C3-4 level (Figure 1). The center of the mass was to the right of midline and appeared to occupy about half the dimensions of the normal cord (Figure 2). It demonstrated uniform enhancement with gadolinium. There was mild surrounding edema, as well as a small syrinx extending from the lower brainstem to the upper thoracic cord. However, there was no evidence of associated hemorrhage.

Click image to view larger picture



Fig. 1

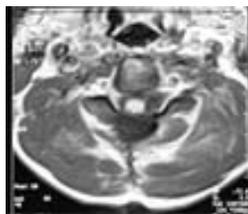


Fig. 2



Fig. 3

The patient reported smoking 15 packs of cigarettes per year; otherwise, his medical history and family history were negative for risk factors associated with tumors.

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Physical examination was significant for mild atrophy and weakness (4+/5) of the right upper extremity as well as mild weakness (5-/5) of the right lower extremity. His gait was mildly spastic. Hyperreflexia and clonus were present in both legs. Proprioception was nearly absent in the right arm.

The patient was admitted to a community-based hospital and underwent attempted resection via a C3-4 laminectomy. Numerous engorged, tortuous vessels consistent with arterialized veins were draped over the dorsal surface of the cord. A biopsy was taken, and the diagnosis of hemangioblastoma was made. However, due to the excessive vascularity, no excision was performed. Postoperatively, the patient remained at his neurological baseline. He subsequently underwent a limited catheter angiogram, which demonstrated the presence of a hypervascular mass in the cervical cord. Arteriovenous shunting was present, but there was no definite nidus of a vascular malformation. The feeding arteries appeared to arise from branches of the right and left vertebral arteries. However, their association with the anterior and posterior spinal arteries was not clear (Figure 3).

The patient was then referred to an academic medical center for further management. At the time, the possibility of Von Hippel-Lindau disease was considered. Several therapeutic options were contemplated, including repeat surgery, repeat angiography with possible embolization, and stereotactic radiosurgery

## **The Results**

### **Case Progression Described**

### **Expert Opinions**

[Donald W. Larsen, MD](#), [Jacques J. Morcos, MD](#) and [Charles J. Prestigiacomo, MD](#)

#### **Donald W. Larsen, MD**

In my experience, embolization is helpful when these tumors are relatively large with well-developed feeding arteries. However, I would consider offering subselective embolization of this lesion only if surgical resection were contemplated and subselective catheter positioning were feasible.

Performed for selected lesions, preoperative embolization can be a helpful adjunctive procedure. Anecdotally, in my experience when these tumors are large with extensive arteriovenous shunting, they are associated with significant venous hypertension. Interestingly, early improvement in symptoms can result from embolization alone (albeit transient) perhaps as a result of improvement in venous hypertension.

If preoperative embolization is desired, I would consider using a flow-guided microcatheter delivered over a soft microguidewire to select the dominant feeding branches. Extreme care should be taken to get as subselective as possible in order to avoid non-target embolization, especially in the anterior spinal artery. Prior to embolization, I would perform provocative testing with amytal and lidocaine. If these tests were negative, I would then consider polyvinyl alcohol (PVA) embolization with very dilute PVA particles approximately 250 microns in dimension. Extreme care also should be taken to avoid clumping of particles and resultant occlusion of the microcatheter. If a subselective catheter position cannot be obtained safely, then any possible risk reduction afforded by preoperative embolization will be negated and thus, should not be performed.

Finally, even if embolization is not performed, a detailed angiogram directed toward identifying all possible feeding arteries and draining veins may be helpful for surgical planning.

[Donald W. Larsen, MD](#)

### **Jacques J. Morcos, MD**

The case presented is that of a 40-year-old man with an intramedullary homogeneously enhancing tumor at C3-C4 that is associated with a rostral and caudal syrinx. In addition, it is prominently symptomatic with right-sided motor and dorsal columns dysfunction. The "limited" angiogram is said to show prominent supply from both vertebral arteries with arteriovenous shunting, although only the right vertebral injection is shown. The biopsy at a previous institution was read as a hemangioblastoma. The question is how to proceed.

Hemangioblastomas of the spinal cord are rare and can be either sporadic isolated lesions, or one of the manifestations of von Hippel-Lindau disease (VHL), an autosomal dominant condition characterized by hemangioblastomas of the cerebellum, spinal cord and retina, and renal cell carcinoma, as well as angiomas of the kidneys, adrenals and/or pancreas. The patient presented here must indeed be screened for VHL using a contrast magnetic resonance image of the brain and entire spine, a magnetic resonance image or computed tomography scan of the abdomen, as well as an ophthalmological consultation with a retinal specialist. If necessary, genetic analysis of the patient and his family may become necessary. The implications of the disease are of course multiple and go beyond the scope of the seemingly isolated lesion presented here.

In the presence of VHL in this particular patient, one must reconfirm the histology of the biopsied lesion. Is it truly a hemangioblastoma, or is it renal cell carcinoma? Both histologies are similar and often confused. Besides MIB-1 indexing, the staining for inhibin alpha subunit (inhibin A) expression (present in hemangioblastoma, but not in renal cell carcinoma) has been described as a discriminator. Furthermore, there exist even more rare instances of renal cell carcinoma metastatic in a hemangioblastoma (in the context of VHL).

Given the confirmation of a sporadic hemangioblastoma diagnosis, then surgical resection is the most appropriate treatment. Once spinal hemangioblastomas become symptomatic, and particularly when they become associated with a syrinx, they tend to progress in morphology and clinically worsen. True to form, this particular lesion is dorsal in the cord, which is by far more common than the ventral cord location. This has an implication for blood supply. Prior to surgical resection, a "complete" angiogram should be obtained, specifically including thyrocervical and costocervical trunk injections. Less likely sources in a high cervical lesion are the supreme intercostals off the aortic arch.

Preoperative embolization is very worthwhile in an effort to "tame" the lesion and render intraoperative dissection safer. Polyvinyl alcohol particles are ideal agents, given the planned resection a few days later, as opposed to alcohol or *N*-butyl cyanoacrylate. Embolization is, of course, superselective, and will clarify the involvement—or more likely lack of involvement—of medullary arteries. We perform these procedures at our institution under general anesthesia with intraprocedural monitoring of somatosensory and motor evoked potentials. Provocative testing of suspicious arterial pedicles can be achieved with superselective lidocaine injection, for confirmation of safety of embolization. If the microcatheter cannot be made to achieve enough specificity into a higher order vessel in its path towards the lesion, then that particular vessel should not be embolized.

Successful embolization is foreseen in this case, and microsurgical resection should follow within days through a reopening of the laminectomy approach with standard microsurgical techniques and intraoperative monitoring. Complete resection is expected and realistic, as reported in most clinical series, with good long-term outcomes.

The above recommendation stands for patients aged 20, 40 or 60. At age 80, it might be prudent to follow the lesion conservatively, or possibly consider the CyberKnife, a technology making early inroads in the frameless stereotactic treatment of spinal pathologies. The results of spinal stereotactic surgery are not yet well documented, and therefore the technique currently only can be considered a distant second alternative after microsurgical resection.

[Jacques J. Morcos, MD](#)

### **Charles J. Prestigiacomo, MD**

Arun Amar, MD, and Murat Gunel, MD, present quite an interesting case of a 40-year-old, right-handed gentleman with progressive hypesthesia and paresis of the right arm and leg. Imaging confirmed the presence of a solid, nonhemorrhagic, homogeneously enhancing, well-circumscribed intramedullary lesion eccentric to the right at the C3-C4 level with surrounding edema and syrinx. A two-level laminectomy performed at an outside institution demonstrated numerous engorged arterialized veins over the dorsal surface of the cord, and the biopsy later confirmed the diagnosis of hemangioblastoma. Limited angiographic imaging demonstrated a hypervascular mass with arteriovenous shunting and contribution from both vertebral arteries. The patient was transferred for further management and evaluated for von Hippel-Lindau disease (VHL).

Though hemangioblastomas are benign vascular lesions typically presenting in the posterior fossa or upper cervical cord, the treatment of these lesions in the setting of VHL can be controversial. Genetically linked to a tumor suppressor gene on chromosome 3, VHL disease presents as a conglomeration of multiple craniospinal hemangioblastomas, retinal angiomas, pancreatic cysts, renal cell carcinomas and adrenal tumors. Approximately 20 percent of patients presenting with craniospinal hemangioblastomas will actually have VHL disease.<sup>1</sup>

The mainstay for the treatment of these lesions has been surgical resection, with reported morbidity and mortality rates ranging from 7 percent to 10 percent.<sup>2</sup> Because of the need for multiple surgeries in the setting of VHL over the course of the patient's life, associated morbidity and mortality can rise significantly. Therefore there has been a recent assessment of alternative modes of therapy for the treatment of these lesions, especially in the setting of VHL as a means of decreasing treatment morbidity and mortality while maintaining acceptable quality of life for the patient.

Fractionated radiation and stereotactic radiosurgery has been shown in some series to provide good local control of multiple lesions with good clinical outcomes. Chang and colleagues reported that 15 of 23 tumors (65 percent) with greater than two-year follow-up regressed or disappeared radiographically.<sup>3</sup> Overall freedom from progression in their series was 97 percent. In this series, however, the number of patients treated for spinal hemangioblastomas was very small (two patients).

As presented, there is no clear evidence that this patient has VHL. The patient is reported to have a single, symptomatic lesion in a location that is "typical" for sporadic hemangioblastomas. Consequently, the use of radiosurgery or fractionated radiation would not be the treatment of choice at this stage, even in the setting of VHL.

Angiography (though limited to a single view) does clearly demonstrate at least one significant feeder (possibly a later spinal artery given its point of origin and its course) contributing to this hypervascular lesion. Because of these angiographic findings, a complete spinal angiogram to properly evaluate the feeders contributing to this lesion should be performed. This angiogram should include catheterization of both vertebral, thyrocervical (ascending cervical branch) and dorsocervical arteries, so as to effectively assess for possible anastomotic feeders. In addition, identifying the anterior spinal artery and assessing its transit time is important in determining the angioarchitecture of the lesion and the surrounding normal spinal cord.

Preoperative embolization for spinal hemangioblastomas has been performed in selected cases with variable results.<sup>4,5,6</sup> Though it anecdotally is a good adjunct for the surgical resection of these lesions by substantially reducing blood loss and allowing for better visualization of the spinal cord/tumor interface, it rarely achieves 100 percent devascularization of the lesion.<sup>5</sup> Because at least one large pedicle is noted on Figure 3, particle embolization could be performed with 150-250 micron polyvinyl alcohol particles. Electrophysiological monitoring with or without provocative testing should be performed if there is any concern that possible feeding branches to normal spinal cord parenchyma originate from the large feeding pedicle.

### Recommendation

Preoperative particle embolization with or without electrophysiologic monitoring followed by surgical resection of this single symptomatic spinal hemangioblastoma.

[Charles J. Prestigiacomo, MD](#)

### References

1. Neumann HP, Lips CJ, Hsia YE, Zbar B. Von Hippel-Lindau syndrome. *Brain Pathol.* 1995 Apr;5(2):181-93. Review. [PubMed: 7670659](#)
2. Lonser RR, Weil RJ, Wanebo JE, DeVroom HL, Oldfield EH. Surgical management of spinal cord hemangioblastomas in patients with von Hippel-Lindau disease. *J Neurosurg.* 2003 Jan;98(1):106-16. [PubMed: 12546358](#)
3. Chang SD, Meisel JA, Hancock SL, Martin DP, McManus M, Adler JR Treatment of hemangioblastomas in von Hippel-Lindau disease with linear accelerator-based radiosurgery. *Neurosurgery.* 1998 Jul;43(1):28-34; discussion 34-5. [PubMed: 9657185](#)
4. Standard SC, Ahuja A, Livingston K, Guterman LR, Hopkins LN. Endovascular embolization and surgical excision for the treatment of cerebellar and brain stem hemangioblastomas. *Surg Neurol.* 1994 May;41(5):405-10. [PubMed: 8009416](#)
5. Takeuchi S, Tanaka R, Fujii Y, Abe H, Ito Y. Surgical treatment of hemangioblastomas with presurgical endovascular embolization. *Neurol Med Chir (Tokyo).* 2001 May;41(5):246-51; discussion 251-2. [PubMed: 11396304](#)
6. Tampieri D, Leblanc R, TerBrugge K. Preoperative embolization of brain and spinal hemangioblastomas. *Neurosurgery.* 1993 Sep;33(3):502-5; discussion 505. [PubMed: 8413884](#)

### Case Progression Described

After discussion with the patient, including the risks of spinal embolization, it was decided to attempt a resection based on the angiogram and magnetic resonance imaging findings, without an initial attempt at embolization.

The patient was taken to the operating room and intraoperative electrophysiological monitoring was employed, as well as the Solumedrol spinal cord protocol. Upon opening the dura, the lesion was readily identifiable, surrounded by large tortuous arterialized vessels. Exploration of the superior plane of the lesion yielded access to the deep arterial feeder, and a temporary aneurysm clip was placed across it. No significant change was noted in the large arterialized veins surrounding the lesion. A second feeder, coming from the right side and more superficial, was then temporarily obliterated. Although the flow was decreased, it was felt that another deep feeder was irrigating the vascular complex and tumor, raising the risk of brisk arterial bleeding if further resection were attempted. The wound was closed without incident, and the patient experienced no postoperative sequelae.

After further discussion with the patient, explaining that the risk-benefit ratio now favored spinal embolization, on the third postoperative day the patient underwent a spinal angiogram with embolization of a deep ascending cervical feeder. The descending and right-sided feeders were left intact, since it was felt that these vessels could be easily obliterated during surgery. The patient tolerated the embolization without incident.

Three days after embolization, the patient was taken to the operating room for definitive resection. The placement of temporary aneurysm clips across the two previous arterial feeders obliterated the arterialization of the surrounding vessels. The tumor was resected with minimal bleeding. Even at maximal microscopic magnification, visualization was not impaired. Postoperatively the patient's exam remained unchanged, and he was discharged on postoperative day five.

**John Strugar, MD, and Arun Amar, MD**

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## CV Highlights at the 2004 AANS Annual Meeting

[By Frank Culicchia, MD](#)

Membership Chair

*CV Section Explores the Changing Face of Cerebrovascular Surgery*

The AANS/CNS Cerebrovascular Section meeting will be held on the afternoon of May 4 during the 2004 AANS Annual Meeting in Orlando. The theme is timely to those currently practicing, and those considering subspecializing in the field of neurovascular surgery:

"The Changing Face of Cerebrovascular Surgery: Present and Future as a Neurovascular Surgeon." Daniel Barrow, MD, and Roberto Heros, MD, both preeminent leaders in the field, will explore this issue, presenting their very thoughtful, introspective viewpoints. With the emergence of endovascular techniques, there are many who feel that the end of neurovascular surgery is in sight. Following this presentation, all will have a proficient understanding of the issues facing those in neurovascular surgery.

Robert Grubb, MD, will be honored as the Donaghy lecturer, recognizing his many years of vital contributions, enthusiasm, and dedication to the neurovascular specialty. His topic "Cerebral Hemodynamics and Stroke Risk in Patients with Atherosclerotic Occlusive Disease" promises to update attendees on the cutting-edge diagnostic and treatment options in management and prevention of stroke.

The Scientific Session will feature 10 abstracts chosen from over 200 submitted to the Cerebrovascular Section for review. Following each abstract presented, a moderator has been assigned for a two-minute question and comment period. This format promises to generate interest and attention; as well as address potential controversial topics the abstract may engender. The afternoon promises to be exciting, informative, and thought provoking for all those attending.

An up-to-date listing of programs is available at [http://www.aans.org/annual/2004/Final\\_Program\\_p54-55.pdf](http://www.aans.org/annual/2004/Final_Program_p54-55.pdf)

Complete meeting information can be found at <http://www.aans.org/annual/2004>.

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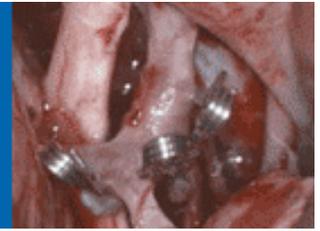
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## Technology Report

Ricardo J. Komotar, MD  
[E. Sander Connolly Jr., MD](#)

### SMART Stents Look Promising in the Treatment of Cerebrovascular Disease

The emerging technology and expertise of endovascular therapy is expanding the treatment options for carotid artery stenosis and intracranial atherosclerosis. Angioplasty is commonly used to reduce vessel stenosis and revascularize ischemic tissue. Restenosis frequently occurs, however, necessitating the deployment of intra-arterial stents to maintain vessel patency. Unfortunately, not all cerebrovascular disease is amenable to endovascular therapy. Stent applicability is dictated by lesion characteristics and represents one of the major limitations of this strategy. These characteristics are becoming better defined as more sophisticated technology develops, thereby expanding the repertoire of endovascular neurosurgeons.

One of the more recent advancements in stent technology has been the development of shape memory alloy recoverable technology (SMART) stents. The SMART stent is composed of Nitinol, a nickel-titanium metallic alloy. This material possesses shape memory, referring to its ability to assume a predetermined shape once reaching a preset critical temperature and undergoing a phase transformation. The atomic arrangement changes from a Martensite phase, in which the material is very malleable, to an Austenite phase, in which the material exhibits a high degree of strength and superelasticity.<sup>1,2</sup> In this phase, Nitinol possesses a high degree of flexibility, kink, and fatigue resistance. SMART stents are preset to conform between 26 degrees Celsius and 32 degrees Celsius. Once released within the vascular system, these stents equilibrate with body temperature and instantaneously assume their memorized shape.

SMART stents possess segmented-hoop geometry with very short individual segments (Figure 1). This segmented geometrical design allows for fairly independent action by individual stent hoops. SMART stents derive many of their behavioral characteristics from these unique elastic properties, and are able to adapt to native vessel contours more successfully than their predecessors. Images from the Dotter Interventional Institute at the Oregon Health Sciences University illustrate this quality of conformability (Figure 2). In contrast, conventional stents may cause arterial deformity at proximal and distal ends, a phenomenon that potentially perturbs the normal carotid contour. SMART stents also have the advantage of crush recoverability. If transiently compressed by an external force, the stents immediately resume their expanded shape. This is particularly advantageous in superficial arteries, such as the carotid, in which significant crush rates associated with balloon-expandable stents previously have been reported. Of note, one of the limitations of SMART stents is that once deployment has been initiated, it cannot

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be halted.

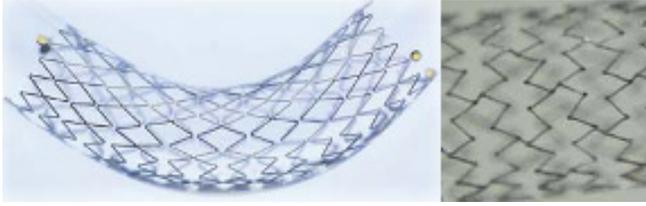


Figure 1 SMART stents with segmented-hoop geometry

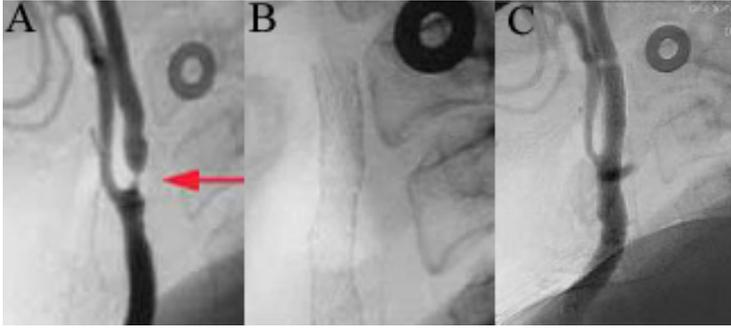


Figure 2A Symptomatic focal, high-grade cervical carotid stenosis, recurrent post-carotid endarterectomy

Figure 2B After stent placement and its dilatation to 6 mm diameter

Figure 2C Follow-up angiogram of the self-expanding, nitinol 0.018 SMART stent.

In conclusion, SMART stents represent a significant technological advancement in endovascular neurosurgery. By addressing what is presently one of the major limitations for minimally invasive treatment of cerebrovascular disease, these devices broaden the spectrum of lesions amenable to neurointerventional therapy.

## References

1. Duerig TW, Pelton AR, Stockel D. The utility of superelasticity in medicine. *Biomed Mater Eng.* 1996;6(4):255-66. Review. [PubMed: 8980834](#)
2. Gotman I. Characteristics of metals used in implants. *J Endourol.* 1997 Dec;11(6):383-9. Review. [PubMed: 9440845](#)

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## AANS/CNS Cerebrovascular Section Membership Recruitment

[By Frank Culicchia, MD](#)

Membership Chair

### Section's Strength to Improve Patient Care Lies Within Membership

The purpose of the AANS/CNS Cerebrovascular Section is to advance education, research, and patient care in the area of cerebrovascular disease. Through its activities and educational programs, the Cerebrovascular Section 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 cerebrovascular disease to provide a broad focus in advancing cerebrovascular surgery. This is most evident at the annual meeting of the Cerebrovascular Section. 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 neurovascular surgery. Involvement of the critical care, cerebrovascular anesthesiologists, 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, a newsletter published three times per year, and e-mail updates on developments within the field of cerebrovascular surgery. The strength of the AANS/CNS Cerebrovascular Section to improve care to our patients lies within our membership. Please take some time to browse the Cerebrovascular Section Web page, [www.neurosurgery.org/cv](http://www.neurosurgery.org/cv). An [application for membership can be downloaded](#) for your convenience. If you need any assistance in identifying members for letters of recommendation, please contact me. I look forward to hearing from you soon!

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## Leadership

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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 Murat Gunel, MD, editor, *Cerebrovascular News*, at [murat.gunel@yale.edu](mailto:murat.gunel@yale.edu).

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## Would you like to submit a case for "What Would You Do?"

To submit a case for possible inclusion in an upcoming issue of *Cerebrovascular News*, please provide the following information.

1. An electronic version of the case.
2. Two to four images to be displayed, with appropriate legends.
3. The age of the patient, which will be added to age groups of 20, 40, 60 and 80 for the purpose of evaluating the effect of patient age on the recommended therapeutic options.
4. Therapeutic options to be considered.
5. (Optional) One or two questions pertinent to the case.

E-mail your case to:

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