Clinical Neuroscience NEWS

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Multi-Modality Treatment of Basilar Apex Aneurysms

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Chairman, Department of Neurosurgery Director, Cushing Neuroscience Institutes

his issue of the Clinical Neuroscience Newsletter will focus on the treatment strategies for what has always been regarded as one of the most difficult vascular lesions to treat – the basilar artery apex aneurysm. Drs. Chalif, Setton, and Langer have compiled four recent cases that illustrate the open



microsurgical and the endovascular treatment of these challenging lesions. The Brain Aneurysm Center at North Shore University Hospital continues to demonstrate remarkable growth and serves as a model of collaborative multidisciplinary management. With our outstanding Neuro ICU, North Shore University Hospital is ideally set up to treat the entire spectrum of neurovascular disorders including aneurysms, AVMs, dural fistulas, carotid disease, and stroke. I hope that you will find these beautifully presented cases both fascinating and educational. Future issues of our newsletter will cover the wide array of clinical services offered by our growing department.



David J. Chalif, MD Chief, Neurovascular Neurosurgery



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David J. Langer, MD Chief, Cerebrovascular Research Our growing neurovascular team at North Shore University Hospital has the ability to treat and manage every aspect of neurovascular pathology, ranging from standard anterior circulation aneurysmal subarachnoid hemorrhage to complex basilar artery aneurysms, AVMs, carotid disease, and stroke.

We pride ourselves on our 24/7, multi-modality clinical team approach, inclusive of our 16-bed neurosurgical ICU and our recent recruits: Dr. David Langer, neurosurgeon, and Dr. Rishi Malhotra, neurointensivist. In addition, an important member of our team includes Dr. David LeDoux, Director of Neurocritical Care.

New equipment acquisitions include a new Leica microscope with fluorescent angiographic capability to complement our three Zeiss microscopes and quantitative intra-operative cerebral blood flow probe technology.

We have begun to initiate programmatic clinical research projects in MR flow measurements in patients with asymptomatic carotid disease, as well as the development of nonocclusive laser bypass techniques in large vessel brain bypass, ELANA (Excimer Laser Assisted Neurovascular Anastomosis). Further advancing our commitment to cerebrovascular science, the Cushing Neuroscience Institutes will now become the national training center for the recently FDAapproved ELANA bypass technique for the treatment of complex vascular lesions.

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In this issue we highlight our approach to a formidable vascular pathology—the basilar artery apex aneurysm. Microsurgical treatment of subarachnoid hemorrhage (SAH) from rupture of basilar artery aneurysms is associated with a high morbidity and mortality, based on the proximity of the aneurysmal fundus to critical perforators arising from the basilar artery apex and the proximal P1 segments.

Endovascular techniques, inclusive of the combination of intra-arterial stents and platinum and coated coils, have revolutionized the treatment of these aneurysms and have significantly reduced peri-operative morbidity and mortality.

A significant percentage of ruptured aneurysms are now treated using endovascular methods, and nowhere in the cerebral circulation is this more evident than in the posterior circulation and at the basilar apex in particular. We believe in a treatment strategy of ruptured basilar apex aneurysms based upon a "coil first" paradigm, treating only those ruptured aneurysms with open surgery that cannot be treated safely utilizing minimally invasive interventional catheter-based techniques.

Despite the dominance of interventional options in the basilar location, inclusive of the combined use of endovascular stents and coils, selected lesions, categorized primarily by very small aneurysm size, remain best treated by microsurgical clipping. Craniotomy for these lesions is frequently augmented by adjunctive skull-base approaches. Aneurysms less than 4 mm in size maintain increasing risks to the neuro-interventionalist, yet can often be secured safely by open surgery.

In this newsletter we present four recent cases of basilar artery aneurysms successfully treated with both endovascular and open microsurgical techniques. Our coordinated team at the Brain Aneurysm Center at North Shore University Hospital reviews all aneurysm cases, and appropriate treatment modalities are selected. The coordinated efforts of our open microsurgical and our endovascular teams have yielded excellent clinical outcomes in patients with lesions at the basilar artery apex.





Case Presentations

Case 1: 55-year-old male with grade 1 SAH, positive family history, neurologically intact post-operatively.



Figure 1.1 Pre-operative angiography.



Figure 1.4 Final clipping.



Figure 1.2 Initial exposure through right craniotomy.



Figure 1.5 Post-operative angiogram, non-subtracted image.



Figure 1.3 Enlarged exposure after drilling of posterior clinoid.



Figure 1.6 Post-operative angiogram confirming complete microsurgical clipping.

Case 2: 42-year-old female with grade 3 SAH, status post-coiling, requiring VP shunt, neurologically intact post-treatment.



Figure 2.1 Vertebral angiography demonstrating a ruptured basilar apex aneurysm (arrow).



Figure 2.2 Complete obliteration of the aneurysm (arrow) is achieved after endovascular coiling.

Case 3: 58-year-old male with wide-necked unruptured basilar artery apex aneurysm treated with stent-assisted coiling, neurologically intact post-treatment.



Figure 3.1 3D reconstruction angiography demonstrates a wide-necked basilar apex aneurysm (arrow).



Figure 3.2 Complete obliteration of the aneurysm is achieved with stent-assisted coiling (arrow A). A previous coil mass for an anterior circulation aneurysm is also seen (arrow B).

Case 4: 50-year-old male with grade 1 SAH, requiring VP shunt, neurologically intact post-operatively.



Figure 4.1 Reconstructed initial 3D angiogram.



Figure 4.2 Initial exposure prior to opening Liliequist's membrane.



Figure 4.3 Liliequist's membrane is opened, perforators are dissected, and the aneurysm is visualized (arrow).



Figure 4.4 As the ICA is retracted, the aneurysm is clipped with a straight titanium clip.

2010 Neurovascular Statistics from the Brain Aneurysm Center at North Shore University Hospital



SAVE THIS DATE!

Saturday, October 1st, 2011. Long Island's 3rd Annual Brain Aneurysm Awareness Walk at Jones Beach State Park, Field 5. For <u>Registration Information call Nicole Salant, RN, at (516) 562-3815.</u>

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