

FERNE/EMF Grant Award
An Emergency Department Diagnostic Protocol
For Patients With Transient Ischemic Attack:
A Randomized Controlled Trial

Michael A. Ross MD
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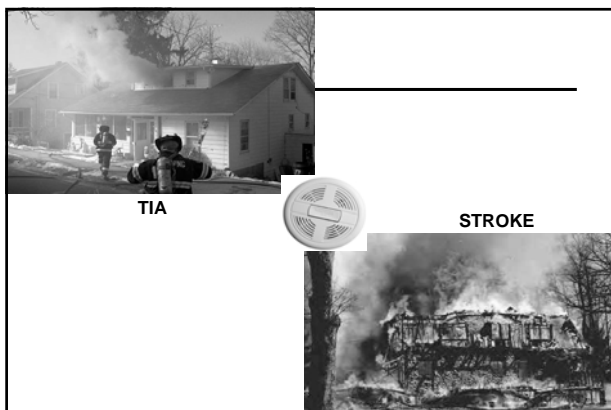
Department of Emergency Medicine
William Beaumont Hospital
Wayne State University School of Medicine

Funded by the Foundation for Education and Research in Neurological
Emergencies (FERNE) and the Emergency Medicine Foundation (EMF)



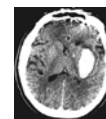
Background

- **300,000 TIAs occur annually**
 - 10.5% suffer a stroke within 90 days of an ED visit
- **Stroke is preceded by TIA in 15% of pts**
- **Stroke is the THIRD leading cause of death**
 - National cost of stroke = \$51 billion annually!



Management of TIA:

- **Areas of Certainty:**
 - Need for ED visit, ECG, labs, Head CT
- **Areas of less certainty**
 - The timing of the carotid dopplers
- **Areas of Uncertainty** - Johnston SC. *N Engl J Med.* 2002;347:1687-92.
 - “The benefit of hospitalization is unknown. . . Observation units within the ED. . . . may provide a more cost-effective option.”



Study Objective:

To determine if emergency department TIA patients managed using an accelerated diagnostic protocol (ADP) in an observation unit (EDOU) will experience:

- shorter length of stays
- lower costs
- comparable clinical outcomes

. . . relative to traditional inpatient admission.

Methods

An IRB approved prospective randomized study

Setting:



- **William Beaumont Hospital: A high-volume university-affiliated suburban teaching hospital**
 - Emergency department
 - 2005 ED census = 115,894
 - ED observation unit = 21 beds
 - Emergency physician - “admitting” physician for all patients

Patient population:

- Presented to the ED with symptoms of TIA
- ED evaluation:
 - History and physical
 - ECG, monitor, HCT
 - Appropriate labs
 - **Diagnosis of TIA established**
 - Decision to admit or observe
 - **SCREENING FOR STUDY**

Methods:
Randomization

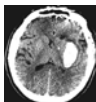
- Patients were consented, then:
- Sealed envelope opened -
 - Randomized to:
 - EDOU (ADP orders)
 - Inpatient bed (inpatient orders)
 - Data collection forms
- Once randomized - primary care physician notified

Methods:
TIA ADP Protocol

- Developed by multidisciplinary group
 - Used for ~1 year prior to study
- Target pathology being sought:
 - Crescendo TIAs or occult stroke
 - Paroxysmal atrial fibrillation, major arrhythmias
 - Carotid stenosis >50%
 - Intra-cardiac source of clot - (PFO, valves, etc.)

Methods:
ADP Exclusion criteria

- Persistent acute neurological deficits
- Crescendo TIAs
- Positive HCT
- Known embolic source (including a. fib)
- Known carotid stenosis (>50%)
- Non-focal symptoms
- Hypertensive encephalopathy / emergency
- Prior stroke with large remaining deficit
- Severe dementia or nursing home patient
- Unlikely to survive beyond study follow up period
- Social issues making ED discharge / follow up unlikely
- History of IV drug use



Methods:
ADP Interventions

- Four components:
 - Serial neuro exams
 - Unit staff, physician, and a neurology consult
 - Cardiac monitoring
 - Carotid dopplers
 - 2-D echo
- **BOTH** study groups had orders for the same four components

Methods:
ADP Disposition criteria

- **Home**
 - No recurrent deficits, negative workup
 - Appropriate antiplatelet therapy and follow-up
- **Inpatient admission from EDOU**
 - Recurrent symptoms or neuro deficit
 - Surgical carotid stenosis (ie >50%)
 - Embolic source requiring treatment
 - Unable to safely discharge patient

Methods:
90-day Study Follow Up

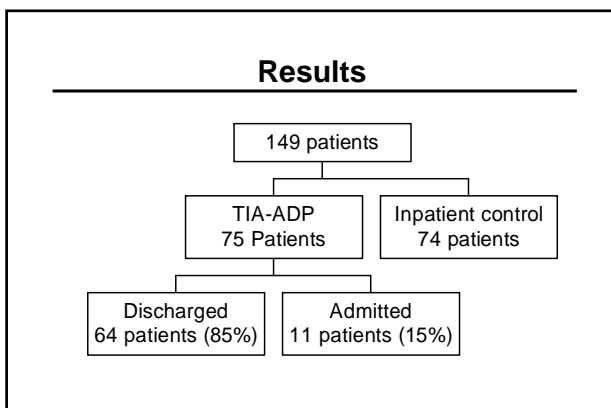
- **Methods:**
 - Structured telephone interview
 - Electronic records review
 - Paper chart review
- **Recidivism:**
 - Related return visit to ED or hospitalization
 - Scheduled or unscheduled
 - Not routine office or clinic visits

Methods:
Study Outcome Measures

- **Length of stay**
 - ED arrival to hospital discharge
- **90-day Total Direct Cost**
 - Index visit costs + 90-day related costs
 - “EPSi” – hospital cost accounting system
 - Professional costs not included
- **Clinical outcomes - stroke, recidivism**

Statistical Methods

- **Power analysis:**
 - The study sample size had a “strong” power (.80) to detect a 25% absolute difference in the primary outcome of length of stay.
 - equivalent to 24 hours
- **Analysis:**
 - Univariate and descriptive statistics used
 - Difference between medians estimated by the Hodges-Lehmann method



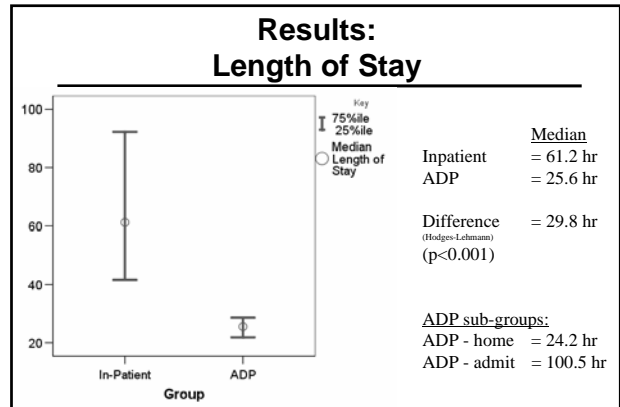
Results:
Patient Characteristics

	Inpatient Total n=74	TIA-ADP Total n=75
Mean Age (sd)	67.7yr (15.4)	68.4yr (15.3)
Male n (%)	34 (46%)	31 (41%)
TIA Stroke Risk Factors - mean (sd) *	2.7 (1.4)	2.4 (1.1)
Median (IQR) Initial ED Length of Stay	6.2 hrs (5.0-6.2)	5.7 hrs (4.5-5.5)

* Johnston - JAMA. 2000;284:2901-6.

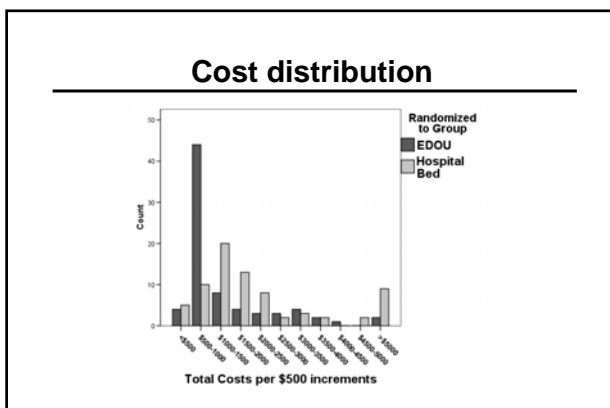
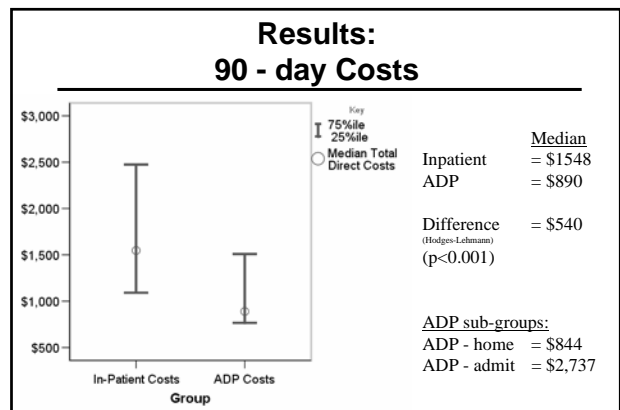
Results:
Performance of clinical testing

	Inpatient (n=74)	TIA-ADP (n=75)
Carotid imaging		
Number completed (n, %)	67 (90.5%)	73 (97.3%)
Time to completion	25.2 hr (17.3 – 37.1)	13.0 hr (8.4 – 18.0)
Echocardiography		
Number completed (n, %)	54 (73%)	73 (97.3%)
Time to completion	43.0 hr (23.8 – 63.8)	19.1 hr (16.7 – 22.5)



Results:
90-Day Clinical Outcomes

90 Day Outcomes	Inpatient Total n=74	TIA-ADP Total n=75
Related return visits	9 (12%)	9 (12%)
Clinical Outcomes		
Index visit CVA	5	7
Subsequent CVA (90 day)	2	3
Total 90 day CVA	7 (9%)	10 (13%)
Related Major event or MACE	4	4



- Limitations and Issues:**
- Limitations:**
 - Not powered for individual clinical outcomes
 - Single center, EDOU
 - May not be applicable outside the EDOU
 - Future Issues:**
 - ADP for small strokes (NIH <3)?

Implications

- **National feasibility of ADP:**
 - 18% of EDs have an EDOU
 - 220 JCAHO stroke centers
- **National health care costs**
 - Potential savings if 18% used ADP:
 - \$29.1 million dollars
 - Medicare observation APC
- **Impact of shorter LOS**
 - Patients – satisfaction, missed Dx . . .
 - Hospitals – bed availability

Summary:

A diagnostic protocol for TIA in an EDOU is more efficient, less costly, and demonstrated comparable clinical outcomes to traditional inpatient admission.

Acknowledgements

- **FERNE / EMF**
- **Beaumont research staff and residency**

Questions?

