


Stroke Systems Improved Outcomes?

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Key Clinical Questions


- What is the current status of primary stroke center designation?
- What is the current status of tertiary stroke center designation?
- What regional or national stroke systems currently exist?
- What networks for evaluation, consultation, and transfer exist?
- How are telemedicine systems utilized in these stroke systems?
- What are the documented benefits and outcome enhancements for stroke patients who are treated in these systems?

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What is the current status of primary stroke center designation?

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Major Elements of a Primary Stroke Center

- Patient care areas
 - Acute stroke teams
 - Written care protocols
 - Emergency medical services
 - Emergency department
 - Stroke unit
 - Neurosurgical services
- Support services
 - Stroke center director
 - Neuroimaging services
 - Laboratory services
 - Outcome and quality improvement activities
 - Continuing medical education

Alberts MJ, et al. JAMA. 2000;283:3102-3109.


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Primary Stroke Centers in the US

- Approximately 5,000 hospitals in the US
- As of June 2007 there are 352 certified Stroke Centers
- 94 more in the pipeline
- 40 states
- State certification in several states

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Standardized Measure Set

- Standardized measures:
 - Tissue plasminogen activator (t-PA) considered and given
 - Patient discharged on antithrombotics
 - Deep vein thrombosis (DVT) prophylaxis
 - Patients with atrial fibrillation receiving anticoagulation therapy
- Additional Pilot Measures:
 - Screen for dysphagia
 - Lipid profile during admission
 - Antithrombotic medication within 48 hours of hospitalization
 - Stroke education
 - Smoking cessation
 - Rehabilitation plan considered

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Primary Stroke Center Performance Measure Pilot Study

- Methods:
 - 30 certified Primary Stroke Centers self-reported data from 11 standardized measures for 12 months
 - Data collected and aggregated monthly
 - Analysis of performance to determine if improvement occurred over time

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Primary Stroke Center Performance Measure Pilot Study

- Results:
 - Absolute positive change in rates for all 11 measures
 - Statistically significant improvement in 8 of 11 measures
 - tPA administration increased 18.26% during the period

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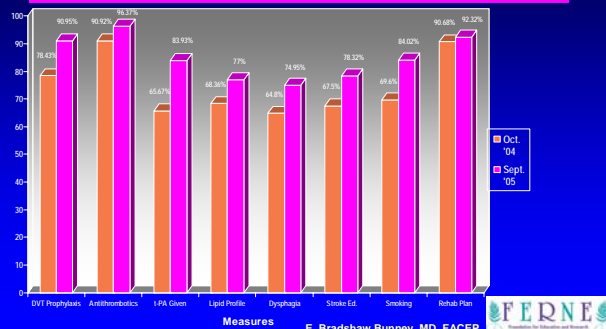
Primary Stroke Center Performance Measure Pilot Study

- Additional Changes in Measures:
 - DVT Prophylaxis: +12.52%
 - Discharged on antithrombotics: +5.45%
 - Lipid profile: +8.64%
 - Screen for dysphagia: +10.15%
 - Stroke education: +10.82%
 - Smoking cessation counseling: +14.42%
 - Plan for Rehab Considered: +1.64%

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Mean Values and Overall Changes in Pilot Hospital Stroke Performance Measures Over 12 Month Pilot



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Performance Measures: Next Steps

- Effort underway to align stroke measures across three initiatives:
 - Joint Commission Standardized Measure Set
 - CDC's Coverdell Registry
 - ASA's Get With the Guidelines - Stroke

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Performance Measures: Next Steps

- Value of aligning measures:
 - Ability to compare data across all registries
 - Ability to determine impact of certification on stroke care
 - Limits the burden of data collection on hospitals

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What is the current status of tertiary stroke center designation?

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Elements of Comprehensive Stroke Center

- Health care personnel with specific expertise
 - Vascular neurology
 - Vascular neurosurgery
 - Critical care
- Diagnostic techniques
 - MRI, diffusion, perfusion
 - CTA
 - Carotid duplex
- Surgical intervention
 - Aneurysm clipping
 - Ventriculostomy placement
- Infrastructure
 - ICU
 - OR
 - Stroke registry
- Education
 - Community education
 - Community prevention
 - CME

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Comprehensive Stroke Center Designation

- No formal certification established
- Under review by JCAHO
- 1-2 years away

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What regional or national stroke systems currently exist?

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Stroke Registries

- Senator Paul Coverdell from Georgia
- Died July 2000
- CDC awarding grants to states to establish registries
- National link

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Coverdell Stroke Registry

- 6867 stroke admissions at 98 hospitals
- 4 states (MI, GA, OH, MA)
- Less than 2/3 had documented onset times.
- Less than 50% had:
 - dysphagia screening (45%)
 - lipid testing (34%)
 - smoking cessation counseling (21%)
- 3% received rTPA in MI, GA, OH, while 8% received rTPA in MA.
- Conclusion: only a minority of acute stroke patients are treated according to established guidelines.
- Protocols will be redesigned to improve compliance with the established guidelines which may reveal outcomes benefit.

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What networks for evaluation, consultation, and transfer exist?

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Stroke Networks

- Consultation agreements
- Rotating call between institutions
- Consolidating resources among a network of hospitals
- Uniform protocol usage
- Maximize therapy usage

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Rural Nevada

- One designated stroke center
- 25 rural EDs
- One protocol agreed to by all hospitals
- Central stroke team
- Site visits to confirm protocol adherence and promote team approach
- Help to raise the treatment of stroke patients to a common norm

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How are telemedicine systems utilized in these stroke systems?

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Telemedicine Systems

- Two-way videoconferencing to connect a treating physician with a remote consultant
- Management option for the treatment of acute stroke patients in hospitals without the resources to provide acute stroke care.

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Telemedicine Systems

- Telemedicine consultation on 24 acute stroke patients
- 6 (25%) received tPA
 - door to needle time of 106 (+/- 22) minutes
 - consult to needle time of 36 (+/- 15) minutes.
- No protocol violations
- May increase the number of stroke patients receiving therapy
- May assist in delineating a group of patients that can receive optimal treatment at the originating hospital thus improving the utilization of scarce resources.

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What are the documented benefits and outcome enhancements for stroke patients who are treated in these systems?

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Stroke Systems Outcomes

- To date there is very little data supporting outcome improvement with the use of specific guidelines or protocols.
- Most of the existing data concentrates on the improvement in compliance with protocols thus the possibility of improving outcomes.

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Stroke Systems Outcomes

- Correlation between the 11 elements of the primary stroke center certification and outcomes
- 16,853 stroke patients from 34 academic medical centers.
- In-hospital mortality rate was 6.3%
- 2.4% of patients received rTPA
- None of the 11 elements decreased in-hospital mortality or increased the frequency of discharge to home
- Four of the elements predicted increased rTPA use
 - written care protocols
 - integrated EMS
 - organized emergency department
 - CME

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Stroke Systems Outcomes

- 32 hospitals in Brooklyn and Queens
- Comparing stroke treatment before implementation of the BAC guidelines with treatment after guideline implementation
- Use of tPA increased from 2.4 to 5.2%.
- Protocol violations decreased from 11.1 to 7.9%.
- Overall there was improvement in door to doctor, door to CT and door to needle times.
- However, peri-stroke complications and discharge to home were not improved.

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Key Learning Points

- Stroke center certification provides a method of measuring quality improvement in stroke patient care
- Stroke registries measure quality indicators as well as outcomes
- Stroke networks allow a region to achieve a particular quality standard
- Outcomes measurement needs to be continued to establish the role of stroke systems as well as therapies

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