Cognitive Impairment Following Adult Spinal Deformity Surgery

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Introduction

• Elderly patients undergoing major surgery may experience cognitive deterioration due to lesser plasticity in their brain tissue

• Postoperative cognitive dysfunction (POCD) – characterized with undefined dysfunction of the memory, concentration and analyse skills*

• Adult Spinal Deformity (ASD) and POCD?

Purpose

To analyze the cognitive abilities of older patients undergoing surgery for spinal deformity before and after the procedure so as to understand whether ASD surgery is associated with POCD
Patients and Methods

• Prospective longitudinal study
• Patients > 50 years
  • ASD surgery - ESSG database
• Parameters
  – Demographical aspects (clinical & surgical)
  – Mini mental state examination (MMSE)
  – HRQOL questionnaires (ODI, SF-36, SRS-22)
• Statistics
  – Descriptive analysis
  – Repeated measures of ANOVA
## Results

- Demographical Characteristics (n=90, 6 weeks; n=58, 6 months)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Female / Male (n) (%)</th>
<th>Age (mean)(std. dev.)</th>
<th>Etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female / Male (n) (%)</td>
<td>71 / 19 (78.9 / 21.1)</td>
<td>67.4 (8.2) years</td>
<td></td>
</tr>
<tr>
<td>Degenerative</td>
<td>36 (40.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idiopathic</td>
<td>34 (37.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others*</td>
<td>20 (22.2)</td>
<td></td>
<td>failed-back, post-traumatic, scheuermann, neuromuscular, congenital, post-infection</td>
</tr>
</tbody>
</table>

*failed-back, post-traumatic, scheuermann, neuromuscular, congenital, post-infection
Results

- Surgical Characteristics (n=90)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average</th>
<th>(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery time (min)</td>
<td>240.1</td>
<td>(111.9)</td>
</tr>
<tr>
<td>Estimated blood loss (ml)</td>
<td>1621.2</td>
<td>(1058.7)</td>
</tr>
<tr>
<td>Number of levels fused</td>
<td>11.2</td>
<td>(4.4)</td>
</tr>
<tr>
<td>Length of hospitalization (days)</td>
<td>14.2</td>
<td>(11.45)</td>
</tr>
</tbody>
</table>
Results

• MMSE (n=90, 6 weeks; n=58, 6 months)*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop</td>
<td>26.88</td>
<td>2.691</td>
<td>90</td>
</tr>
<tr>
<td>6th Week</td>
<td>27.17</td>
<td>2.474</td>
<td>90</td>
</tr>
<tr>
<td>Preop</td>
<td>26.93</td>
<td>2.815</td>
<td>58</td>
</tr>
<tr>
<td>6th Week</td>
<td>27.34</td>
<td>2.579</td>
<td>58</td>
</tr>
<tr>
<td>6th Month</td>
<td>27.57</td>
<td>2.528</td>
<td>58</td>
</tr>
</tbody>
</table>

(p>0.05)

A decrease of more than 2 points (3 or 4) was observed in 6 patients (6.7%) at both time points

* While taking effect size as 0.245; Type-I error rate 0.05 and correlation among repeated measures as 0.65, the power of this analysis is 0.99
Results

- MMSE (n=58, 6 months)*

* While taking effect size as 0.245; Type-I error rate 0.05 and correlation among repeated measures as 0.65, the power of this analysis is 0.99
Discussion - Summary

• ASD surgery
  – Major
  – Better cognitive functions (MMSE mean score)
  – No statistical difference between time points
    • minor influence of ASD itself on cognitive abilities
    • relatively stable hemodynamic conditions during surgery
Thank you...

- ASD surgery
  - Better cognitive functions (MMSE mean score)
  - No statistical difference between time points

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