The Epidemiology of Post-stroke seizures and post-stroke epilepsy

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Stroke is the most common cause of epilepsy in the elderly population with an incidence of 2-4 % in different studies.

It was found that 11.5 % of patients with stroke were at risk of developing post-stroke seizures within 5 years.
The epidemiology of post stroke epilepsy and seizures are still unclear in our country, further information in this area would help to answer questions about prevention and management of post-stroke seizures and epilepsy.
In this study, we aimed to present the epidemiological data of post stroke seizures & epilepsy in our clinics, regarding frequency, relationship with subtypes and the location of stroke.
Material and methods

In this retrospective study, data of 345 patients who had stroke was collected from Brain Diseases Center and Al thawra Neurological Center, Sana'a, Yemen for 1-4 years (mean: 2.5 ± 1.5), between December 1, 2004 and December 2008.
Data of patients was reviewed retrospectively including:
Medical history, physical examination and standardized laboratory tests (such as blood tests, extracranial Doppler, Electrocardiogram, and echocardiography.)
Exclusion criteria

Subjects with transitory ischaemic attacks, subarachnoid and epidural haemorrhages, or those with history of epilepsy were excluded.
The diagnosis of stroke subtypes based on the clinical and neuroimaging findings.

Topographic localizations and classification, according to TOAST criteria.

Post-stroke epilepsy is defined, according to the guidelines developed by the ILAE, as two or more unprovoked epileptic seizures occurring at least 1 week after the stroke.

Early onset refers to the first seizure occurring within 2 weeks of stroke onset and “late onset” refers to the first seizure occurring after 2 weeks of stroke onset.
The demographic, clinical, radiological, laboratory and outcome data was recorded and analyzed using SPSS.
## Demographic characteristics

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>204</td>
<td>141</td>
<td>345</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>56.3±18.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No (%)</td>
<td>69.6%</td>
<td>30.4%</td>
<td>100%</td>
</tr>
</tbody>
</table>

The chart on the right shows the gender distribution with 41% Male and 59% Female.
Clinical characteristics of patients with seizures

Seizure Onset
- Early onset: 32%
- Late onset: 68%

Seizure semiology
- Generalized: 32%
- Partial: 42%
- Partial with 2ry generalization: 26%
Overall, 24 (6.9%) Patients had post-stroke seizures and 10 (2.9%) had post-stroke epilepsy.

- Frequency of seizures according to stroke subtypes:
  - Ischaemic: 67%
  - Haemorrhagic: 25%
  - Venous Infarction: 8%

- Frequency of epilepsy according to stroke subtypes:
  - Ischaemic: 50%
  - Haemorrhagic: 30%
  - Venous Infarction: 20%
Prevalence of seizures in stroke subtypes

- **Total**: 345 (6.9% with seizures)
- **Venous**: 12 (16.7% with seizures)
- **Haemorrhagic**: 50 (12% with seizures)
- **Ischemic**: 283 (5.7% with seizures)

Legend:
- Light blue: with seizures
- Dark red: Total
Prevalence of epilepsy in stroke subtypes

<table>
<thead>
<tr>
<th>Subtype</th>
<th>Total</th>
<th>With Epilepsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>345</td>
<td>10</td>
</tr>
<tr>
<td>Venous</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Haemorrhagic</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Ischemic</td>
<td>283</td>
<td>5</td>
</tr>
</tbody>
</table>

2.9% Haemorrhagic
25% Venous
4% Total
1.8% Ischemic
0% Haemorrhagic
20% Venous
40% Total
60% Ischemic
100%
## Territorial involvement in stroke subtypes among patient with seizures

<table>
<thead>
<tr>
<th>Stroke subtype</th>
<th>Territorial involvement</th>
<th>MCA</th>
<th>ACA</th>
<th>PCA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic</td>
<td>no</td>
<td>16</td>
<td>2</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>76.2</td>
<td>9.5</td>
<td>12.3</td>
<td>100</td>
</tr>
<tr>
<td>Hemorrhagic</td>
<td>no</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>75</td>
<td>12.5</td>
<td>12.5</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>22</td>
<td>3</td>
<td>4</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75.8</td>
<td>10.4</td>
<td>13.8</td>
<td>100</td>
</tr>
</tbody>
</table>
Topographic localization in patients of post-stroke seizures

**Topographic localization of ischaemic stroke**
- Subcortical: 33%
- Cortical: 67%

**Topographic localization in venous infraction**
- Subcortical: 20%
- Cortical: 80%

**Topographic localization in haemorrhagic stroke**
- Subcortical: 38%
- Lobar: 62%
Conclusion

Our results indicate that post-stroke seizures and epilepsy are more common among patients who have experienced venous infarctions.

Localizations were shown to be mainly in the cortical region and the territory of the middle cerebral artery.
Recommendation

The epidemiology of post-stroke seizures and epilepsy still unclear in our country, therefore, additional work of prospective, multicenter studies are needed. Comprehension of epidemiology, and also risk factors for post stroke seizures and epilepsy would help to better define the high risk group that could benefit from early management of epileptogenesis.