Management of Non-lesional Epilepsy: 
*The Use of SPECT*

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American Epilepsy Society  |  Annual Meeting
Disclosure

Nothing to disclose.
Learning Objectives

• Identify the potential utility of SPECT in patients with non-lesional epilepsy

• Discuss strategies to improve the diagnostic yield of SPECT in these individuals
Subtraction ictal SPECT co-registered to MRI improves clinical usefulness of SPECT in localizing the surgical seizure focus

T. O’Brien, E. So, B. Mullan, M. Hauser, B. Brinkmann, N. Bohnen, D. Hanson, G. Cascino, C. Jack, and F. Sharbrough

Neurology Volume 50(2):445-54
February 1998
SISCOM

Mayo protocol

- Admitted to EMU
- MRI head
- Ictal video-EEG recordings
- Injections: 7 AM to 11 PM
- EMU techs
- 99mTc-ECD (Neurolite ®)
Ictal SPECT statistical parametric mapping in temporal lobe epilepsy surgery


Neurology Volume 74(1):70-76
January 2010
STATISCOM vs SISCOM: TLE

• Lateralization and localization:
  – STATISCOM vs SISCOM
  – 73/87 (84%) vs 57/87 (66%)
  – p< 0.05

• Nonlesional TLE:
  – STATISCOM vs SISCOM
  – 25/29 (86%) vs 17/29 (59%)
  – p= 0.02
  – STATISCOM 20/25 (80%) correct localization
<table>
<thead>
<tr>
<th>TLE Subtype</th>
<th>STATISCOM</th>
<th></th>
<th>SISCOM</th>
<th></th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesial</td>
<td>37/57</td>
<td>65%</td>
<td>5/57</td>
<td>9%</td>
<td>.001</td>
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<tr>
<td>Neocortical</td>
<td>16/24</td>
<td>67%</td>
<td>12/24</td>
<td>50%</td>
<td>&gt;0.05</td>
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<tr>
<td>Indeterminate</td>
<td>6/6</td>
<td>100%</td>
<td>4/6</td>
<td>67%</td>
<td>&gt;0.05</td>
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<tr>
<td>Total</td>
<td>59/87</td>
<td>68%</td>
<td>21/87</td>
<td>24%</td>
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</table>
Statistical SPECT Processing in MRI Negative Epilepsy Surgery


Neurology, in press
<table>
<thead>
<tr>
<th></th>
<th>Temporal Lobe Epilepsy</th>
<th>Extratemporal Lobe Epilepsy</th>
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<tbody>
<tr>
<td></td>
<td>Dominant Focus</td>
<td>Concordant Localization</td>
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<tr>
<td>Localization</td>
<td>Localization</td>
<td></td>
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<tr>
<td>SISCOM</td>
<td>68% (43/63)</td>
<td>38% (24/63)</td>
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<tr>
<td>STATISCOM</td>
<td>97% (61/63)</td>
<td>71% (45/63)</td>
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<tr>
<td>ISAS</td>
<td>97% (61/63)</td>
<td>67% (42/63)</td>
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</table>
Conclusions

1. Ictal-interictal SPECT may demonstrate a focal imaging alteration concordant with the site of seizure onset in non-lesional epilepsy.

2. SPM-based methods of SPECT processing showed better localization of SPECT hyperperfusion.