Basilar Artery Dissection

Q & A

Q: How did quantitative vessel flow measurements contribute to the diagnosis and subsequent treatment plan?

A: The patient was able to avoid an angioplasty once the NOVA study demonstraed that there was adequate posterior circulation flow.

Q: Could this assessment have been made with other technologies?

A: Large vessel flow rates and flow distribution for the Circle of Willis would not be available from any other diagnostic testing.

Patient History

≫ A 41 year old woman presented with an intracranial bleed and was found to have a dissection of the basilar artery. She was put on Coumadin and closely monitored for several weeks.

≫ A follow up angiogram showed a 70% stenosis in the mid basilar artery. Based on these findings, she is being considered for angioplasty.

≫ Although she has had two previous posterior circulation strokes, she is currently asymptomatic and alert. She relies on a wheelchair to walk more than a short distance.

Treatment Options

≫ Wait and see. Continue with conservative management.

≫ **Angioplasty. This was felt to be a high risk option because the patient lacks posterior communicating arteries. A complication that occluded the top 1/3 of the basilar would likely be fatal.**

Her neurologist requested a NOVA study before a decision was made to intervene. As it is not yet available at his hospital the patient flew to Chicago to have her NOVA study performed at the University of Illinois Medical Center.

NOVA Report

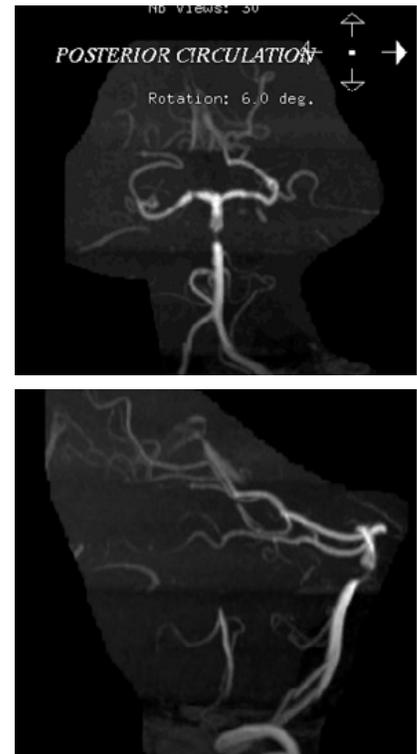The results of the NOVA study are summarized on the Vessel Map and Baseline Table (Figures 3 and 4).

Figure 1: Sequential TOF Maxium Intensity images showing posterior circulation with basilar stenosis; posterior (top) and lateral (bottom) views.
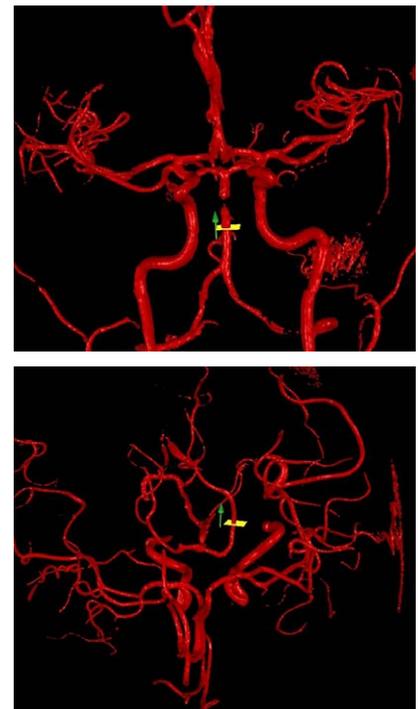

Figure 2: NOVA 3D Model of the Circle of Willis. Yellow plane shows perpendicular slice for flow measurement in the Basilar Artery (top) and Left Posterior Cerebral Artery (bottom).
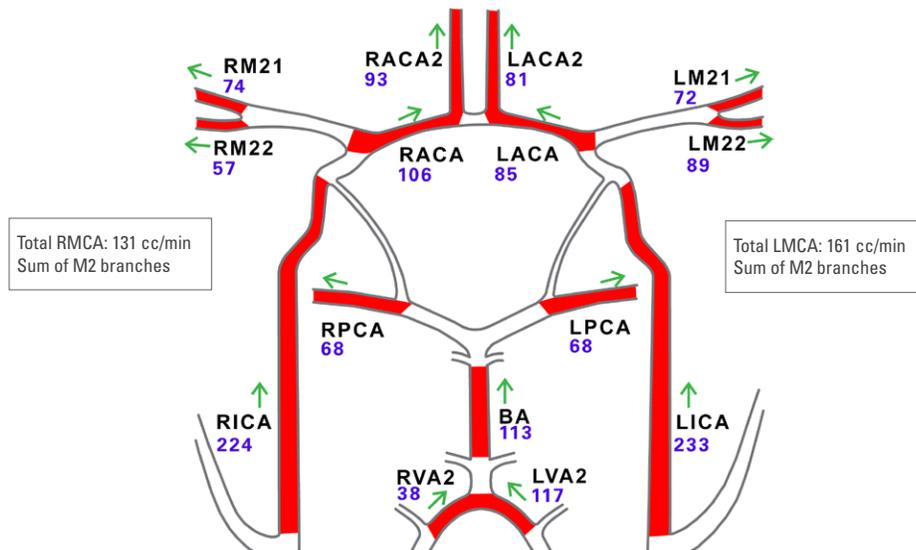
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NOVA™

Figure 3: NOVA Vessel Map. A schematic of the blood vessels showing individual vessel flow rates in milliliters per minute and arrows indicating direction of flow.

VESSEL	FLOW(mL/min)	AGE 18-40*	AGE 41-60*	AGE>=61*
LICA	233	169-379	**135-365**	110-352
RICA	224	147-377	**120-362**	92-344
BA	113	101-231	**76-224**	77-181
LACA	85	-	-	-
RACA	106	-	-	-
TACA	191	98-274	**95-247**	83-229
LPCA	68	35-113	**40-98**	34-88
RPCA	68	34-108	**34-94**	31-85
LACA2	81	41-119	**25-109**	25-111
RACA2	93	41-113	**33-103**	31-101

Figure 4: NOVA Baseline Table. Patient's flow rates and age adjusted normal ranges.
Data presented at the 2008 International Stroke Conference, New Orleans, LA

Findings

» The flows in her basilar and posterior cerebral arteries are well within the compensated range.

» Posterior circulation flows are low risk according to the Hanjani algorithm.

Reference: Amin-Hanjani, S., Du X., Zhao M., Walsh K., Malisch, T., and Charbel FT.
"Use of Quantitative Magnetic Resonance Angiography to Stratify Stroke Risk in Symptomatic Vertebobasilar Disease," Stroke 2005;36:1140-1145

Conclusions

NOVA provided important information on the patient's hemodynamic status that helped guide her management. Since NOVA showed that posterior circulation flows were adequate, after consultation with her neurologist, **the patient elected not to have the angioplasty.**