Spasticity is a Risk factor of Complications and Surgical Outcome in the Management of Neuromuscular Early-Onset Scoliosis (EOS) with a Rib-Based Growing System (RBGS)

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DISCLOSURES

• Norman Ramirez MD - none
• Gerardo Olivella MPH - none
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• Pablo Marrero MD - none
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• Children Spine Study Group - none
NEUROMUSCULAR SCOLIOSIS

• Early Onset
• Rapid Progression
• Progression After Skeletal Maturity
• Compromise Functional Abilities
• Long Curves, May Include Sacrum
• Pelvic Obliquity
INTRODUCTION

• Neuromuscular EOS is difficult to treat and has a high rate of complications.

• The Neuromuscular patients can be divided in two groups:

  1. Spastic: eg. Cerebral Palsy

Robert Campbell et al. (1992)

Rib-Based Growing System (RBGS) as option to control spinal deformity, allow spinal growth, and address thoracic insufficient syndrome in children with neuromuscular Scoliosis
HYPOTHESIS

• Patients with spasticity would have poor surgical outcomes and a higher complication rate compared to patients with hypotonia treated with a Rib Based Growing System [RBGS].
METHODS

• IRB approved, retrospective cohort study, collected from Children Spine Foundation multicenter database.

• Comparison between both groups based on:
  • Pre-Operative
  • Intra-operative
  • Post-operative data
METHODS

• Complications were reported using a standardized scheme.

A New Classification System to Report Complications in Growing Spine Surgery: A Multicenter Consensus Study

John T. Smith, MD,* Charles Johnston, MD,† David Skaggs, MD,‡ John Flynn, MD,§ and Michael Vitale, MD||

(Smith et al JPO, Dec 2015)
RESULTS

• 131 non-ambulatory neuromuscular EOS patients treated with a RBGS
  • Spastic (32)
  • Hypotonic (99)

• All patients were treated with a Rib-Pelvis RBGS (VEPTR)
## RESULTS

<table>
<thead>
<tr>
<th>Mean</th>
<th>PRE-OP DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Gender (% female)</td>
</tr>
<tr>
<td>NS</td>
<td>Mean Age at Surgery (yrs)</td>
</tr>
<tr>
<td>NS</td>
<td>Mean Weight (kg)</td>
</tr>
<tr>
<td>NS</td>
<td>Mean Height (cm)</td>
</tr>
<tr>
<td>NS</td>
<td>Mean Follow-up (yrs)</td>
</tr>
<tr>
<td>NS</td>
<td>Mean Preop Cobb (Deg)</td>
</tr>
<tr>
<td>NS</td>
<td>Mean Preop Kyphosis (Deg)</td>
</tr>
</tbody>
</table>
## RESULTS - Cobb Angles (Immediate & Most Recent)

<table>
<thead>
<tr>
<th></th>
<th>COBB</th>
<th>SPASTIC</th>
<th>HYPOTONIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate % of Correction</td>
<td>37%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Residual % Correction</td>
<td>16%</td>
<td>11%</td>
<td></td>
</tr>
</tbody>
</table>
# RESULTS - Complications: (P<0.05)

<table>
<thead>
<tr>
<th>COMPLICATIONS (%)</th>
<th>SPASTIC</th>
<th>HYPOTONIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infections</td>
<td>53 %</td>
<td>39 %</td>
</tr>
<tr>
<td>Device Migration</td>
<td>29 %</td>
<td>36 %</td>
</tr>
<tr>
<td>Death</td>
<td>8 %</td>
<td>1 %</td>
</tr>
<tr>
<td>Implant Failure</td>
<td>6 %</td>
<td>13 %</td>
</tr>
<tr>
<td>TOTAL %</td>
<td>78 %</td>
<td>56 %</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>30 %</td>
<td>10 %</td>
</tr>
<tr>
<td>Removal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CONCLUSION

• There was no significant difference in surgical correction between both groups.
CONCLUSION

• Spastic patients had more complications than those with hypotonia in the management of neuromuscular scoliosis treated with a RBGS.
GRACIAS!
REFERENCES


