Ischemic Stroke Patient Characteristics and Outcomes in California

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STROKE

- A disease that the arteries leading to and within the brain are either blocked by a clot or rupture

- ~ 800,000 Americans experience a stroke each year
  - a stroke occurs every 40 seconds
  - a stroke death occurs every 4 minutes

- the #4 leading cause of death and the #1 cause of disability in US

- Estimated cost $71.5 billion in 2012, projected to increase to $240.67 billion by 2030 in US
STROKE TYPES

Ischemic Stroke

- Clot occluding artery 87%

Hemorrhagic Stroke

- Intracerebral Hemorrhage
- Subarachnoid Hemorrhage

Bleeding into brain
Bleeding around brain
INTRODUCTION

- “Time lost is brain lost in acute ischemic stroke”
- Timely interventions are critical to reverse the damage, and to reduce mortality and disability
- Timely administration of tissue-type plasminogen activator (tPA) is known to improve the stroke outcomes
  - “clot buster”
  - IV tPA window 3 hours, IA tPA window 4.5 hours
  - Disability risk ↓ 30% despite ~5% symptomatic ICH risk

- Clinical guidelines urged to increase the use of tPA in acute ischemic stroke patients, though most studies have shown a low rate of tPA use nationally
INTRODUCTION

- How the tPA usage rate is related to stroke outcomes at California (CA) counties is unknown.

- With the recent change in CA population demographics, and more hospitals participating in “Get with the Guidelines-Stroke,” current stroke patient profiles and stroke outcomes in CA hospitals are unknown.

- OSHPD recently released a report “Ischemic Stroke: Hospital Outcomes in California, 2011-2012” to assess the quality of ischemic stroke care at California acute care hospitals.

[Link to report](http://oshpd.ca.gov/HID/Products/PatDischargeData/Stroke/stroke2011-2012.html)

[Link to health information](https://chhs.data.ca.gov/Healthcare)
OBJECTIVES

For ischemic stroke patients admitted in CA acute care hospitals

- To understand statewide ischemic stroke patient characteristics

- To examine stroke care outcomes (risk adjusted 30-day Mortality and 30-day Readmission rates) and tPA usage at state and county levels
METHODS

➤ Data
  – California patient discharge data (PDD), an all-payer database from OSHPD
  – California death certificate records, from the California Department of Public Health

➤ Inclusion Criteria
  – Admission date between January 1, 2012 and November 30, 2013
  – Age 18 and older
  – Principal diagnosis of ischemic stroke (ICD-9-CM 433, 434, 436)
METHODS

- Exclusion Criteria
  - Principal diagnosis of hemorrhagic stroke (ICD-9-CM 430, 431, and 432)
  - Prior stroke history within 180 days of the stroke admission
  - Transfer Patients
  - Non general acute care hospitals

- Identify tPA receipt
  - ICD-9 CM V45.88, 9910
  - The validation study demonstrated that use of tPA is well-coded in the PDD

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METHODS

The outcome measures

- Developed by a team of clinicians, statisticians and health services experts from the University of California, Los Angeles (UCLA)
- Statistically adjusted for demographics, comorbidity, and stroke severity
- Validation by UCLA showed that risk-adjusted mortality outcomes based on OSHPD inpatient and emergency department data, linked with state mortality data, were feasible, reliable, and valid measures of hospital performance
RESULTS

- Total 7,376,583 Admissions in California between January 1, 2012 and November 30, 2013

- About 5.5% of total admissions (402,916) were adults with stroke

- 20% of admissions with stroke (82,731), were primary diagnosis with ischemic stroke and admitted to acute care hospitals

- Total 70,447 patients were included in the study
Ischemic Stroke Patients by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Percent (%)</th>
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<tbody>
<tr>
<td>Male</td>
<td>48.8</td>
</tr>
<tr>
<td>Female</td>
<td>51.2</td>
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</tbody>
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Ischemic Stroke Patients by Age Group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percent (%)</th>
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</thead>
<tbody>
<tr>
<td>18-44</td>
<td>3.5</td>
</tr>
<tr>
<td>45-64</td>
<td>26.7</td>
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<tr>
<td>65-74</td>
<td>21.3</td>
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<tr>
<td>75-84</td>
<td>25.9</td>
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<tr>
<td>85+</td>
<td>22.7</td>
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</tbody>
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Ischemic Stroke Patients by Race/Ethnicity

- White: 38%
- Black: 6%
- Hispanic: 37%
- Asian/Pacific Islander: 14%
- Other: 5%

CA population in 2012
- White: 56%
- Black: 10%
- Hispanic: 19%
- Asian/Pacific Islander: 11%
- Other: 4%
Ischemic Stroke Patients by Expected Payer

- Medicare: 67%
- Medi-Cal: 9%
- Private: 16%
- Self Pay: 4%
- Other: 4%
Inpatient and 30-day Mortality rates

Among 70,447 stroke patients during 2012 to 2013:

- 3,486 (4.9%) patients died in the hospital, decrease compared with the data during 2011-2012 (5.3%)
- 7,340 deaths within 30 days of admission
- The California statewide 30-day mortality rate was 10.4%, slightly decrease compared with the rate during 2011-2012 (10.6%).
- Of the 274 hospitals, 9 hospitals performance were rated “Better” and 9 hospitals were rated “Worse” than the state average.
Hospital Inpatient Mortality Rates by County

22 out of 46 counties had higher rate than statewide level (4.9%) in 2012-13
VS 26 out of 46 counties (5.3%) in 2011-12
Hospital 30-day Mortality Rates by County

27 out of 46 counties had higher rate than statewide level (10.4%) in 2012-13
VS 34 out of 46 counties (10.6%) in 2011-12

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30-day Readmission Rates

Among 66,961 stroke discharges during 2011 to 2012:

- 8,305 hospital readmissions within 30 days

- The California statewide 30-day readmission rate was 12.4%, slightly decrease compared with the rate during 2011 to 2012 (12.8%)

- Of the 271 hospitals, 3 hospitals performance were rated “Better” and 7 were rated “Worse” than the state
Average Hospital 30-day Readmission Rates by County

14 out of 46 counties had higher rate than statewide level (12.4%) in 2012-13 VS 12 out of 46 counties (12.8%) in 2011-12

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tPA Usage

Among the 70,447 patients during 2012 to 2013

- 5,853 patients received tPA
- The California statewide tPA usage rate was 8.4%
- Significantly increase compared with tPA usage during 2011-2012 (7.2%)
16 out of 46 counties had lower rate than statewide level (8.4%) in 2012-13 VS 30 out of 46 counties (7.2%) in 2011-12
Distributions of Average County Rates for tPA and Outcomes
SUMMARY AND CONCLUSIONS

- White non-Hispanic patients accounted for 56% of all ischemic strokes
- 70% of patients were 65 years and older.
- Medicare comprised 67% of all ischemic stroke admissions.
- CA ischemic stroke patients varied by age, race/ethnicity and expected payer.
- The tPA use and stroke outcomes were different by regions
- The tPA usage rate significantly increases in most of counties, and rates for 30-day mortality, in-hospital mortality and 30-day readmission decrease.

“Ischemic Stroke: Hospital Outcomes in California, 2012-2013” is coming soon.
STUDY CAVEATS

- Stroke outcomes depend on time, place and person

- PDD, an administrative dataset, can not record the time and accurate place, so the model wasn’t risk adjusted to time and place

- PDD provide limited data to characterize patients’ risk of death/readmission
May is **National Stroke Awareness Month**

Irreversible nerve cell injury can occur after only **5 minutes** of interrupted blood flow.

**SPOT A STROKE**

- **F**ACE DROOPING
- **A**RM WEAKNESS
- **S**PEECH DIFFICULTY
- **T**IME TO CALL 911

*Stroke Warning Signs and Symptoms*
ACKNOWLEDGMENTS

• University of California, Los Angeles
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    • Joseph Parker, Ph.D.
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    • All staff from HOC
About OSHPD

OSHPD is the leader in collecting data and disseminating information about California’s healthcare infrastructure, promoting an equitably distributed healthcare workforce, and publishing valuable information about healthcare outcomes.

http://oshpd.ca.gov/