Saving lives one stroke program at a time: The Qatar Stroke program experience

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No conflict of interest to declare with this presentation

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Objectives

• Management of stroke: current status 2016
• Stroke care Qatar 2013
• Establishing a stroke program at Hamad General Hospital, Doha, Qatar
• Determine if the introduction of new initiatives makes a difference to stroke care
• Future plans
Stroke: status report 2016

• Leading cause of chronic disability and second most common cause of death and dementia (worldwide 15 million strokes per year).

• Incidence declining in the developed world but increased by 20% the last decade in L/MICs.

• In the developed world, the decline secondary to improved risk factor management and enhanced acute stroke care
  – Organized stroke care (Prevention of complications).
  – Reperfusion therapy.
# Cerebrovascular Disease: Stroke Types

<table>
<thead>
<tr>
<th>Ischemic Stroke (80-85%)</th>
<th>Hemorrhagic Stroke (15-20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atherothrombotic Cerebrovascular Disease (20%)</td>
<td>Intracerebral Hemorrhage (60%)</td>
</tr>
<tr>
<td>Lacunar (25%) (small vessel disease)</td>
<td></td>
</tr>
<tr>
<td>Cardioembolic (20%)</td>
<td></td>
</tr>
<tr>
<td>Cryptogenic (30%)</td>
<td>Subarachnoid Hemorrhage (40%)</td>
</tr>
</tbody>
</table>
Stroke risk in patients with acute stroke

<table>
<thead>
<tr>
<th>Medical History</th>
<th>Percentage (Count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>71.9% (299)</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>18.8% (78)</td>
</tr>
<tr>
<td>Past congestive heart failure</td>
<td>4.1% (17)</td>
</tr>
<tr>
<td>Past myocardial infarction</td>
<td>10.6% (44)</td>
</tr>
<tr>
<td>Past stroke</td>
<td>20.9% (87)</td>
</tr>
<tr>
<td>Past transient ischemic attack</td>
<td>12.3% (51)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>18.5% (77)</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>46.6% (194)</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>5.0% (21)</td>
</tr>
</tbody>
</table>
Repeat CT 24 hours
tPA the sooner the better!!

3-15% of all AIS victims receive tpa
Mobile Stroke Unit: Taking the treatment to the patient
Stroke Unit Trialists' Collaboration.

Organized inpatient (stroke unit) care for stroke. The Cochrane Library.

20 RCTs - data from 3864 people with stroke comparing specialized stroke rehabilitation units with conventional care.

In most RCTs, the specialized stroke rehabilitation unit was a designated area or ward; some trials used a mobile "stroke team".
# Stroke Unit Trials

6 and 12 month outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Stroke Unit</th>
<th>Control</th>
<th>Risk Diff (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home (ind)</td>
<td>44%</td>
<td>38%</td>
<td>6 (2,9) **</td>
</tr>
<tr>
<td>Home (dep)</td>
<td>16%</td>
<td>16%</td>
<td>0 (-2,3)</td>
</tr>
<tr>
<td>Institution</td>
<td>18%</td>
<td>20%</td>
<td>-3 (-6,0) *</td>
</tr>
<tr>
<td>Dead</td>
<td>22%</td>
<td>26%</td>
<td>-3 (-6,-1) *</td>
</tr>
</tbody>
</table>

Stroke Unit Trialists Collaboration
Population: 2.3 million
Local Qatari: 240,000
South Asians: 1.3 million
Arabs: (non-Qatari) 500,000
Philippines: 300,000

Single health care for the country (Hamad Medical Corporation)
Stroke 2013: Qatar

- Number of admissions per year ~ 850
- Admissions via EMS ~ 30-40%
- Admission to medical wards
  - Four wards/200 beds/60+ physicians
  - No stroke team/protocols
  - Average LOS ~ 11 days
- Neurology consultation service
Developing a stroke program at Hamad General Hospital

- Establishing a stroke unit
- Stroke evaluation and rapid thrombolysis pathway
- Develop a stroke registry (monitor outcome)
- Weekly stroke rounds
- Endovascular program
Changes to patient care

• **Improving rates of thrombolysis**
• Risk of complications depend on LOS in ED
• Stroke Unit care improves outcome
• Ethnicity and stroke
• Other programs under development
Number of Patients receiving Vascular intervention (TPA/Thrombectomy)

18% of ischemic stroke receive treatment
Door to needle time, minute: Median (IQR)

P-value <0.001

Akhtar et al J Stroke & CVD 2016
Changes to patient care

- Improving rates of thrombolysis
- **Risk of complications depend on LOS in ED**
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Risk of complications in ED related to length of stay.

- **ED STAY ≤ 8 HRS**: 227/265 (85.6%)
- **ED STAY > 8 HRS**: 506/629 (80.4%)

Comparing the two groups, there is a significant difference in the risk of complications, with a p-value of **P < 0.04**.

NIHSS at admission

- Mild (0-4): 3.3% (385/398)
- Moderate (5-15): 11.6% (291/329)
- Severe (≥16): 61.6% (45/73)

- 96.7% (13/398)
- 88.4% (38/329)
- 38.4% (28/73)

P < 0.001

Categories:
- No complications
- Complication present
Functional outcome at discharge and at 90 days (mRS)
DHOW₃ score

Simple triage score for nurses to prioritize stroke admissions in a busy ED.

- Dysphagia
- Hemiplegia
- Observation required
- Wet (Incontinence)
- Weight (BMI)
- Wait (time in ED)
Changes to patient care

• Improving rates of thrombolysis
• Risk of complications depended on LOC in ED
• **Stroke Unit care improves outcome**
• Ethnicity and stroke
• Other programs under development
Establishment of stroke program

- **Stroke ward**
  - March 2014 (8 beds; 50% of stroke admissions)
  - June 2014 (12 beds; 70% of stroke admissions)

- **Stroke evaluation and treatment pathway**

- **Hiring of 4 NPs and two stroke fellows**

- **Stroke registry established**

- **Endovascular program** (5 new stroke and endovascular physicians)
Investigations completed within 3 days

\[ P = 0.037 \]

- PRE-PROTOCOL: 20.5% (139/678)
- POST-PROTOCOL MW: 15.5% (105/678)
- POST-PROTOCOL SW: 64.0% (434/678)
Complications (total 133 in 871 patients)

- **Pneumonia**: 36.3% (64/176)
- **UTI**: 10.8% (19/176)
- **Bed Sores**: 4.0% (7/176)

Other percentages:
- 18.0% (27/150) for another condition
- 7.7% (42/545) for another condition
- 2.2% (12/545) for another condition
- 4.7% (7/150) for another condition
- 1.3% (75/545) for another condition

Statistical significance: $P = 0.0005$

Data source: Akhtar et al STROKE 2015
Complications


Stroke Ward became functional
Average length of stay for all stroke patients

Days

Average length of stay for all stroke patients

Days

Q1 2014: 10
Q2 2014: 9
Q3 2014: 8
Q4 2014: 8
Q1 2015: 7
Q2 2015: 6
Q3 2015: 6
Q4 2015: 5
Q1 2016: 5
LOS for patients with hospital complications (N=871)

<table>
<thead>
<tr>
<th>Ward</th>
<th>With</th>
<th>Without</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>42</td>
<td>23</td>
</tr>
<tr>
<td>Medical Ward</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Stroke Ward</td>
<td>18</td>
<td>6</td>
</tr>
</tbody>
</table>
Changes to patient care

• Improving rates of thrombolysis
• Risk of complications depended on LOC in ED
• Stroke Unit care improves outcome
• **Ethnicity and stroke**
• Other programs under development
<table>
<thead>
<tr>
<th>Clinical features and risk factors at presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall  n=1727</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td><strong>Total patients</strong></td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Initial Diagnosis</strong></td>
</tr>
<tr>
<td>Ischemic Strokes/TIA</td>
</tr>
<tr>
<td>Intracerebral Bleed</td>
</tr>
<tr>
<td>CVST</td>
</tr>
<tr>
<td><strong>Risk Factors</strong></td>
</tr>
<tr>
<td>Diabetes</td>
</tr>
<tr>
<td>Hypertension</td>
</tr>
<tr>
<td>Dyslipidemia</td>
</tr>
<tr>
<td>Smoking</td>
</tr>
<tr>
<td>Stroke</td>
</tr>
<tr>
<td>CAD</td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
</tr>
<tr>
<td>BMI</td>
</tr>
<tr>
<td><strong>DM not on treatment</strong></td>
</tr>
<tr>
<td><strong>HTN not on treatment</strong></td>
</tr>
</tbody>
</table>
Initial Diagnosis vs. Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Ischemic Stroke/ TIA</th>
<th>ICH</th>
<th>CVST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>512 (86.2%)</td>
<td>77 (13.0%)</td>
<td>5 (0.8%)</td>
</tr>
<tr>
<td>Southasian</td>
<td>746 (80.7%)</td>
<td>169 (18.3%)</td>
<td>9 (1.0%)</td>
</tr>
<tr>
<td>Fareastern</td>
<td>138 (66.0%)</td>
<td>70 (33.5%)</td>
<td>1 (0.5%)</td>
</tr>
<tr>
<td>African</td>
<td>55 (75.3%)</td>
<td>17 (23.3%)</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>44 (91.7%)</td>
<td>4 (8.3%)</td>
<td>0</td>
</tr>
</tbody>
</table>
Future plans

• Improving rates of thrombolysis
• Risk of complications depended on LOC in ED
• Stroke Unit care improves outcome
• Ethnicity and stroke

• Other programs under development
  – Telestroke
  – Stroke CT ambulance
  – Identification of collaterals in acute stroke
Conclusions

• Stroke care improves with introduction of a comprehensive program
• Stroke-related complications begin very early after arrival to the hospital and are preventable.
• “Stroke Units” save lives and improves outcome
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  – Professor Rajvir Singh (Sr Statistician)

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  – Furkan bin Irfan udin (Sr. research fellow)
  – Zain Bhutta (research fellow)