Ictal offset patterns and postictal dynamics-a SEEG study

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# Materials and methods

## Patient lot

<table>
<thead>
<tr>
<th>Nr</th>
<th>Sex</th>
<th>Age</th>
<th>Lateralization</th>
<th>Nr of Electrodes</th>
<th>Pathology</th>
<th>Localization</th>
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<tbody>
<tr>
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<td>L</td>
<td>11</td>
<td>DNET</td>
<td>Temporal, middle temporal gyrus</td>
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<td>R</td>
<td>12</td>
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<td>Temporo mesial</td>
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<td>Occipito-temporal basal</td>
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<tr>
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<td>25</td>
<td>R</td>
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<td>Temporo mesial</td>
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<tr>
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<td>F</td>
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<td>Parietal Operculum+Insula</td>
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<td>L</td>
<td>12</td>
<td>Hippocampal sclerosis</td>
<td>Temporo mesial</td>
</tr>
</tbody>
</table>

45 seizures (35 F, 5 F-induces, 5-SG), 2500 contacts, 4kHz sampling rate 230 contact-recording hours
The SEEG method-definition of concepts

SOZ: first path. activity (usually LVFA+DC) before CO, <structurally coherent>

EZ: primary organisation of the ictal network;

IZ: abnormal interictal activity;

Rule: IZ⊆EZ ⊆SOZ

Ictal start: beginning of SOZ

Ictal end: end of repetitive/sharp activity or return to baseline

Pre-ictal period: Start - Ictal Period (-Stimulation Rhythm)

Post-ictal period: Stop + Ictal Period
Introduced variables

• IA (Ictal Activation) = Ictal Energy / Prelctal Energy;
• IR (Ictal Rebound) = Postictal Energy / Ictal Energy;
• IS (Ictal Supression) = Postictal Energy / Prelctal Energy;

• Relative Ictal Activation = Ictal energy contact \( x \) / \( \sum_{1}^{n} \) Ictal energy contact \( i \)

• Start/Stop order = \( \frac{t_{x} - t_{\text{min}}}{t_{\text{max}} - t_{\text{min}}} \)
Energy dynamics-by epileptogenicity
Energy dynamics-by ictal activation quartiles

All patients All Bands Quartile

- IA
- IS
- IR

Correlations:
- All: $r = 0.89$, $p < 0.01$
- IA-IR: $r = 0.74$, $p < 0.01$
Ending chronology-single case example
Ending chronology - whole lot
Postictal flatline

- **SOZ**  Sensitivity: 42.34  Specificity: 99.08  Accuracy: 98.70  PPV: 0.23  NPV: 1.00
- **IZ**  Sensitivity: 33.11  Specificity: 99.68  Accuracy: 97.90  **PPV: 0.74**  NPV: 0.98
- **Non IZ**  Sensitivity: 0.32  Specificity: 66.89  Accuracy: 2.10  PPV: 0.26  NPV: 0.02
Postictal HFOs
Postictal HFOs

- $S_v = S_c = \text{PPV} = \text{NPV}$
Ending patterns 1-focal hypersynchronous
Ending patterns 2-focal asynchronous
Ending patterns 3-secondary generalised
Case presentation

Left Hippocampus

Left Lingual Gyrus

Right Hippocampus
Thank you for your attention