Patient and Facility Characteristics Related to Hypertension Control after a Transient Ischemic Attack

Sigma Theta Tau International's 28th International Nursing Research Congress

Dublin, IE July 2017

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Objectives:
- Identify issues in hypertension control after a transient ischemic attack (TIA).
- Describe health care facility characteristics that are associated with better hypertension control after discharge from a TIA.

No disclosures
Acknowledgement and Funding

Dawn M. Bravata, MD, Principal Investigator of the CARETime Study

Supported by Department of Veterans Affairs (VA), Health Services Research & Development Service (HSRD), Stroke Quality Enhancement Research Initiative (QUERI) Service Directed Project (SDP 12-178)

Dr. Sico is supported by a VA HSRD Career Development Award (HX001388-01A1)
United States Veteran’s Health Administration (VHA)

- Largest healthcare system in the US
- 168 VHA Medical Centers
- 1,053 outpatient clinics of varying complexity
- Serving more than 8.9 million Veterans each year
TIA and Minor Stroke in the VHA

~11,000 Veterans with TIA or any stroke are cared for in a VA Emergency Department or ward annually

~ 8500 with TIA or minor stroke

In general US population:
TIA prevalence: > 5 million Americans have had a TIA
Stroke prevalence: 6.6 million Americans have had a stroke

Timely Preventative Care After a TIA

- Patients with TIA have high risk of repeat TIAs, stroke and death
- Timely delivery of hypertension management and other preventive care can dramatically reduce risk of recurrent events
- Little is known about patient or facility factors affecting hypertension management in the VHA
- The VHA has no guidelines or quality metrics for TIA
- TIA patients are likely to be viewed with less urgency than stroke patients and thus “fall through the cracks”
CARETime Study of VHA Patients

- Administrative data for 8,000 patients with TIA or minor stroke in any VHA ED or inpatient ward (FY2011)
- Review of 800 charts from 45 large volume VA Medical Centers
- Case study interviews with staff from 14 diverse VAMCs

Develop and test TIA and minor stroke quality indicators

Identify barriers and facilitators of providing high quality TIA care
# Quality of VA TIA and Minor Stroke Care (FY2014)

<table>
<thead>
<tr>
<th>Process of Care</th>
<th>Eligible</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain imaging</td>
<td>7563</td>
<td>88.9</td>
</tr>
<tr>
<td>Antithrombotics</td>
<td>7477</td>
<td>83.8</td>
</tr>
<tr>
<td>HbA1c measurement</td>
<td>3464</td>
<td>82.5</td>
</tr>
<tr>
<td>Anticoagulation for atrial fibrillation</td>
<td>1222</td>
<td>82.1</td>
</tr>
<tr>
<td>Deep Vein Thrombosis (DVT) prophylaxis</td>
<td>4346</td>
<td>74.9</td>
</tr>
<tr>
<td><strong>Hypertension control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean BP over 90 days post-discharge &lt;140/90 mmHg</td>
<td>5979</td>
<td>71.8</td>
</tr>
<tr>
<td>Neurology consult</td>
<td>7823</td>
<td>70.6</td>
</tr>
<tr>
<td>Electrocardiography</td>
<td>7570</td>
<td>67.0</td>
</tr>
<tr>
<td>Carotid artery imaging</td>
<td>7685</td>
<td>64.1</td>
</tr>
<tr>
<td>High or moderate potency statin</td>
<td>7054</td>
<td>47.2</td>
</tr>
<tr>
<td>Oral hypoglycemic intensification</td>
<td>706</td>
<td>37.5</td>
</tr>
<tr>
<td>Carotid stenosis intervention</td>
<td>222</td>
<td>35.1</td>
</tr>
<tr>
<td>Antihypertensive intensification</td>
<td>2997</td>
<td>28.3</td>
</tr>
<tr>
<td>Substance abuse treatment for alcohol abuse</td>
<td>775</td>
<td>9.2</td>
</tr>
<tr>
<td>Polysomnography</td>
<td>5962</td>
<td>3.8</td>
</tr>
</tbody>
</table>
Aims of this Study

- Identify patient and facility characteristics associated with hypertension control for TIA patients in the 90 days following discharge from an ED or inpatient setting.
- Apply information gained from the study to improve hypertension management by:
  - Targeting patients for interventions
  - Guiding system-level changes to improve care
Study Sample

3676 TIA patients with a TIA (ICD-9 of 435.x as primary discharge code)
- Admitted to ED or inpatient setting
- 132 VHA facilities
- 12 month period from October 2010 to September 2011

168 excluded patients
- Died during the index ED visit/hospitalization or within 90 days
- Discharged to hospice or transferred to a non-VA acute care facility

3508 patients in final analysis sample
Data Sources

VHA inpatient and outpatient data and Medicare claim files
◦ Past medical history
◦ Presenting symptoms
◦ Healthcare utilization (e.g., inpatient admission or ED only)

Pharmacy Benefits Management (PBM)
◦ Medications during the ED visit or inpatient stay

Corporate Data Warehouse (CDW) data
◦ Vital signs
◦ Consultations
Variables: Hypertension

Hypertension control
- BP control at 90 days post-discharge from the index ED or inpatient admission
- Control was defined as mean systolic BP <140 mmHg and mean diastolic BP <90 mmHg from values measured within 90 days after discharge

Additional hypertension variables
- History of hypertension
- BP control at discharge after the TIA event
Variables: Patient and Facility

- **Inpatient admission** or discharge directly from the ED
- **Neurologist consult** during initial ED visit or inpatient stay
- History of **hypertension**, **hyperlipidemia**, **sleep apnea**, **dialysis**, or **depression**
- **Facility Characteristics:**
  - **VHA stroke center** designation of primary stroke center
  - **FTE internal medicine staff**
  - Rate of **BP control for overall** patient population
Analysis

Binary outcome: BP control at 90 days (1=yes, 0=no)

Model
- Hierarchical general linear model (HGLM) with a logit link function
- Facility random effect to address patient clustering within facilities

Independent variables
- BP control at discharge
- Patient characteristics
- Facility characteristics
## Sample Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>BP Control at Discharge from Index TIA</td>
<td>58%</td>
</tr>
<tr>
<td>BP Control at 90 Days after Discharge</td>
<td>78%</td>
</tr>
<tr>
<td>Male</td>
<td>95%</td>
</tr>
<tr>
<td>Mean Age (SD)</td>
<td>69 (12)</td>
</tr>
<tr>
<td>History of Hypertension</td>
<td>82%</td>
</tr>
<tr>
<td>History of Hyperlipidemia</td>
<td>76%</td>
</tr>
<tr>
<td>History of Sleep apnea</td>
<td>19%</td>
</tr>
<tr>
<td>Dialysis</td>
<td>3%</td>
</tr>
<tr>
<td>History of Depression</td>
<td>40%</td>
</tr>
<tr>
<td>Inpatient admission (vs. ED only)</td>
<td>68%</td>
</tr>
<tr>
<td>Neurologist consult</td>
<td>63%</td>
</tr>
<tr>
<td>Facility: VA Stroke Center</td>
<td>59%</td>
</tr>
<tr>
<td>Facility: &gt; 25 stroke admissions per year</td>
<td>62%</td>
</tr>
<tr>
<td>Facility: FTE internal medicine staff / 100k patient visits</td>
<td>1.0</td>
</tr>
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</table>
### Modeling Results: Significant Predictors of BP Control at 90 Days

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Adj. Odds Ratio [95% CI]</th>
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<tbody>
<tr>
<td><strong>Patient Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Uncontrolled BP at discharge</td>
<td>.36 [.30-.44]</td>
</tr>
<tr>
<td>History of hypertension</td>
<td>.45 [.30-.44]</td>
</tr>
<tr>
<td>Dialysis</td>
<td>.57 [.34-.96]</td>
</tr>
<tr>
<td>History of hyperlipidemia</td>
<td>1.37 [1.09-1.72]</td>
</tr>
<tr>
<td>Sleep apnea</td>
<td>1.29 [1.00-1.64]</td>
</tr>
<tr>
<td>Depression</td>
<td>1.27 [1.04-1.54]</td>
</tr>
<tr>
<td><strong>Facility Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Stroke center designation</td>
<td>1.45 [1.08-1.94]</td>
</tr>
<tr>
<td>Top quintile of FTE internal medicine staff</td>
<td>1.45 [1.08-1.95]</td>
</tr>
<tr>
<td>Percentage of all patients with BP control</td>
<td>1.14 [1.03-1.25]</td>
</tr>
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Findings and Implications

Finding: Inpatient admission and neurologist consult had no relationship to post-discharge BP control.

Implications: BP control is an ongoing process requiring risk factor management in the outpatient setting after the TIA event.
Findings and Implications

Finding:
TIA patients with a history of hypertension and uncontrolled BP at discharge had poorer BP control at 90 days.

Implications:
TIA patient with a history of uncontrolled BP should be targeted for intensive risk factor management after discharge.
Findings and Implications

Finding:
Patients with a history of hyperlipidemia, sleep apnea, or depression, had better BP control.

Implications:
Effectively treating these comorbidities should contribute to BP control. On the other hand, If the they are undiagnosed or untreated these comorbidities could make BP control more difficult.
Findings and Implications

Finding:
TIA patients had better BP control in facilities with a designated stroke center, more FTE internal medicine staff, and better record of BP control.

Implications:
Better BP control can be achieved in VA Medical Centers through better coordination of TIA care, more primary care resources, and better overall hypertension management.
The Key to TIA Care Coordination: Nurses

We conducted interviews with health care providers at 14 high-volume VHA Medical Centers to inquire about successes and barriers to good TIA care.

A major contributor to risk factor management was the presence of an RN stroke/TIA coordinator who

- Bridged the care transition with neurology, radiology and vascular surgery.
- Was pivotal in arranging for follow-up care in the stroke clinic, if available, and with the primary care provider.
Translation of Project Findings: PREVENT Intervention

New project in progress
Aimed at better preventive care for TIA
Follow up to CARETime Study
Address identified barriers to TIA Care
Targeted at high volume VA medical centers
DATA FEEDBACK
- Monthly performance data
- Quarterly outcome data
- CAC support to customize site-specific data

QUALITY IMPROVEMENT SUPPORT
- Strategic planning support tool
- Help sites use data for ongoing QI
- Systems redesign virtual collaborative
- Web-based hub for sharing QI plans, lessons learned, and resource library

PROFESSIONAL EDUCATION
- Multi-media: presentations, video, publications, posters, checklists, pocket-cards
- Targeted: nursing, neurology, ED, pharmacy

CLINICAL PROGRAMS
- Pharmacy protocol
- Post-discharge nursing follow-up protocol
- Acute telehealth HTN disease management supplement

EHR TOOLS
- Patient identification tool
- Templated notes and order menus

IT BARRIERS
- How to find patients to provide care
- How to facilitate identifying gaps in care

INADEQUATE CARE COORDINATION
- Across settings
- Across specialties

QUALITY IMPROVEMENT UNCERTAINTY
- Lack of experience with QI
- Patient-focused versus facility-focused: distinguishing providing care from improving care
- No collaborations with systems redesign staff

LACK OF PERFORMANCE DATA
- Belief that all patients are being admitted
- Misinformation about patient volume
- Lack of performance or outcome data
- Consequences of missed processes of care not evident across specialties or settings

KNOWLEDGE GAPS
- About clinical urgency to treat TIA/minor stroke patients who are asymptomatic
- About guideline-recommended care

PREVENT INTERVENTION

BARRIERS

QUALITY IMPROVEMENT UNCERTAINTY

LACK OF PERFORMANCE DATA

IT BARRIERS

INADEQUATE CARE COORDINATION

KNOWLEDGE GAPS
# CARETime Project Team

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