Post-Stroke Seizures in Srinagarind Hospital

Somsak Tiamkao
Anupol Panitchote
http://epilepsy.kku.ac.th

Introduction

- More than 50% of epilepsy in elderly cause by stroke
- 5-20% of all stroke will have subsequent seizures
- Early/late (2 weeks) onset seizures
- Risk factor; subtype, location, severity
- Post-stroke seizures impact on early mortality and outcome

Method

- Retrospective study
- Stroke patients during 2000-2004
- Inclusion; cerebral infarction, ICH from HT, AVM, aneurysm
- Exclusion; trauma, SAH, CVST, seizure with explain by other causes
- Sample size 650 cases

Method

- Medical record; OPD, IPD
- Telephone, mailing questionnaire
- Demographics, type of stroke, brain imaging
- Seizure, recurrent stroke
- Mortality

Objective

- To study prevalence of post-stroke seizures
- Associated factors of post-stroke seizures
- Mortality after stroke

Results

- 1413 IPD stroke patients
- Random sampling 650 patients
- 495/650 medical records were found
- 372/495 patients were complete study
- Male: Female = 218 : 154 (58.6 : 41.4%)
- Mean age 58.9 ± 15.3
### Results

#### Demographic data

<table>
<thead>
<tr>
<th>Character</th>
<th>Number (%) (n=372)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>218 (58.6)</td>
</tr>
<tr>
<td>Female</td>
<td>154 (41.4)</td>
</tr>
<tr>
<td>Age (years) mean 58.93, SD 15.3, min 16, max 91</td>
<td></td>
</tr>
<tr>
<td>16-30</td>
<td>22 (5.9)</td>
</tr>
<tr>
<td>31-45</td>
<td>42 (11.3)</td>
</tr>
<tr>
<td>46-60</td>
<td>113 (30.4)</td>
</tr>
<tr>
<td>61-75</td>
<td>147 (39.5)</td>
</tr>
<tr>
<td>&gt;75</td>
<td>46 (12.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Underlying disease</th>
<th>Number (%) (n=372)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>302 (81.2)</td>
</tr>
<tr>
<td>No</td>
<td>70 (18.8)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>176 (58.3)</td>
</tr>
<tr>
<td>DM</td>
<td>109 (36.1)</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>54 (17.9)</td>
</tr>
<tr>
<td>Heart diseases</td>
<td></td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>51 (16.9)</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>31 (10.3)</td>
</tr>
<tr>
<td>Valvular heart diseases</td>
<td>48 (15.9)</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>18 (5.9)</td>
</tr>
<tr>
<td>Other heart diseases</td>
<td>4 (1.3)</td>
</tr>
<tr>
<td>Malignancy</td>
<td>18 (5.9)</td>
</tr>
<tr>
<td>Other diseases</td>
<td>78 (25.9)</td>
</tr>
</tbody>
</table>

#### Stroke subtype

<table>
<thead>
<tr>
<th>Stroke subtype</th>
<th>Number (%) (n=372)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic stroke</td>
<td></td>
</tr>
<tr>
<td>Cerebral thrombosis</td>
<td>271 (72.8)</td>
</tr>
<tr>
<td>Cerebral embolism</td>
<td>194 (71.6)</td>
</tr>
<tr>
<td>Other causes</td>
<td>70 (25.8)</td>
</tr>
<tr>
<td>Unknown</td>
<td>5 (1.9)</td>
</tr>
<tr>
<td>Hypertensive stroke</td>
<td></td>
</tr>
<tr>
<td>Hypertensive ICH</td>
<td>98 (26.3)</td>
</tr>
<tr>
<td>Cerebral aneurysm</td>
<td>50 (51.0)</td>
</tr>
<tr>
<td>Cerebral AVM</td>
<td>4 (4.1)</td>
</tr>
<tr>
<td>Other causes</td>
<td>7 (1.1)</td>
</tr>
<tr>
<td>Unknown</td>
<td>12 (12.3)</td>
</tr>
<tr>
<td>Hemorrhagic stroke</td>
<td></td>
</tr>
<tr>
<td>Hemorrhagic stroke</td>
<td>98 (26.3)</td>
</tr>
<tr>
<td>Ischemic stroke (%)</td>
<td>74 (27.3)</td>
</tr>
<tr>
<td>Hemorrhagic stroke (%)</td>
<td>33 (33.7)</td>
</tr>
<tr>
<td>Cortical</td>
<td>74 (27.3)</td>
</tr>
<tr>
<td>Subcortical</td>
<td>30 (11.1)</td>
</tr>
<tr>
<td>Cerebellium</td>
<td>33 (12.2)</td>
</tr>
<tr>
<td>Brain stem</td>
<td>5 (1.8)</td>
</tr>
<tr>
<td>Multiple site</td>
<td>82 (30.3)</td>
</tr>
<tr>
<td>No data</td>
<td>18 (6.6)</td>
</tr>
</tbody>
</table>

#### Duration of post stroke seizure

<table>
<thead>
<tr>
<th>Duration of post stroke seizure</th>
<th>Number (%) (n=58)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 day - 14 days</td>
<td>35 (60.3)</td>
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<tr>
<td>15 days - 1 years</td>
<td>13 (22.4)</td>
</tr>
<tr>
<td>1 year - 2 years</td>
<td>2 (3.45)</td>
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<tr>
<td>More than 2 years</td>
<td>2 (3.45)</td>
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<tr>
<td>No data</td>
<td>6 (10.4)</td>
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</table>

#### Seizure status

<table>
<thead>
<tr>
<th>Variables</th>
<th>Seizure status (n)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Seizure</td>
<td>No-seizure</td>
</tr>
<tr>
<td>16 - 30</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>31 - 45</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>46 - 60</td>
<td>45</td>
<td>20</td>
</tr>
<tr>
<td>61 - 75</td>
<td>55</td>
<td>20</td>
</tr>
<tr>
<td>&gt; 75</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Sex</td>
<td>Seizure</td>
<td>No-seizure</td>
</tr>
<tr>
<td>Male</td>
<td>87</td>
<td>34</td>
</tr>
<tr>
<td>Female</td>
<td>59</td>
<td>24</td>
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### Results

#### CT brain location

<table>
<thead>
<tr>
<th>CT brain location</th>
<th>Ischemic stroke (%)</th>
<th>Hemorrhagic stroke (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortical</td>
<td>74 (27.3)</td>
<td>33 (33.7)</td>
</tr>
<tr>
<td>Subcortical</td>
<td>30 (11.1)</td>
<td>6 (26.5)</td>
</tr>
<tr>
<td>Cerebellum</td>
<td>33 (12.2)</td>
<td>22 (22.5)</td>
</tr>
<tr>
<td>Brain stem</td>
<td>5 (1.8)</td>
<td>6 (6.1)</td>
</tr>
<tr>
<td>Multiple site</td>
<td>82 (30.3)</td>
<td>6 (6.1)</td>
</tr>
<tr>
<td>No data</td>
<td>18 (6.6)</td>
<td>5 (5.1)</td>
</tr>
</tbody>
</table>
### Results

<table>
<thead>
<tr>
<th>Underlying diseases</th>
<th>Seizure</th>
<th>No-seizure</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>Yes</td>
<td>15</td>
<td>47</td>
</tr>
<tr>
<td>No</td>
<td>43</td>
<td>99</td>
<td>0.21</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Yes</td>
<td>23</td>
<td>72</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
<td>74</td>
<td>0.63</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>Yes</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>No</td>
<td>56</td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>Heart diseases</td>
<td>Yes</td>
<td>22</td>
<td>47</td>
</tr>
<tr>
<td>No</td>
<td>36</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>Yes</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>No</td>
<td>46</td>
<td>120</td>
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</tbody>
</table>

### Underlying diseases

<table>
<thead>
<tr>
<th></th>
<th>Seizure</th>
<th>No-seizure</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic heart diseases</td>
<td>Yes</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>132</td>
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</tr>
<tr>
<td>Valvular heart diseases</td>
<td>Yes</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>No</td>
<td>48</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>Yes</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>No</td>
<td>55</td>
<td>137</td>
<td></td>
</tr>
<tr>
<td>Other heart diseases</td>
<td>Yes</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>58</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>Malignancy</td>
<td>Yes</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>56</td>
<td>138</td>
<td></td>
</tr>
</tbody>
</table>

### Stroke subtype

<table>
<thead>
<tr>
<th>Stroke type</th>
<th>Seizure</th>
<th>No-seizure</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic stroke</td>
<td>36</td>
<td>114</td>
<td>0.015</td>
</tr>
<tr>
<td>Hemorrhagic stroke</td>
<td>22</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Stroke subtype</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebral thrombosis</td>
<td>20</td>
<td>79</td>
<td>0.055</td>
</tr>
<tr>
<td>Cerebral embolism</td>
<td>15</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Other ischemic stroke</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hypertensive cerebral hemorrhage</td>
<td>9</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Ruptured AVM</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Ruptured aneurysm</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Other causes</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Unknown ICH</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

### Stroke location

<table>
<thead>
<tr>
<th>Stroke location</th>
<th>Seizure (n)</th>
<th>Non-seizure (n)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal CT brain</td>
<td>2</td>
<td>11</td>
<td>0.05</td>
</tr>
<tr>
<td>Cortical area</td>
<td>26</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Subcortical area</td>
<td>8</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Cerebellum</td>
<td>6</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Brain stem</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Multiple sites</td>
<td>13</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Mortality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alive</td>
<td>27</td>
<td>31</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Dead</td>
<td>104</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

### Discussion and conclusion

- Recurrent stroke were 16.4% with 5 years
- Mean duration of first recurrent stroke 2.07 years
- National Health Security Office
  - overall mortality rate 39.5%
  - at 30 days 7.5%
  - at 1 year 22.8%
- Post-stroke seizure were significantly associated with mortality
- Prevalence of post-stroke seizures were 15.9 %
- Associated risk: ICU, cortical area, no dyslipidemia
- Recurrent stroke rate at 1 month 1.34%, 6 months 5.1%
- Mortality rate at 30 day 7.5 %, 1 year 22.8%