THE INTERNET STROKE CENTER

PRESENTATIONS AND DISCUSSIONS ON STROKE MANAGEMENT

Emerging Therapies:

Intra-arterial Thrombolysis, Angioplasty, and Stenting

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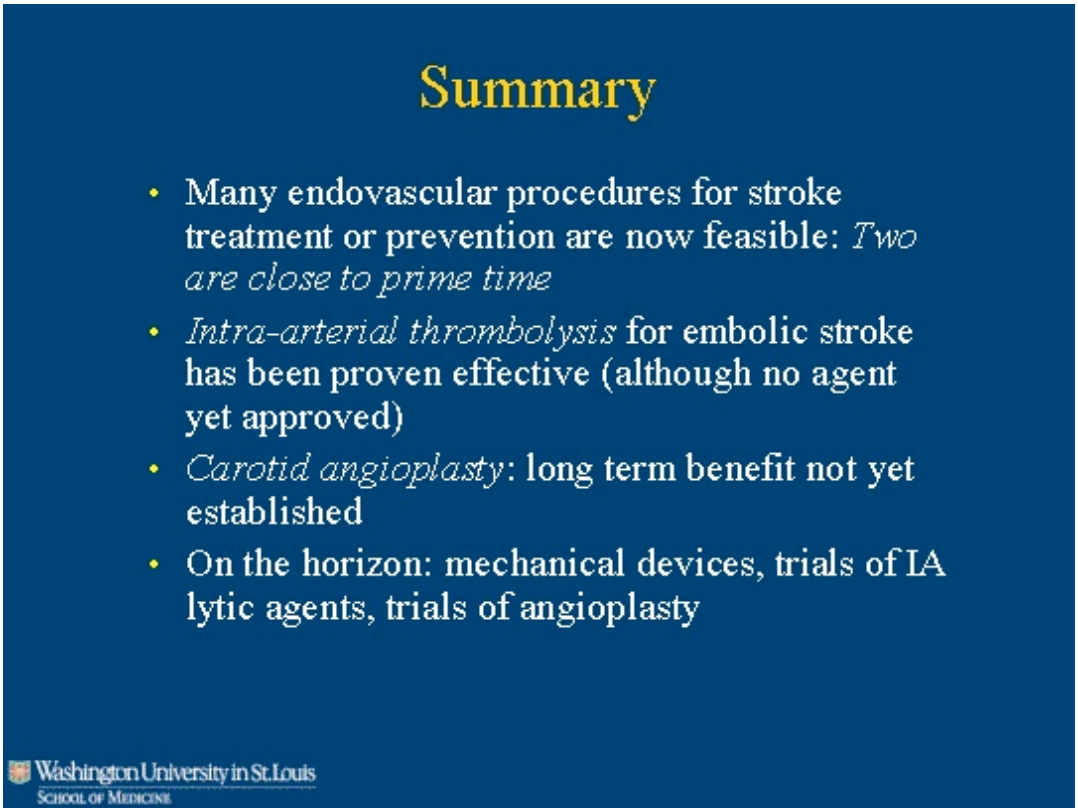
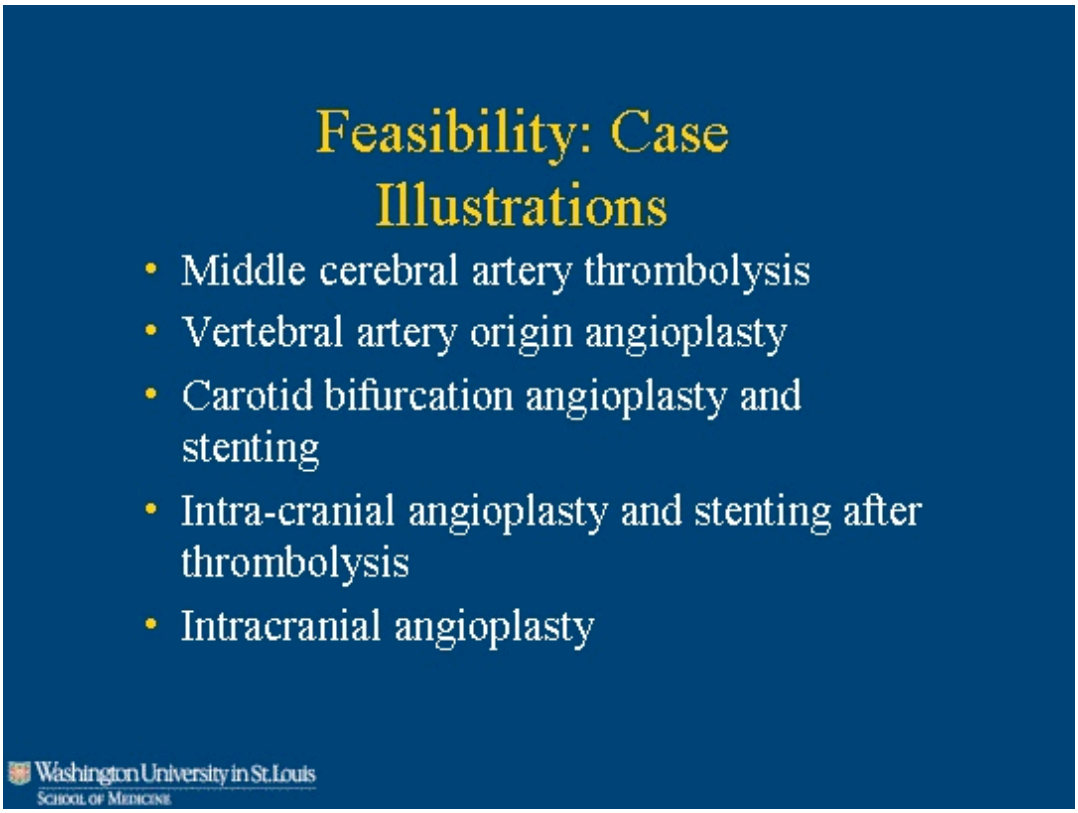
Introduction



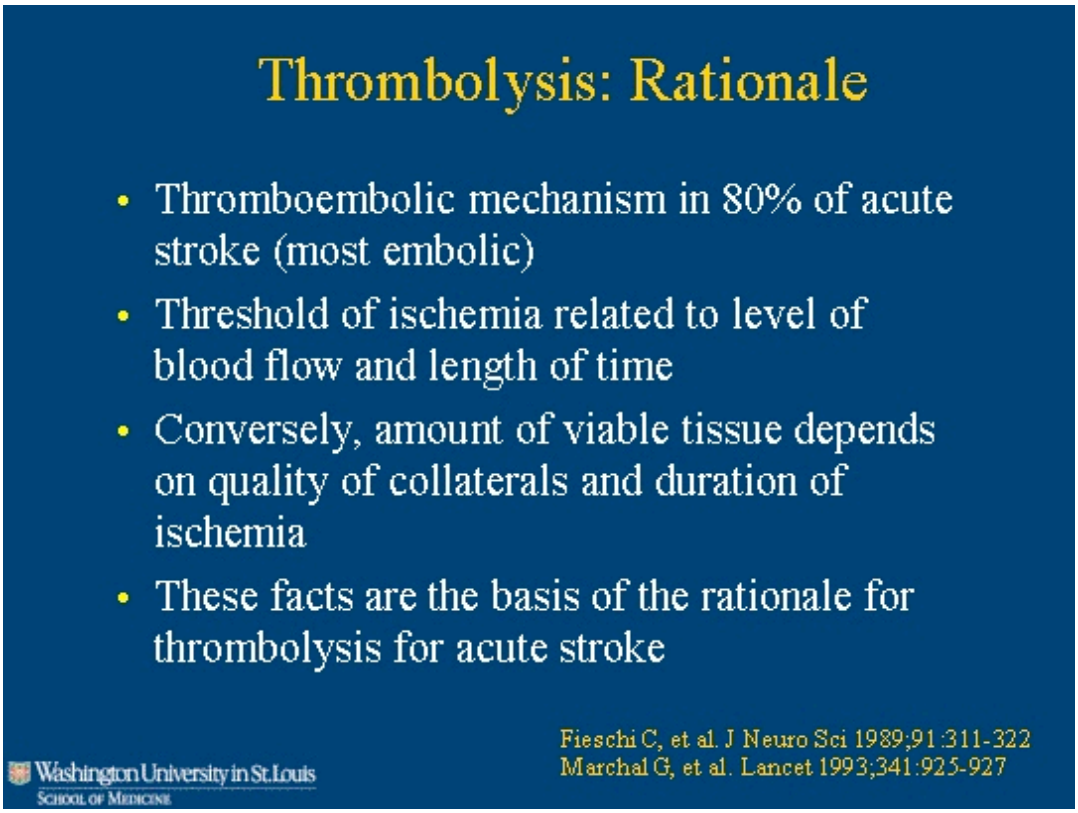
The Team


The Team
• Interventional Neuroradiology
• Stroke Neurology
• Vascular Neurosurgery
• Neurological/Neurosurgical Intensive Care Unit
Washington University in St. Louis
School of Medicine

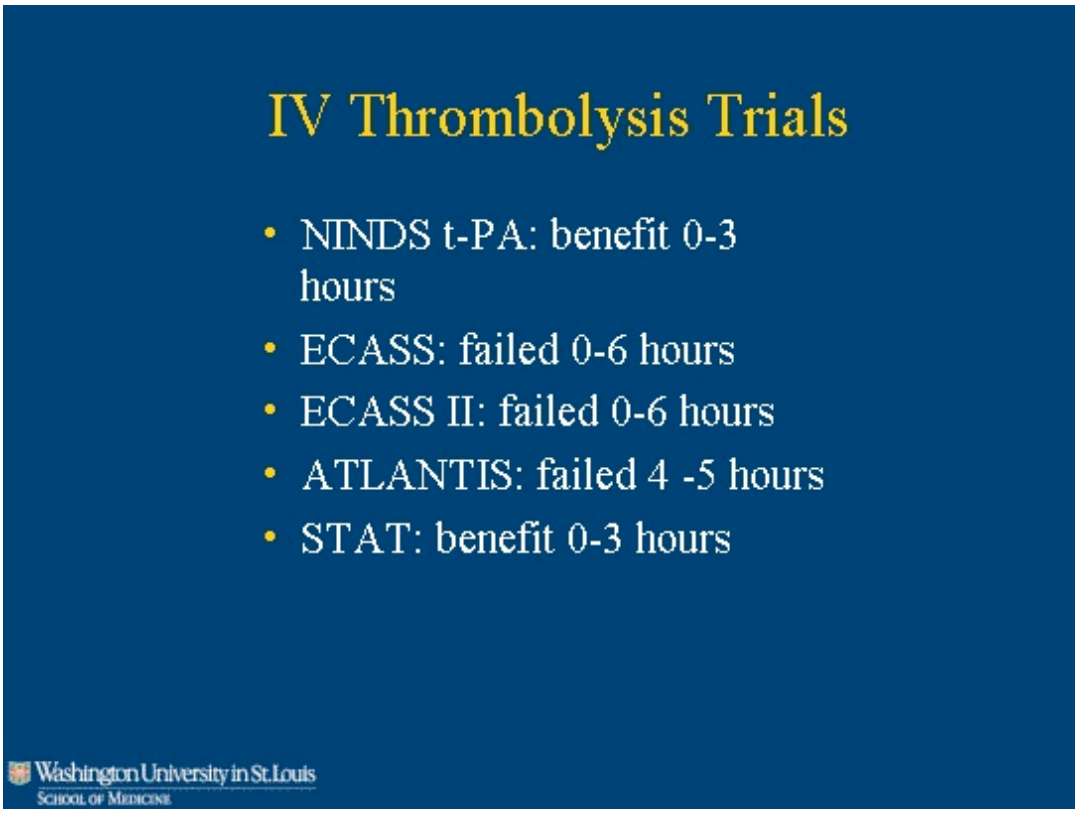
Feasibility: Case Illustrations



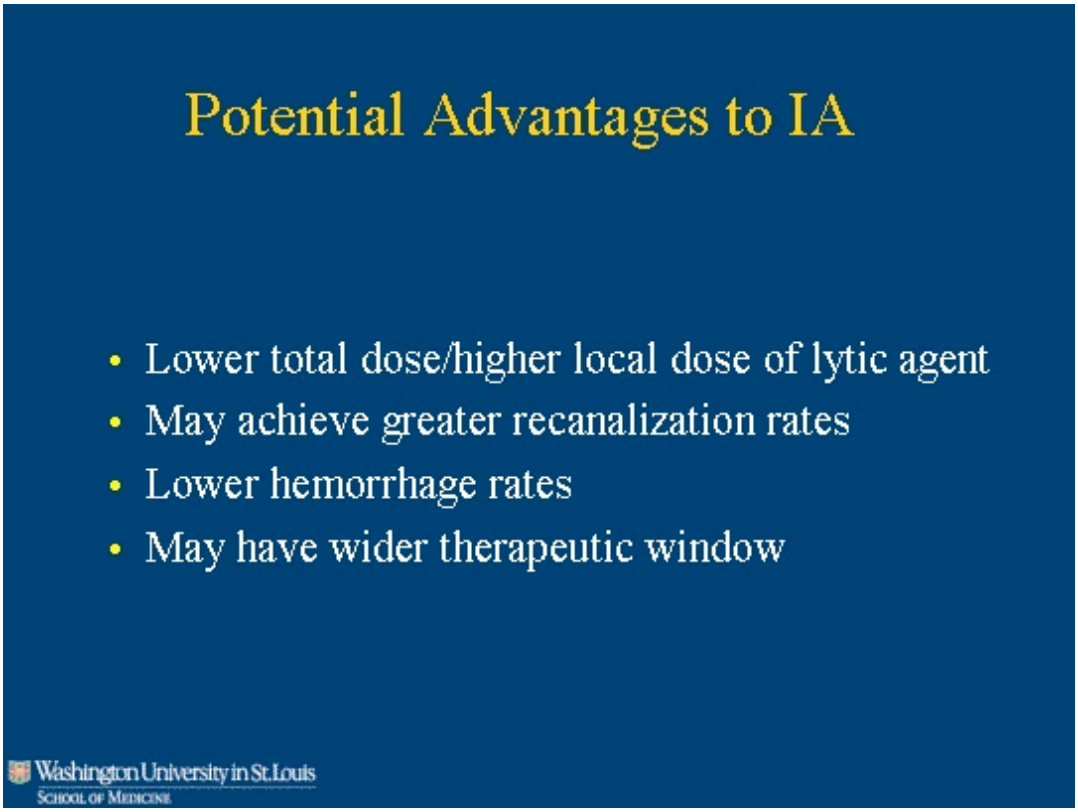
Thrombolysis: Rationale



IV Thrombolysis Trials

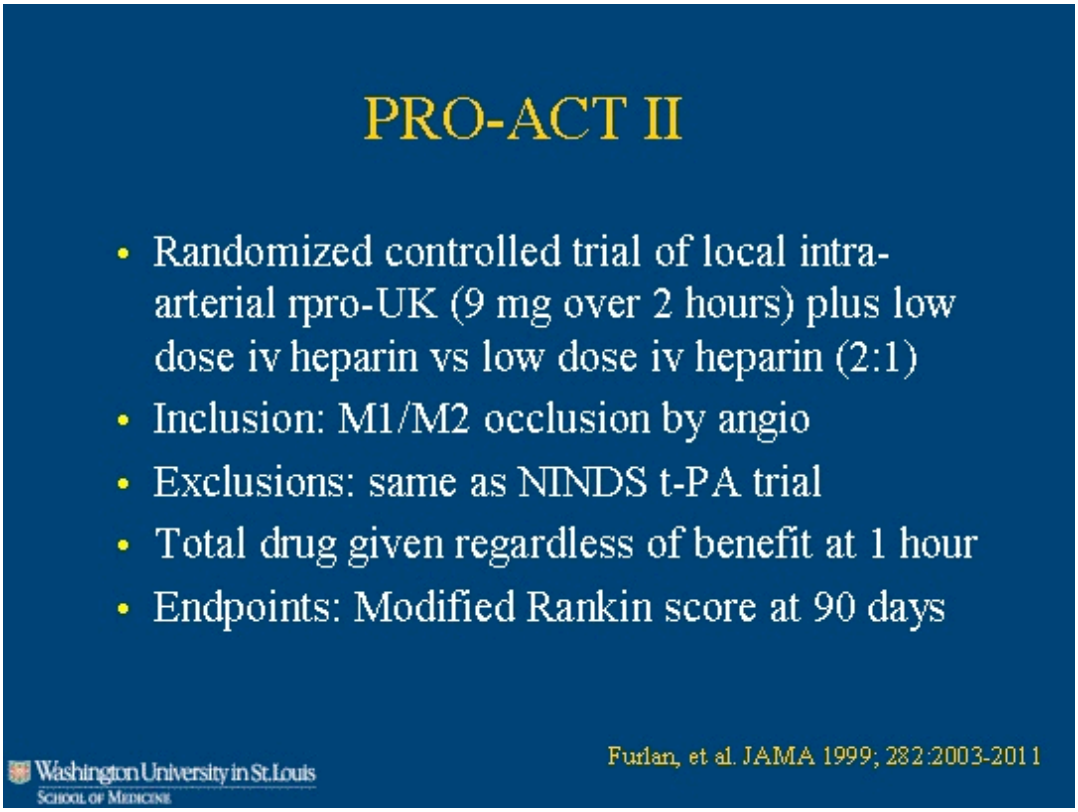


Potential Advantages to IA



Reference:
Furlan, et al. JAMA 1999; 282:2003-2011

PRO-ACT II


PRO-ACT II
• Randomized controlled trial of local intra-arterial rpro-UK (9 mg over 2 hours) plus low dose iv heparin vs low dose iv heparin (2:1)
• Inclusion: M1/M2 occlusion by angio
• Exclusions: same as NINDS t-PA trial
• Total drug given regardless of benefit at 1 hour
• Endpoints: Modified Rankin score at 90 days
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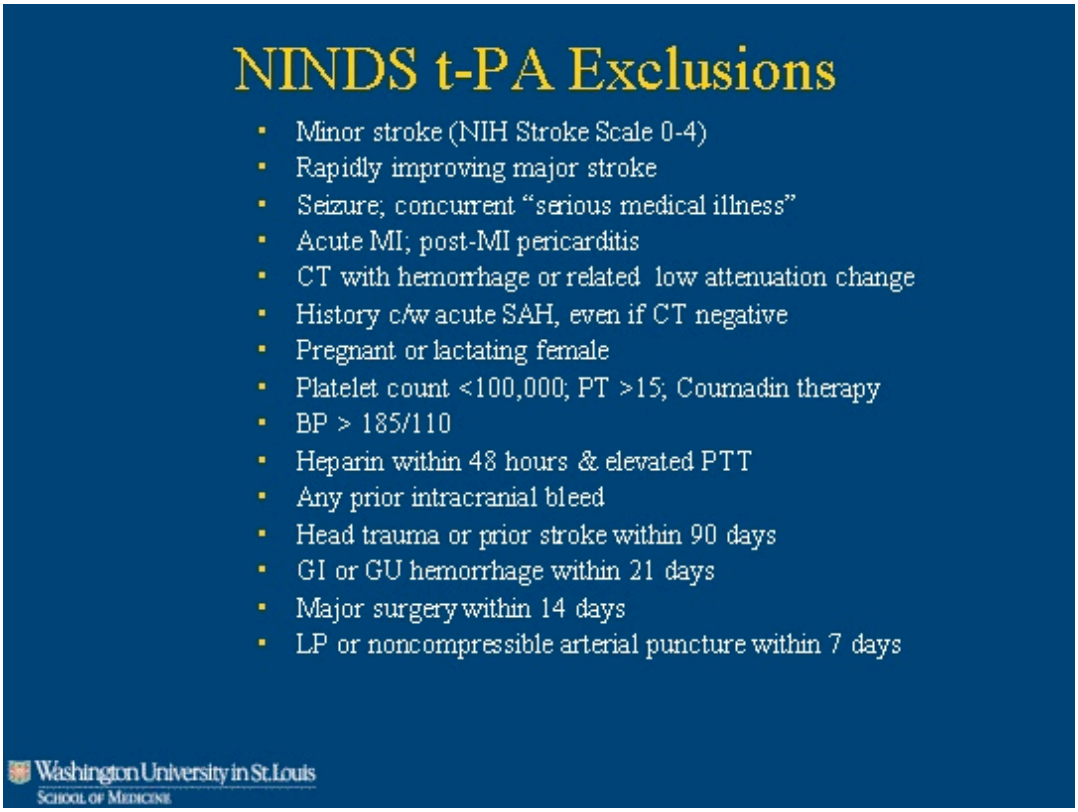
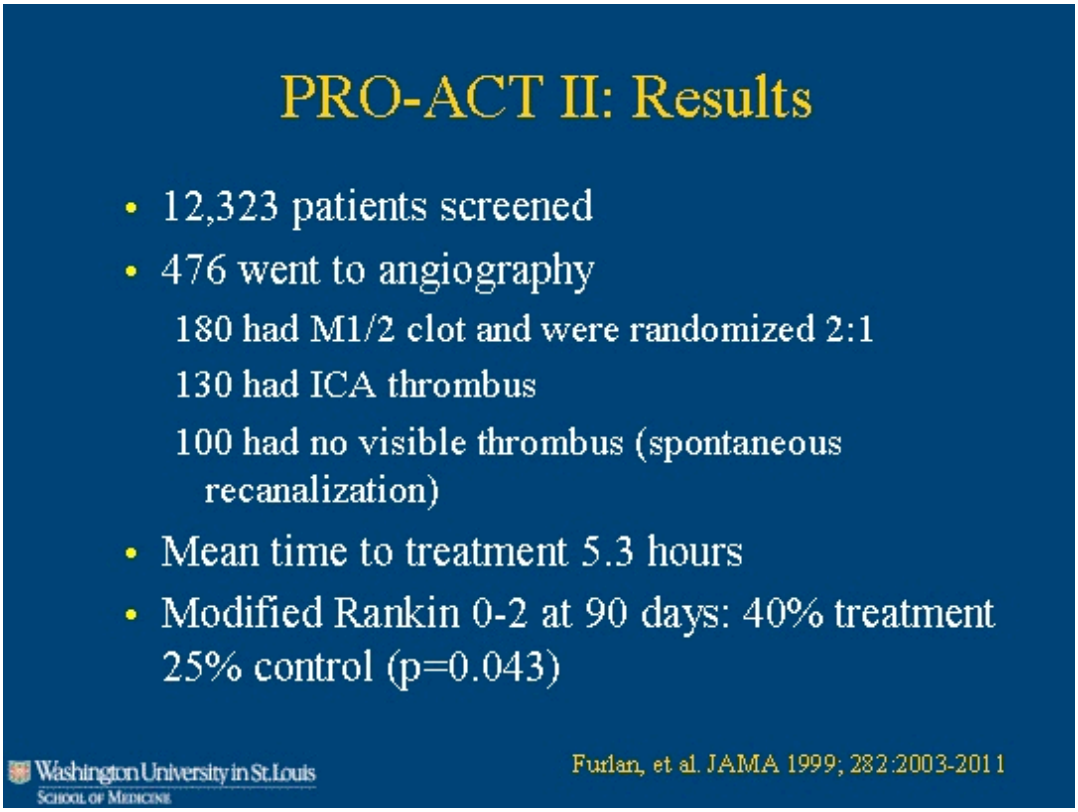
Furlan, et al. JAMA 1999; 282:2003-2011

NINDS t-PA Exclusions

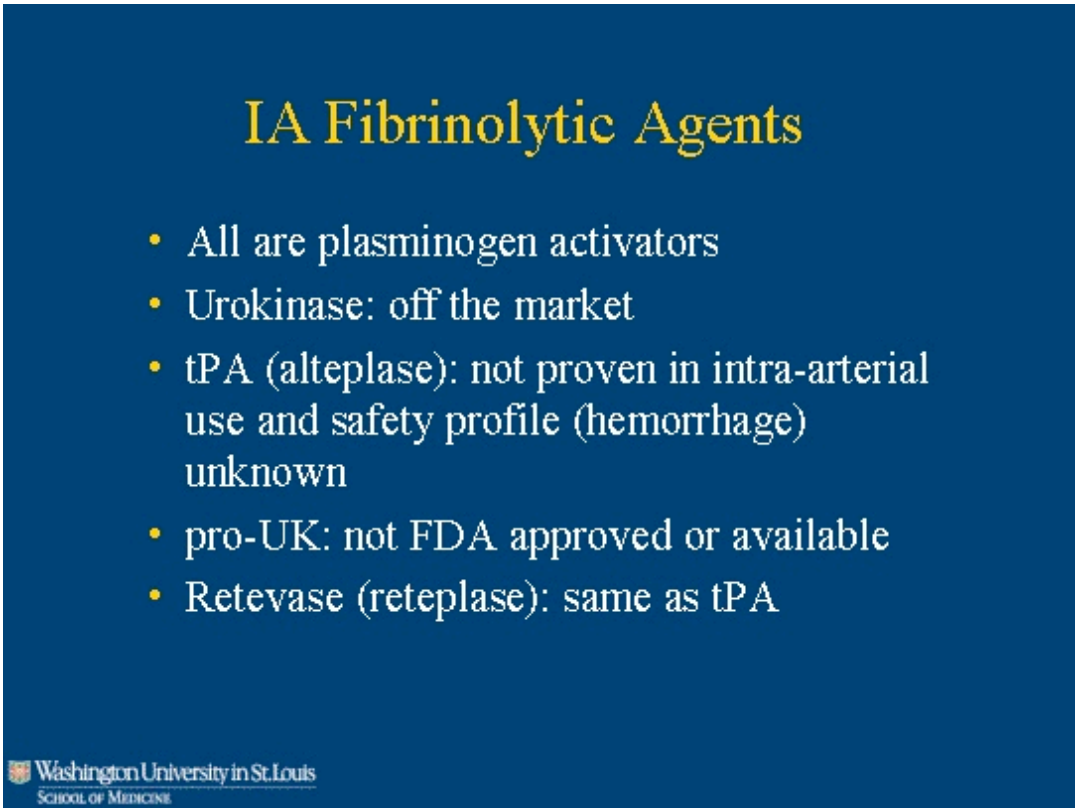


Reference:
Furlan, et al. JAMA 1999; 282:2003-2011
Wolpert S, et al AJNR 1993; 14: 3-13

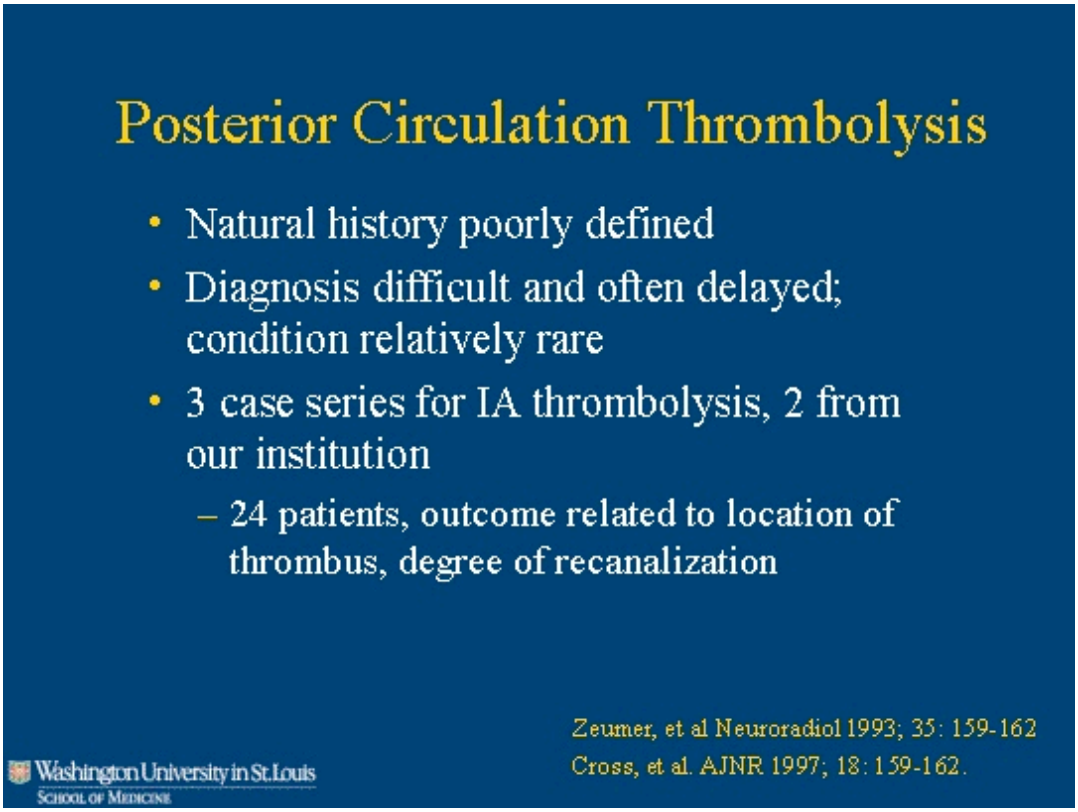
PRO-ACT II: Results



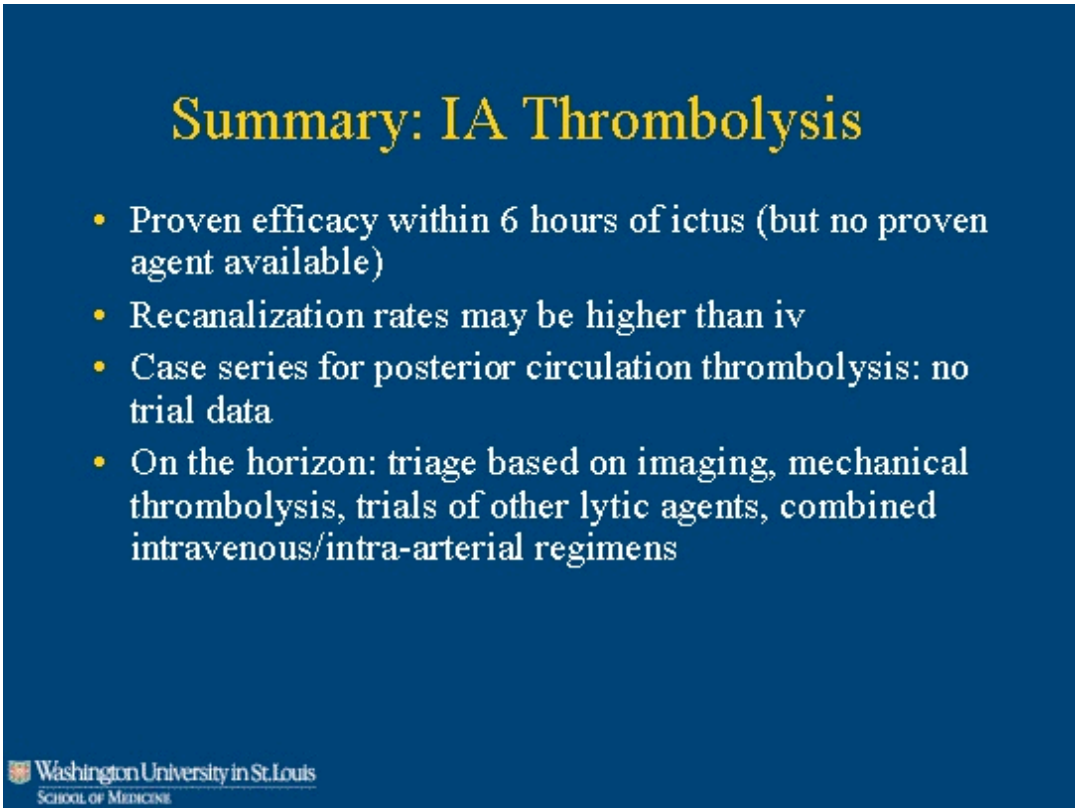
IA Fibrinolytic Agents



Posterior Circulation Thrombolysis

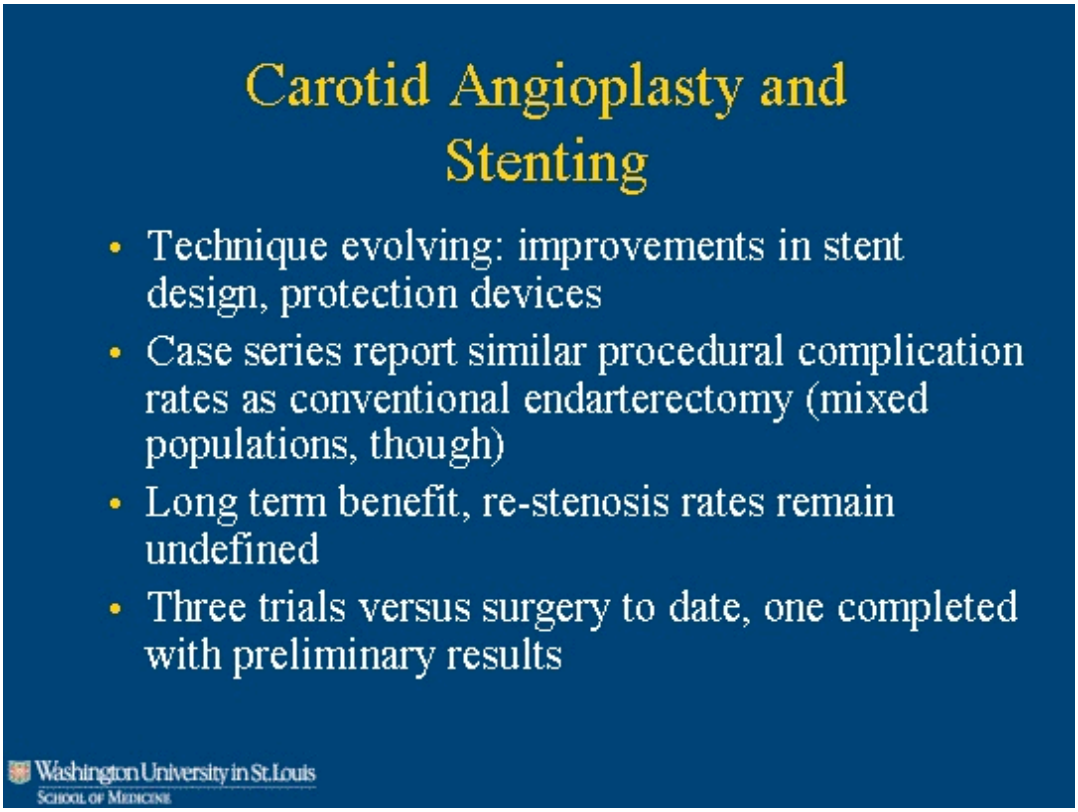


Summary: IA Thrombolysis



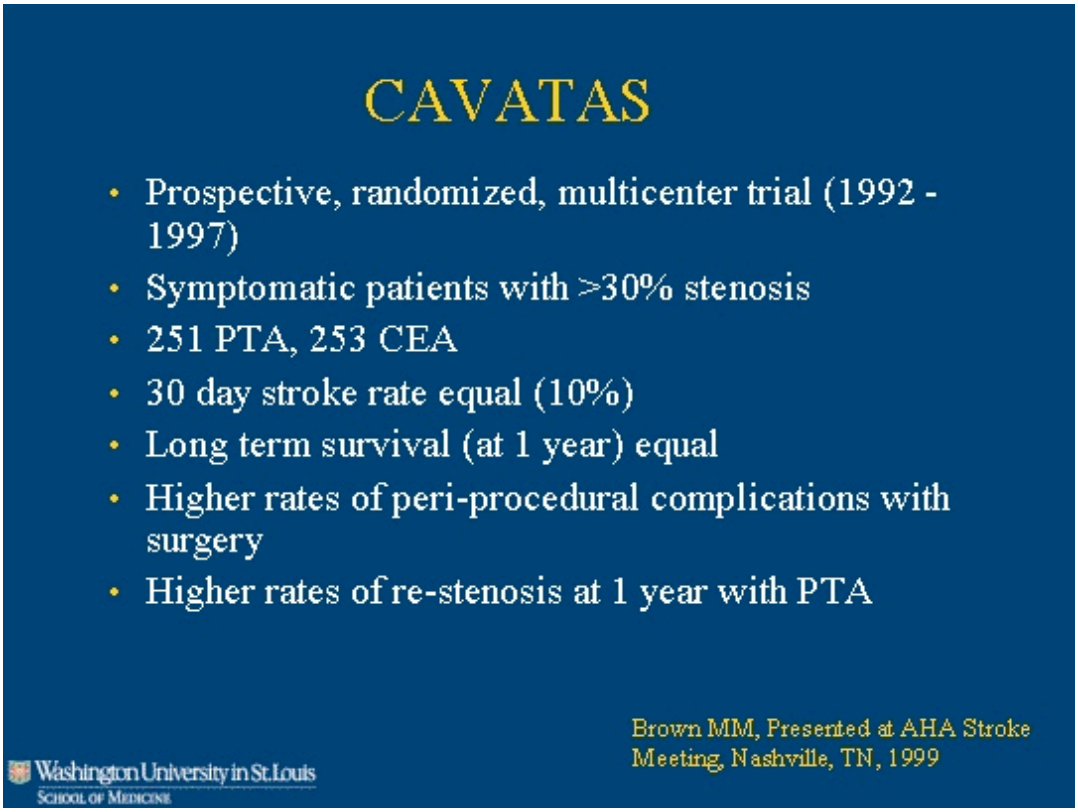
Reference:
Brown MM, Presented at AHA Stroke Meeting, Nashville, TN, 1999

Carotid Angioplasty and Stenting

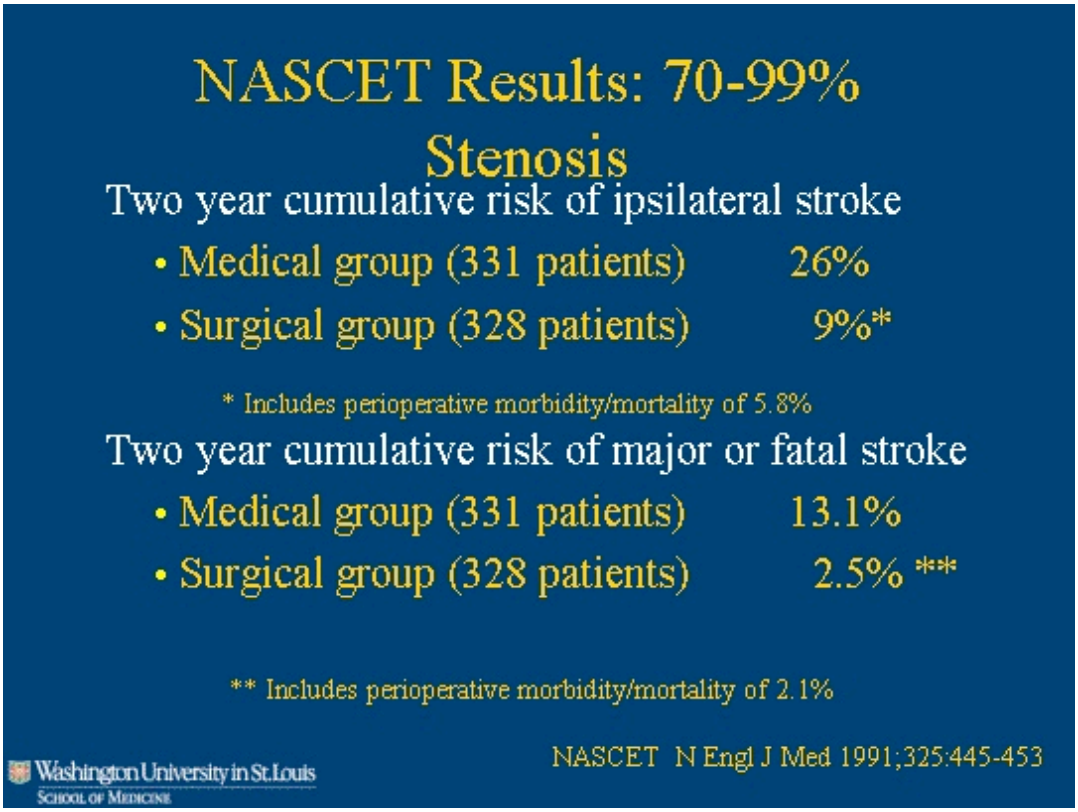


Reference:
NASCET N Engl J Med 1991;325:445-453

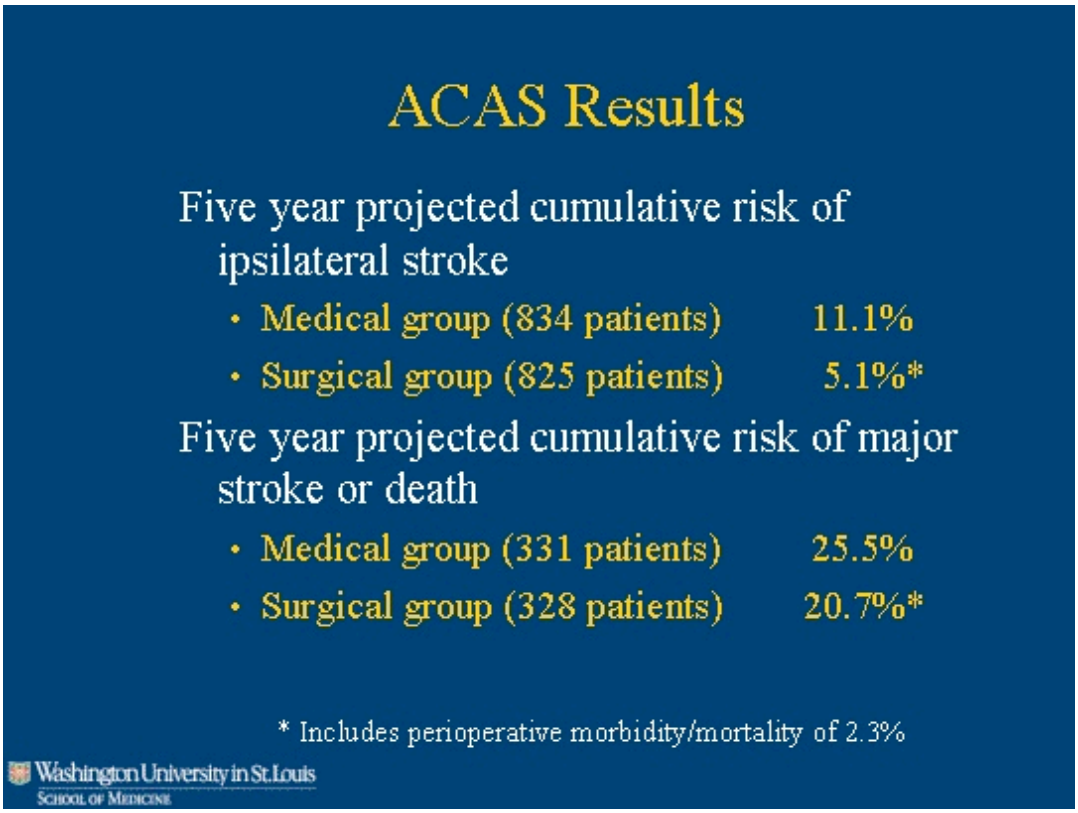
CAVATAS


CAVATAS
• Prospective, randomized, multicenter trial (1992 - 1997)
• Symptomatic patients with >30% stenosis
• 251 PTA, 253 CEA
• 30 day stroke rate equal (10%)
• Long term survival (at 1 year) equal
• Higher rates of peri-procedural complications with surgery
• Higher rates of re-stenosis at 1 year with PTA
Brown MM, Presented at AHA Stroke Meeting, Nashville, TN, 1999
Washington University in St.Louis
School of Medicine

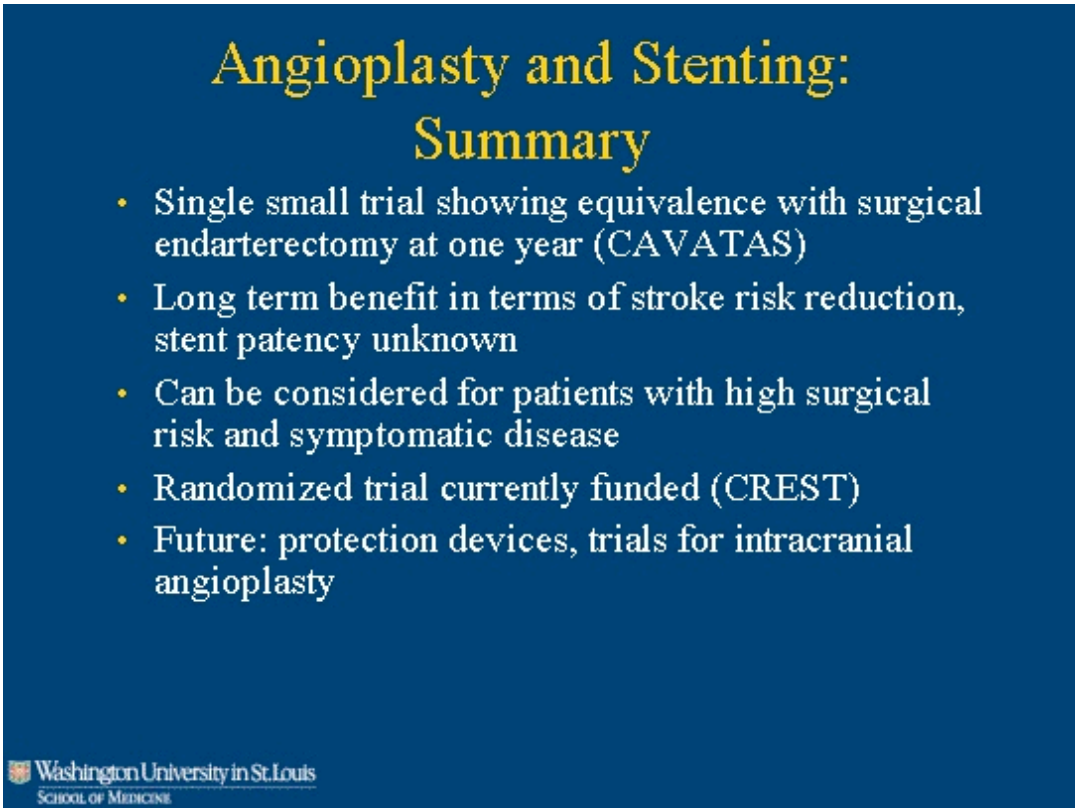
NASCET Results: 70-99% Stenosis



ACAS Results



Angioplasty and Stenting: Summary



References

Thrombolysis: Frequency of embolic occlusion in acute ischemic stroke

Fieschi C, Argentino C, Lenzi GL, Sacchetti ML, Toni D, Bozzao L. "Clinical and instrumental evaluation of patients with ischemic stroke within the first six hours."
J Neuro Sci 1989;91:311-322

del Zoppo GJ, Poeck K, Pessin MS, et al. "Recombinant tissue plasminogen activator in acute thrombotic and embolic stroke."
Ann Neurol 1992;32:78-86.

Evidence of an ischemic penumbra out to 24 hours

Marchal G, Serrati C, Rioux P, et al. "PET imaging of cerebral perfusion and oxygen consumption in acute ischemic stroke: relation to outcome."
Lancet 1993;341:925-927.

Thrombolysis: Clinical trials

Furlan A, et al., "Intra-arterial prourokinase for acute ischemic stroke - The PROACT II study: A randomized controlled trial."
JAMA 1999;282(21):2003-2011

NINDS rt-PA Study. "Tissue plasminogen activator for acute ischemic stroke."
N Engl J Med; 1995;333:1581-1587.

Haacke W, Kaste M, Fieschi C, et al. "Intra-venous thrombolysis with recombinant tissue plasminogen activator for acute hemispheric stroke: the European Cooperative Acute Stroke Study (ECASS)."
JAMA 1995;274:1017-1025.

Sherman DG, Atkinson RP, Chippendale T, Levin KA, Ng K, Futrell N, Hsu CY, Levy DE. "Intravenous ancrod for treatment of acute ischemic stroke: the STAT study: a randomized controlled trial. Stroke Treatment with Ancrod Trial."
JAMA 2000; 283(18):2395-403

Hacke W, Kaste M, Fieschi C, von Kummer R, Davalos A, Meier D, Larrue V, Bluhmki E. Davis S, Donnan G, Schneider D, Diez-Tejedor E, Trouillas P. "Randomised double-blind placebo-controlled trial of thrombolytic therapy with intravenous alteplase in acute ischaemic stroke (ECASS II). Second European-Australasian Acute Stroke Study Investigators"
Lancet 1998 352(9136):1245-5.

Possible lower rate of recanalization with iv t-PA

Wolpert SM, Bruckmann H, Greenlee R, Wechsler L, Pessin MS, del Zoppo GJ. "Neuroradiologic evaluation of patients with acute stroke treated with recombinant tissue plasminogen activator. The rt-PA Acute Stroke Study Group."
AJNR Am J Neuroradiol 1993; 14(1):3-13.

Basilar artery thrombolysis: Case series

Zeumer, Freitag HJ, Zanella F, Thie A, Arning C. "Local intra-arterial fibrinolytic therapy in patients with stroke: urokinase versus recombinant tissue plasminogen activator (r-TPA)."
Neuroradiology. 1993;35(2):159-62.

Cross DT III, Moran CJ, Akins P, Angtuaco EE, Derdeyn CP, Diringer MN. "Collateral circulation and outcome after basilar artery thrombolysis."
AJNR Am J Neuroradiol 1998; 19(8):1557-63.

Natural history of vertebrobasilar disease

Caplan LR. "Vertebrobasilar disease and thrombolytic treatment."
Arch Neurol 1998; 55:450-1.

Mechanical thrombolysis

Mathie AG, Bell SD, Saibil EA. "Mechanical thromboembolectomy in acute embolic peripheral arterial occlusions with use of the AngioJet Rapid Thrombectomy System."
JVIR 1999;10:583-90.

Nakano S, Yokogami K, Ohta H, Yano T, Ohnishi T. "Direct percutaneous transluminal angioplasty for acute middle cerebral artery occlusion."
AJNR Am J Neuroradiol 1998;19:767-72.

Carotid endarterectomy trials

North American Symptomatic Carotid Endarterectomy Trial (NASCET) Collaborators. "Beneficial effect of carotid endarterectomy in symptomatic patients with high-grade carotid stenosis."
N Engl J Med 1991;325:445-453.

Executive Committee of the Asymptomatic Carotid Atherosclerosis Study. "Endarterectomy for asymptomatic carotid artery stenosis."
JAMA 1995;273:1421-1428

Carotid angioplasty: Case series

Yadav JS, Roubin GS, Iyer S, et al. "Elective stenting of the extracranial carotid arteries."
Circulation 1997;95:376-381

Henry M, Amor M, Masson I, et al. "Angioplasty and stenting of the extracranial carotid arteries."
> J Endovasc Surg 1998;5:293-304.

Intracranial angioplasty: Case series

Connors JJ III, Wojak JC. "Percutaneous transluminal angioplasty for intracranial atherosclerotic lesions: evolution of technique and short-term results."
J Neurosurg 1999; 91(3):415-23.

Vertebral origin angioplasty and stenting: Case series

Piotin M, Spelle L, Martin JB, Weill A, Rancurel G, Ross IB, Rufenacht DA, Chiras J. "Percutaneous transluminal angioplasty and stenting of the proximal vertebral artery for symptomatic stenosis."
AJNR Am J Neuroradiol 2000;21(4):727-31.

Malek AM, Higashida RT, Phatouros CC, Lempert TE, Meyers PM, Gress DR, Dowd CF,Halbach VV. "Treatment of posterior circulation ischemia with extracranial percutaneous balloon angioplasty and stent placement."
Stroke 1999;30(10):2073-85.

Abstracts from all of Dr. Derdeyn's publications are available at PubMed.