Stroke Prevention

Intra-cranial PTA and Stenting

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Intracranial Atherosclerosis

Initial Management

- Antiplatelet therapy
- Anticoagulant therapy
- Indication for angiography
  - Persistent symptoms despite medical therapy

Intracranial Atherosclerosis

Ramee et al, CCI 52:457-467, 2001

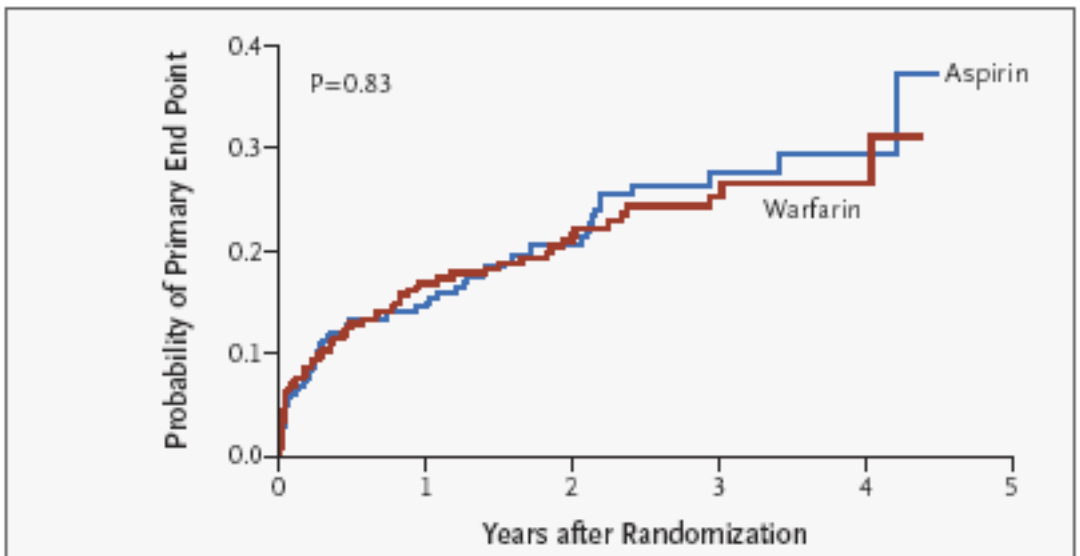
- Natural history
  - Stroke @ 2-4 yr. 43%
  - Mortality 15%-46%
- Balloon angioplasty results
  - Procedural success 68-76%
  - Stroke and death 5-33%

We should be able to do better!

WASID Trial

- Double blind, Multicenter RCT
- 569 patients with TIA or Stroke
- 50-99% stenosis by angiography
- Warfarin (INR 2-3) vs. ASA 1300mg
- Primary Endpoint @ 2years:
  - Ischemic Stroke
  - Brain Hemorrhage
  - Death (non-neurologic, vascular)

NEJM 2005;352,1305-16



No. at Risk					
Aspirin	280	192	120	59	18
Warfarin	289	202	130	66	16

Figure 2. Cumulative Incidence of the Primary End Point after Randomization, According to Treatment Assignment.

The primary end point was ischemic stroke, brain hemorrhage, or death from vascular causes other than stroke.

NEJM 2005;352,1305-16

Comparison of Warfarin and Aspirin for Symptomatic Intracranial Arterial Stenosis

RESULTS

After 569 patients had undergone randomization, enrollment was stopped because of concerns about the safety of the patients who had been assigned to receive warfarin.

The primary end point occurred in 22.1 percent of the patients in the aspirin group and 21.8 percent of those in the warfarin group (hazard ratio, 1.04; 95 percent confidence interval, 0.73 to 1.48; P=0.83).

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confidence interv… …scular causes was
3.2 percent in the aspirin gro… …warfarin group (P=0.16); the
rate of death from nonvascular causes … percent and 3.8 percent, respectively (P=0.05). The primary end point occurred in 22.1 percent of the patients in the aspirin group and 21.8 percent of those in the warfarin group (hazard ratio, 1.04; 95 percent confidence interval, 0.73 to 1.48; P=0.83).

CONCLUSIONS

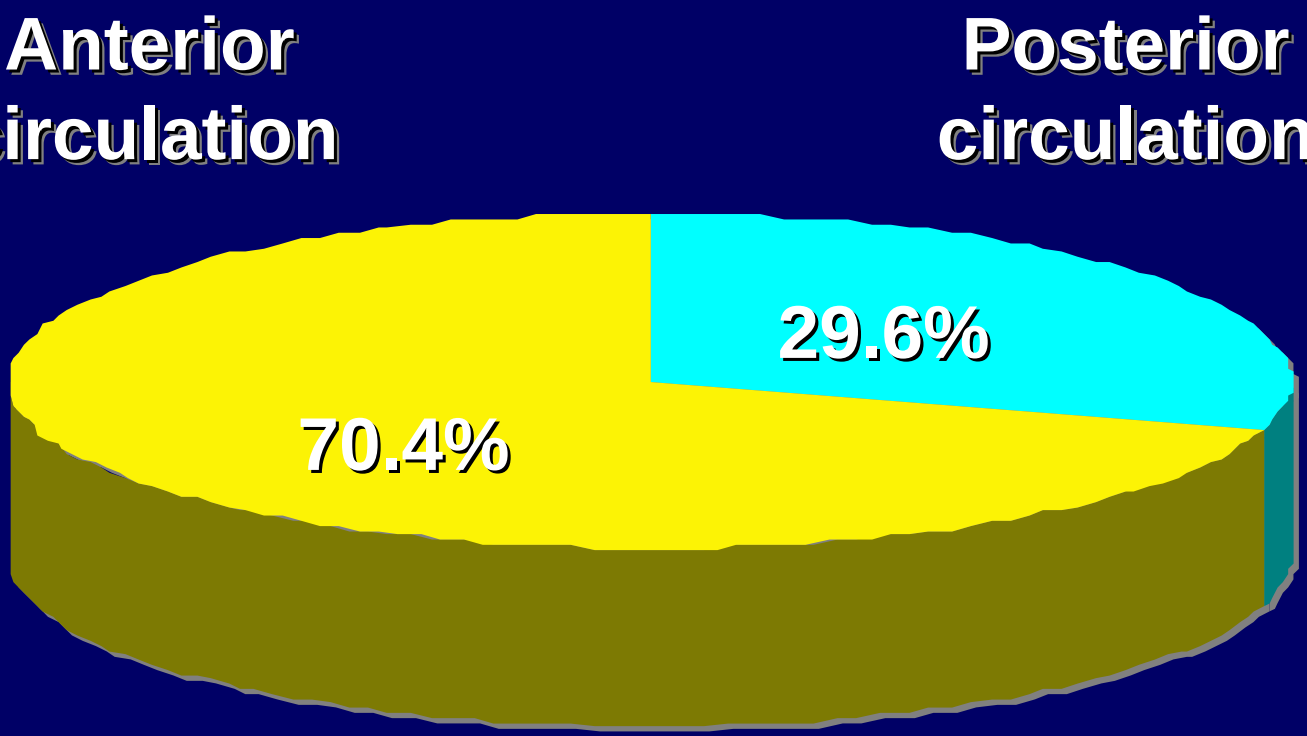
Warfarin was associated with significantly higher rates of adverse events and provided no benefit over aspirin in this trial. Aspirin should be used in preference to warfarin for patients with intracranial arterial stenosis.

NEJM 2005;352,1305-16

Intracranial Intervention
Ochsner Experience

- Patients 57
  - Elective intervention 32 (56%)
  - Acute stroke intervention 25 (44%)
- Retrospective analysis
- 100% neurologic evaluation
- 6 year period: Jan 96-Sept 2002

Intracranial Lesion Location

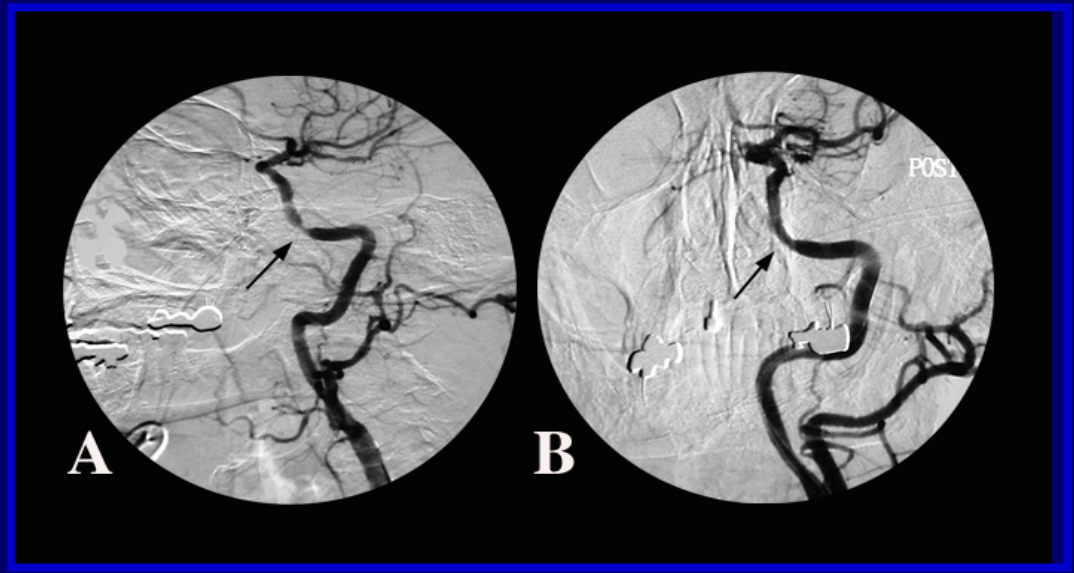


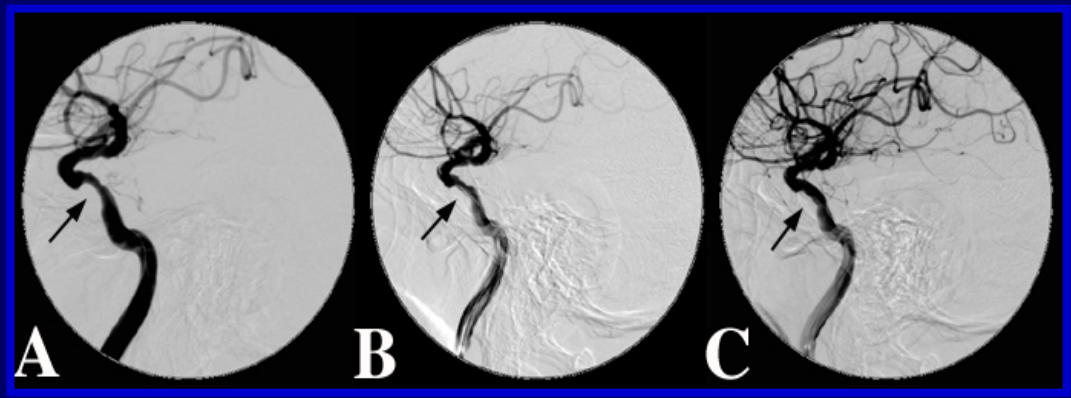
Elective Intracranial Intervention

Acute Results

Technology Transfer

Patients	32
PTA	59%
Stents	41%
Success	100%
TIA	0
Stroke	0
Death	1
Unexpected benefit	*34%*





Elective Intracranial Intervention

Long-term Results

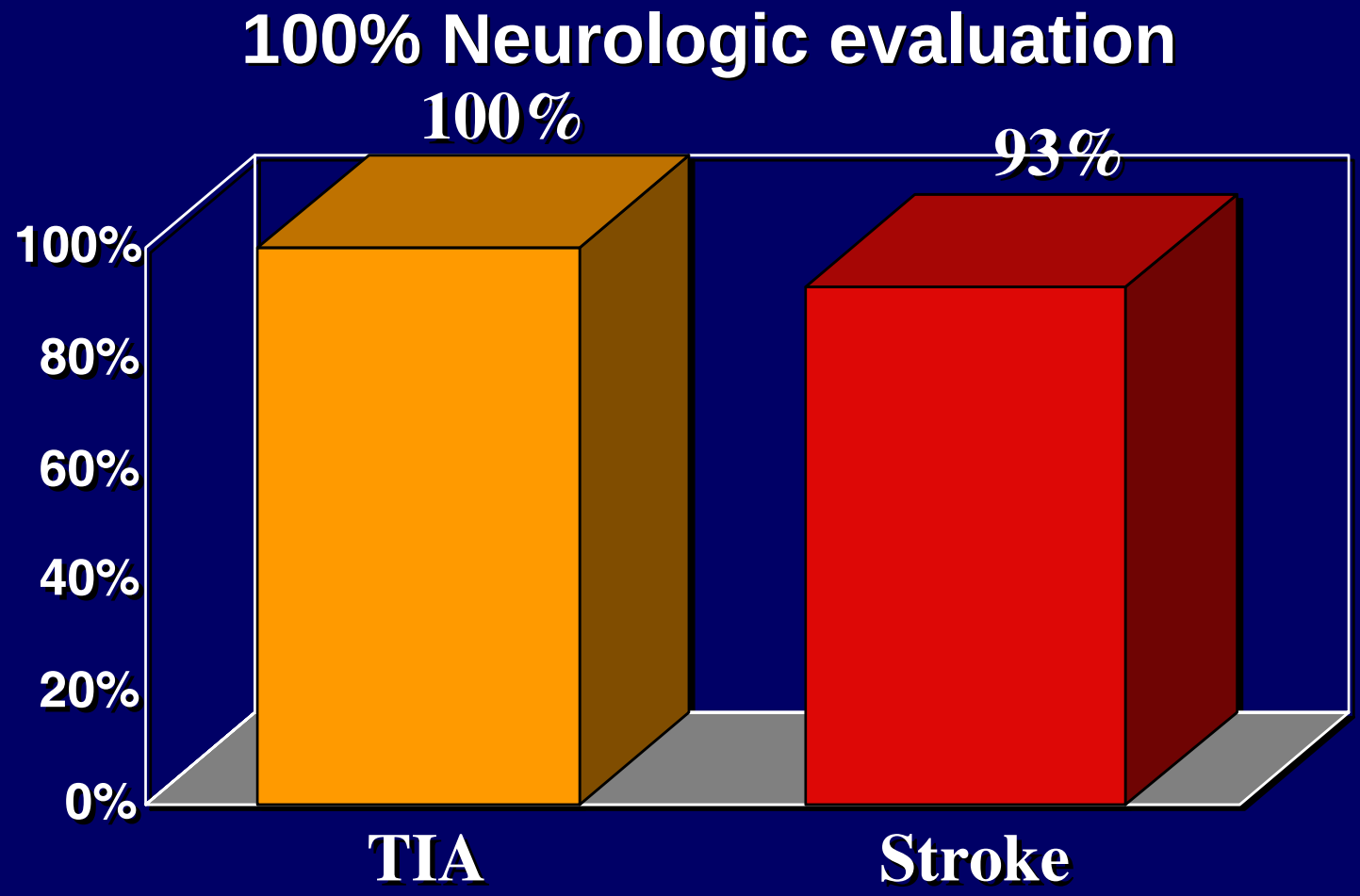
- Patients 34
- Follow-up (mo)
  - Mean 13
  - Range 1-48
- Any stroke 8.6%
- Neurologic death 0%
- Non-neurologic death (8 and 19 mo) 8.6%

Subramanian et al, AHA/Stroke Annual Session, October 2002

Elective Intracranial Intervention

Freedom from events at one year

N = 26 patients



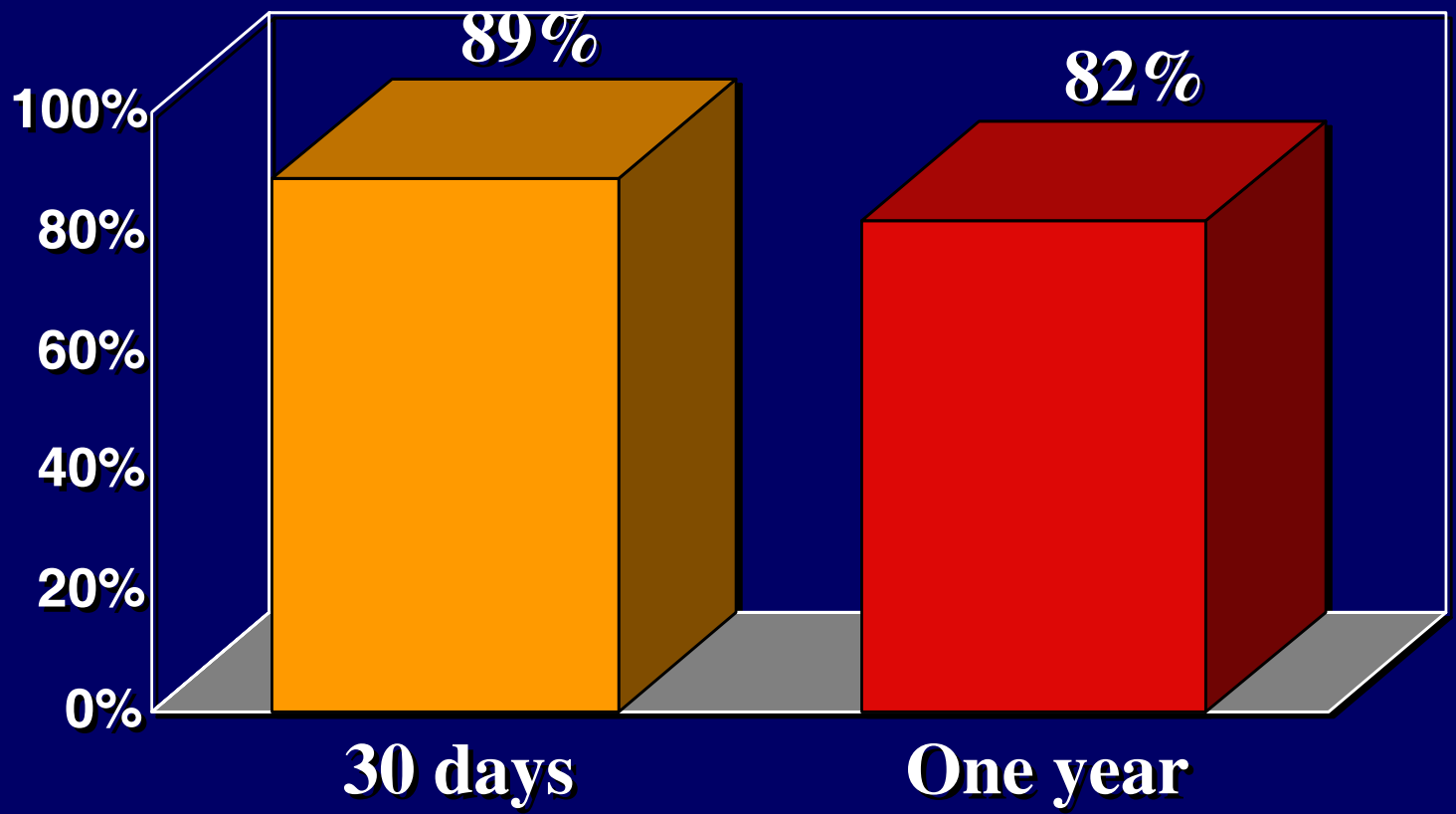
Subramanian et al, JACC 2002

Elective Intracranial Intervention

Symptomatic improvement

N = 27 patients

100% Independent neurologic evaluation



Subramanian et al, JACC 2002

Long-term Results

N = 26

One Year Follow-Up

❖ Any stroke	2 (7.4%)
❖ Neurologic death	0%
❖ Non-neurologic death	2 (7.4%)

Conclusions

- Intracranial angioplasty with provisional stenting is safe and beneficial in the majority of patients with symptomatic intracranial stenosis in this small retrospective study.
- Technology transfer from cardiology to neurointervention makes this technique possible.
- A multidisciplinary team approach in the evaluation and management of these patients is essential.
- The improvement of chronic neurological deficits thought to be permanent suggests that reversible chronic brain ischemia (ie, brain angina) is present in patients with intracranial stenosis.
- These single-center results justify a larger prospective trial to further define those patients who would benefit from this approach.