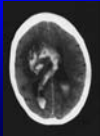




**Stroke 2006:  
Optimal ED Patient  
Management Strategies**

*Case Studies to  
Challenge the Experts*



Stroke 2006 



  
**New York ACEP  
Scientific Assembly**

*Lake George, NY  
July 5-7, 2006*

Stroke 2006 



  
**Thank you to AstraZeneca  
for their support of this  
stroke educational meeting**

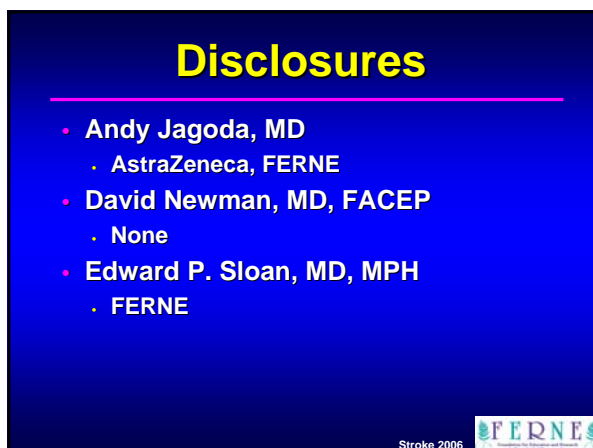
Stroke 2006 



**Panelists**


- Andy S. Jagoda, MD, FACEP  
Mount Sinai School of Medicine
- David H. Newman, MD, FACEP  
St. Luke's/Roosevelt Hospital
- Edward P. Sloan, MD, MPH, FACEP  
University of Illinois at Chicago

Stroke 2006 



**Disclosures**

- Andy Jagoda, MD
  - AstraZeneca, FERNE
- David Newman, MD, FACEP
  - None
- Edward P. Sloan, MD, MPH
  - FERNE

Stroke 2006 



**Prior Panelists**

- Andy Jagoda, MD, FACEP (Moderator)  
Mount Sinai School of Medicine
- Thomas G. Brott, MD  
Mayo Clinic Jacksonville
- E. Bradshaw Bunney, MD, FACEP  
University of Illinois at Chicago
- J. Stephen Huff, MD, FACEP  
University of Virginia
- Edward P. Sloan, MD, MPH, FACEP  
University of Illinois at Chicago

Stroke 2006 

## Prior Panelists' Disclosures

- Andy Jagoda, MD
  - AstraZeneca
- Thomas G. Brott, MD
  - None
- E. Bradshaw Bunney, MD
  - AstraZeneca, Genentech consultant
- J. Stephen Huff, MD
  - None
- Edward P. Sloan, MD, MPH
  - None

Stroke 2006



## Global Objectives

- Improve acute stroke patient care
- Minimize morbidity and mortality
- Expedite disposition
- Optimize resource utilization
- Enhance our job satisfaction

Stroke 2006



## Session Activities

- Present a relevant clinical case
- Poll the audience about care
- Discuss the questions
- Understand areas of consensus
- Explore areas of uncertainty
- Go forth and prosper

Stroke 2006



## Case Presentation

- 62 year-old professor has an apparent stroke while teaching at the local community college.
- Contact to the local EMS base station occurs within 15 minutes of the onset of symptoms.
- He arrives at the closest ED within 30 minutes of symptom onset.

Stroke 2006



## Case Presentation

- VS 178/80 RR 18 P 96 Temp 98.6
- Cardiopulmonary exam OK
- Mental Status OK
- Neurological Exam
  - Awake and alert
  - R facial weakness
  - Slurred speech
  - Right visual field neglect
  - Unable to purposefully move RUE / RLE

Stroke 2006



## Question: *TIA ED Visit*

- Had this patient presented to the ED two weeks earlier with dizziness and numbness in his R upper extremity, what would be your approach?

Stroke 2006



**Question: TIA ED Visit**

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- A. I admit all TIA patients regardless of the severity of the symptoms.

Stroke 2006



**Question: TIA ED Visit**

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- B. I only admit those patients who have clear motor weakness or prolonged symptom duration because of a greater stroke risk.

Stroke 2006



**Question: TIA ED Visit**

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- C. I might consider sending this patient home, but only if I have completed a cranial CT and an evaluation of the carotids (Doppler, CTA, MRA).

Stroke 2006



**Question: TIA ED Visit**

---

- D. I would send this patient home with aspirin therapy and arrange that a physician complete a TIA work-up as an outpatient.

Stroke 2006



**Question: TIA ED Visit**

---

- E. I don't really have an opinion on what to do with this TIA patient, and so would depend on my neurologist for a disposition decision.

Stroke 2006



**Question: TIA ED Visit**

---

- A. I admit all TIA patients.
- B. I only admit those patients who have clear motor weakness or visual symptoms.
- C. Send home after a cranial CT and a carotid evaluation.
- D. Send home, outpatient TIA workup.
- E. No opinion, ask the neurologist.

Stroke 2006



**Question: EMS Triage**

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- Regarding EMS triage, should this patient be:

Stroke 2006



**Question: EMS Triage**

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- A. Transported to the closest hospital?

Stroke 2006



**Question: EMS Triage**

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- B. Diverted to the closest primary stroke center?

Stroke 2006



**Question: EMS Triage**

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- C. Diverted to the closest tertiary center with 24/7 interventional radiology?

Stroke 2006



**Question: EMS Triage**

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- D. Diverted to the closest comprehensive stroke center?

Stroke 2006



**Question: EMS Triage**

---

- E. Let the public health officials figure it out

Stroke 2006



**Question: EMS Triage**

- A. Closest hospital
- B. Closest primary stroke center
- C. Closest 24/7 IR tertiary center
- D. Closest comprehensive stroke center
- E. Public health issue

Stroke 2006



**Question: Inter-hospital Transfer**

- If this patient is transported to the closest ED of a hospital with no specific stroke team or protocol, which of the following best describes circumstances when transfer to a tertiary or stroke center should take place for this stroke patient?

Stroke 2006



**Question: Inter-hospital Transfer**

- A. There are no indications for inter-hospital transfer to take place.

Stroke 2006



**Question: Inter-hospital Transfer**

- B. The patient should be transferred after IV tPA is administered.

Stroke 2006



**Question: Inter-hospital Transfer**

- C. Transfer should take place only if IV tPA is not indicated and CNS intra-arterial thrombolytic therapy or thrombus removal is likely.

Stroke 2006



**Question: Inter-hospital Transfer**

- D. Transfer should take place for all patients if the time from symptom onset is between three and ten hours in order to allow advanced diagnostics to be provided acutely.

Stroke 2006



**Question: Inter-hospital Transfer**

- E.** Transfer to a primary stroke center should take place for all stroke patients, regardless of the time of symptom onset, whether IV tPA has been provided, and whether an acute clot intervention is contemplated

Stroke 2006



**Question: Inter-hospital Transfer**

- F.** This is a consultant issue.

Stroke 2006



**Question: Inter-hospital Transfer**

- A.** No indications
- B.** After IV tPA is administered.
- C.** IV tPA is not indicated and CNS intra-arterial thrombolytic therapy or thrombus removal is likely
- D.** Symptoms 3-10 hours, diagnostics
- E.** Transfer all stroke patients
- F.** Consultant issue

Stroke 2006



**Question: Use of the NIHSS**

- Which of the following describes your views regarding the use of the NIHSS in evaluating stroke severity and the indications for various stroke therapies?

Stroke 2006



**Question: Use of the NIHSS**

- A.** Every emergency physician should know how to calculate the NIHSS for patients such as this one, since it is the standard of care for determining stroke severity and the need for any and all stroke therapies.

Stroke 2006



**Question: Use of the NIHSS**

- B.** It is obvious how severe this patient's stroke is, and the need for all potential stroke therapies can be determined clinically without actually calculating the NIHSS.

Stroke 2006



**Question: Use of the NIHSS**

**C.** The NIHSS can be reliably estimated by determining symptom severity in four categories: motor, speech, mental status, and visual/neglect.

Stroke 2006



**Question: Use of the NIHSS**

**D.** The NIHSS is a research tool that can be calculated retrospectively as needed as long as the neurological exam in the ED is documented appropriately.

Stroke 2006



**Question: Use of the NIHSS**

**E.** When I am considering IV tPA, I just quickly calculate the NIHSS using Internet tools.

Stroke 2006



**Question: Use of the NIHSS**

**F.** What does NIHSS stand for, anyways?

Stroke 2006



**Question: Use of the NIHSS**

- A.** NIHSS is the standard of care
- B.** Determine Rx clinically, no NIHSS
- C.** Estimate NIHSS in 4 clinical areas
- D.** Calculate retrospectively from exam
- E.** Quickly calculate NIHSS with Internet
- F.** What does NIHSS stand for?

Stroke 2006



**Question: Patient NIHSS**

- What is the approximate NIHSS of this patient?
  - Awake and alert
  - R facial weakness
  - Slurred speech
  - Right visual field neglect
  - Unable to purposefully move his RUE / RLE

Stroke 2006



### Question: Patient NIHSS

- A. 0-5
- B. 5-10
- C. 10-15
- D. 15-20
- E. Greater than 20

Stroke 2006



### Question: Use of Scales

- Regarding the use of stroke outcome scales such as the Modified Rankin Scale (MRS) or the Barthel Index (BI), which of the following is your clinical approach?

Stroke 2006



### Question: Use of Scales

- A. I use these scales in assessing stroke patient severity in the ED.

Stroke 2006



### Question: Use of Scales

- B. I understand the MRS and the BI, and I use them to help in assessing the effectiveness of new stroke therapies from published clinical trials.

Stroke 2006



### Question: Use of Scales

- C. I do not have any idea how these outcome scales are utilized, either in the ED or after hospital disposition.

Stroke 2006



### Question: Use of Scales


- D. These scales correlate with the NIHSS, making their use superfluous.

Stroke 2006




### Question: Use of Scales

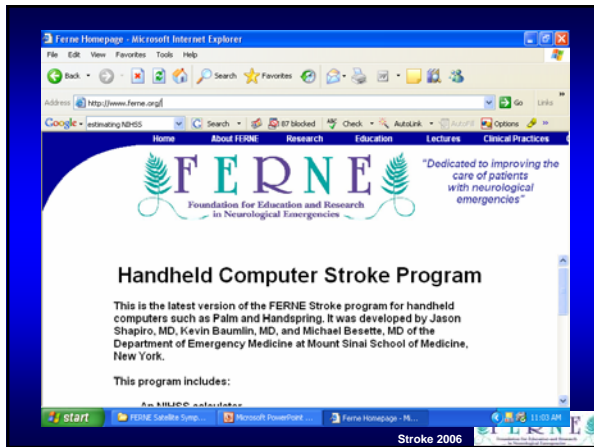
**E. I have not ever heard of these scales, let alone use them!**

Stroke 2006 

### Question: Use of Scales

- A. I use these scales in the ED**
- B. Scales assess the effectiveness of new stroke therapies**
- C. No idea how these outcome scales are utilized**
- D. Scales correlate with the NIHSS, making their use superfluous**
- E. I have never heard of these stroke scales**

Stroke 2006 




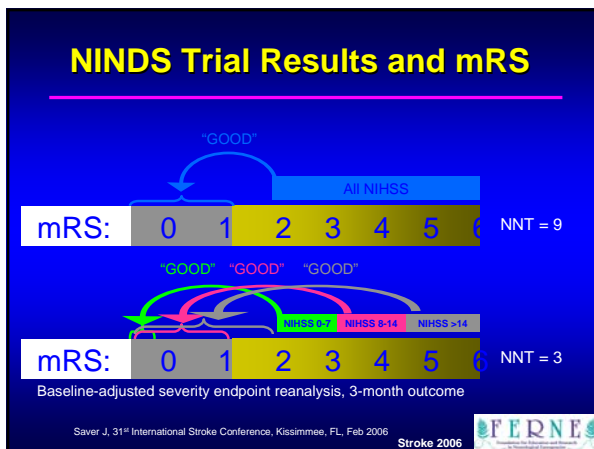
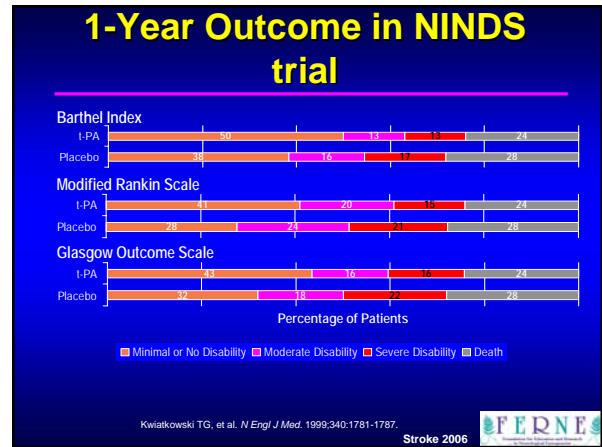
**Handheld Computer Stroke Program**

This is the latest version of the FERNE Stroke program for handheld computers such as Palm and Handspring. It was developed by Jason Shapiro, MD, Kevin Baumin, MD, and Michael Besette, MD of the Department of Emergency Medicine at Mount Sinai School of Medicine, New York.

This program includes:


- An NIHSS calculator

Stroke 2006 



### Question: Use of IV tPA

- This patient's stroke is deemed to be moderate to severe in its severity and is a suitable candidate for thrombolytic therapy with IV tPA. Which of the following is your viewpoint regarding the use of IV tPA given the published efficacy data?**

Stroke 2006 

**Question: Use of IV tPA**

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**A.** If IV tPA is indicated, I use it because the clinical data supports its use and I am adequately supported in its use.

Stroke 2006



**Question: Use of IV tPA**

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**B.** Although I am not opposed to the use of tPA, I do not use it often because patients rarely meet the criteria for use in the ED.

Stroke 2006



**Question: Use of IV tPA**

---

**C.** I try not to use tPA because the published efficacy data does not adequately support its use and because I am not well supported to use it.

Stroke 2006



**Question: Use of IV tPA**

---

**D.** I simply am so concerned about the risk of a symptomatic ICH that I cannot bear to use this drug when treating stroke patients such as this one.

Stroke 2006



**Question: Use of IV tPA**

---

**E.** I leave the tPA use decision to the stroke team or neurology consultant.

Stroke 2006



**Question: Use of IV tPA**

---

**F.** Haven't we discussed tPA enough already?

Stroke 2006



### Question: Use of IV tPA

- A. Clinical data supports its use
- B. Patients rarely meet the criteria
- C. Published efficacy data does not adequately support its use
- D. Concerned about the risk of a symptomatic ICH
- E. Decided by the stroke team
- F. Haven't we discussed tPA enough already?

Stroke 2006



### Question: tPA Data

- Regarding the reanalysis of the NINDS tPA clinical trial data and the phase IV tPA use data, which of the following describe your understanding of the info?

Stroke 2006



### Question: tPA Data

- A. I understand that the reanalysis of the NINDS data suggests that there is a real treatment effect and that the phase IV data confirms that the outcomes of the NINDS study can be replicated in clinical practice.

Stroke 2006



### Question: tPA Data

- B. I know that the NINDS clinical trial data was confirmed, but the numbers are too small to allow for widespread clinical use, even with confirmatory phase IV clinical data.

Stroke 2006



### Question: tPA Data

- C. I have trouble believing phase IV reports, since they are inherently biased, making the use of tPA still somewhat experimental in my practice.

Stroke 2006



### Question: tPA Data


- D. I do not have enough familiarity with the reanalysis or the phase IV publications, such that I have not changed my tPA clinical practice.

Stroke 2006




### Question: tPA Data

E. Why was the data reanalyzed, and what is a phase IV study?

Stroke 2006 


### Question: tPA Data

- A. I understand the reanalysis of the NINDS data & phase IV data
- B. Numbers are too small to allow for widespread clinical use.
- C. I have trouble believing phase IV reports and have not changed
- D. I do not have enough familiarity
- E. What is a phase IV study?

Stroke 2006 


### IV Thrombolysis

- The independent reanalysis of the NINDS tPA clinical trial confirms the results from the initial *NEJM* publication
- Support the use of tPA in stroke patients within three hours of symptom onset
- Number needed to treat calculation based on this reanalysis confirms that approximately 8-10 patients need to be treated with tPA in order to cause one extra patient to have the best clinical outcome.
- 2 patients will improve for every one that develops a sympt ICH

Stroke 2006 


### EM Physicians and Lysis

- Brown et al.
- 1,105 of 2600 ACEP members responded
- 40% not likely to use thrombolytics
  - 65% risk of ICH
  - 23% perceived lack of benefit
  - 12% both
- Upper limit ICH rate 3.4%
- Lowest acceptable relative improvement 40%

Stroke 2006 


### Informed Consent: Documentation

- With tPA, there is a 30% greater chance of a good outcome at 3 months
- With tPA use, there is 10x greater risk of a symptomatic ICH (severe bleeding stroke)
- Mortality rates at 3 months are the same regardless of whether tPA is used
- 2 patients will have a minimal or no deficit for everyone patient with a symptomatic ICH

Stroke 2006 

### Documentation

- Just as important
- “The patient is NOT a candidate for tPA because...”

Stroke 2006 

### Question: Utilizing Tests

- Many diagnostic tests are available when attempting to intervene positively in acute stroke patients. If the initial CT is negative for hemorrhage, how do you utilize tests such as MRI, MRA, CTA, or cerebral angiography when treating stroke patients?

Stroke 2006



### Question: Utilizing Tests

- A. I do not know when these tests are indicated in acute ischemic stroke patients, and so do not order them in the ED.

Stroke 2006



### Question: Utilizing Tests

- B. I am aware that these tests may enhance the ability to diagnose the vascular lesion responsible for the stroke, but I rely on my neurology consultants to determine the need for these tests.

Stroke 2006



### Question: Utilizing Tests

- C. I know that these tests are most useful when considering advanced stroke therapies such as IA thrombolysis or clot retrieval, and only order them when the patient is due to have an interventional radiology procedure.

Stroke 2006



### Question: Utilizing Tests

- D. I order these tests often in order to expedite the diagnostic workup of my ED stroke patients, whether these patients are to receive IV tPA or who might receive an acute interventional radiology procedure.

Stroke 2006



### Question: Utilizing Tests

- E. Have any of these diagnostic tests been proven to be effective at improving outcome in stroke patients?

Stroke 2006



**Question: Utilizing Tests**

- A. I do not order them in the ED.
- B. I rely on my neurology consultants.
- C. I order them when the patient is due to have an interventional radiology procedure.
- D. I order these tests often.
- E. Have these tests been proven to be effective?

Stroke 2006



**Question: Advanced Therapies**

- There are many options that exist after the three-hour IV tPA window, including IA thrombolysis, the Merci clot retrieval device, and devices that enhance cerebral blood flow. What is your clinical practice regarding these advanced stroke therapies?

Stroke 2006



**Question: Advanced Therapies**

- A. I do not have a clear understanding of these advanced therapies, and do not access them for my stroke patients.

Stroke 2006



**Question: Advanced Therapies**

- B. I know of these therapies, but my understanding is that they are experimental in nature and are not a part of the standard of care.

Stroke 2006



**Question: Advanced Therapies**

- C. I have noted these therapies to be used by my neurology consultants on occasion, but I am not sure of the indications for their use.

Stroke 2006



**Question: Advanced Therapies**

- D. I understand the utility of these interventions, and I aggressively pursue them for my stroke patients who do not meet the IV tPA criteria.

Stroke 2006



**Question: Advanced Therapies**

**E. Have any of these therapies been proven to be effective in any published clinical trials?**

Stroke 2006 

**Question: Advanced Therapies**

- A. Do not access them.**
- B. Experimental in nature.**
- C. used by my neurology consultants on occasion.**
- D. I aggressively pursue them.**
- E. Have any of these therapies been proven to be effective in any published clinical trials?**

Stroke 2006 

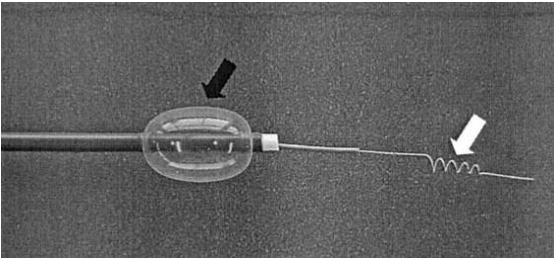
**Stroke** American Stroke Association  
A Division of American Heart Association

**Safety and Efficacy of Mechanical Embolectomy in Acute Ischemic Stroke**  
Results of the MERCI Trial

Wade S. Smith, MD, PhD; Gene Sang, MD; Sidney Starkman, MD; Jeffrey L. Saver, MD; Chelsea S. Kidwell, MD; Y. Pierre Gobin, MD; Helmi L. Latsep, MD; Gary M. Nesbit, MD; Thomas Grobelny, MD; Marilyn M. Rymer, MD; Isaac E. Silverman, MD; Randall T. Higashida, MD; Ronald F. Budzik, MD; Michael P. Marks, MD; for the MERCI Trial Investigators

*Stroke* 2005;36:1432-1438; originally published online Jun 16, 2005; DOI: 10.1161/01.STR.0000171066.25248.1d

**Concentric Retriever Device With Nitinol Coil (White Arrow) and Inflated Balloon (Black Arrow)**



Leary MC, et al. *Ann Emerg Med.* 2003 Jun;41(6):838-46


**MERCI Recanalization and Outcomes**

	<b>ICA (n=47)</b>	<b>MCA (n=80)</b>
BL NIHSS	19	20
TIMI II/III*	53%	45%
NIHSS ↓ 10 pts.**	33%	29%
Sx ICH	15%	4%
Death**	51%	39%

\* About half were TIMI III  
\*\* At 90 days

**Question: Clinical Guidelines**

- **Regarding ischemic stroke patients, what is your understanding and use of clinical guidelines?**

Stroke 2006 

**Question: Clinical Guidelines**

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**A.** I am not aware of any clinical guidelines that direct my care of ischemic stroke patients.

Stroke 2006



**Question: Clinical Guidelines**

---

**B.** I am sure that there are guidelines that exist from organizations such as the American Stroke Association, but I do not use them because primarily my neurology consultants utilize these guidelines.

Stroke 2006



**Question: Clinical Guidelines**

---

**C.** I am familiar with guidelines that direct stroke patient care, and I refer to them on occasion in order to optimize my acute care.

Stroke 2006



**Question: Clinical Guidelines**

---

**D.** I follow clinical guidelines and protocols in my ED because our hospital has integrated them into clinical policies for the institution.

Stroke 2006



**Question: Clinical Guidelines**

---

**E.** I wish that there were guidelines that would direct my treatment of stroke complications such as elevated blood pressure.

Stroke 2006



**Question: Clinical Guidelines**

---

- A.** Not aware of any clinical guidelines.
- B.** My neurology consultants utilize these guidelines.
- C.** I refer to them on occasion.
- D.** Our hospital has integrated them.
- E.** I wish that there were guidelines.

Stroke 2006



**Question: Optimal Therapies**

- Regarding neuroprotection in acute ischemic stroke patients, what is your understanding of current optimal therapies?

Stroke 2006



**Question: Optimal Therapies**

- A. I am not aware of any specific neuroprotection therapies for ischemic stroke patients.

Stroke 2006



**Question: Optimal Therapies**

- B. I believe that the only useful therapies involve ASA use and blood pressure and glucose management in the majority of ischemic stroke patients.

Stroke 2006



**Question: Optimal Therapies**

- C. Besides BP and glucose control, I consider optimal cerebral blood flow to be another critical neuroprotectant, and I pursue aggressive thrombolysis and clot retrieval of the target vessel in order to achieve it.

Stroke 2006



**Question: Optimal Therapies**

- D. I am aware of the trials of specific neuroprotectants, and I utilize them in my clinical practice.

Stroke 2006



**Question: Optimal Therapies**

- E. I do not believe that neuroprotection is possible. Once the initial damage is done, there is no way to protect the infarct zone or ischemic penumbra.

Stroke 2006



## Question: *Optimal Therapies*

- A. Not aware of any therapies.
- B. Only useful therapies involve ASA use and blood pressure and glucose management.
- C. Optimal cerebral blood flow is another critical neuroprotectant.
- D. I utilize them.
- E. I do not believe that neuroprotection is possible.

Stroke 2006



## Conclusions

- Important EM patient clinical area
- Many questions
- Some areas of consensus
- Many areas of opportunity
- Further work is needed
- The interest is there

Stroke 2006



**Questions?  
Thank you!**

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