The Effectiveness of Pre-Operative Halo-gravity Traction (HGT) in Early Onset Scoliosis (EOS) and Severe Kyphoscoliosis: Clinical and Radiographic Study

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Disclosures

Consultant of K2M
Consultant of Synthes
- Introduction -

- HGT improves coronal and sagittal balance and facilitates the implantation of expandable devices where otherwise will not be possible

The goal of the present study was to assess the efficacy of HGT in E.O.S. with severe rigid scoliosis/kyphoscoliosis.

**Material and Methods**
- A retrospective review of 21 patients (11 ambulatory) treated in a single institution between 2005-2011, mean follow up 35 months.
- Material and Methods -

**HGT protocol, included, gradual increase traction to about 40% of patients’ body weight during 8 weeks**
To analyze the impact of HGT on **curve flexibility** and **chest wall** improvement, the **space available for the lung** (SAFL) and the distance between **T.1-S.1** were used to measure the thoracic improvement.

Results:

- 8 males, 13 females, mean age 9.3 Y. (range 3 – 17)
- Ethiology: 1 idiopathic, 1 congenital, 10 neuromuscular, 9 others (osteogenesis imperfecta, syndromic …)

SAFL 83%

10 5 199 mm

S.M.A.Type II

PREOPERATIVE

H.G.T.
The use of HGT was **preoperative** in 15 patients and **perioperative** in 6 patients (previous spine surgeries).

O.I., VEPTR rib/rib, rib/pelvis, bilateral rib / pelvis, **removal of VEPTR + PERIOPERATIVE H.G.T.**, definitely **posterior fusion**, 13 Y.O.

Removal of VEPTR + perioperative H.G.T:  

Posterior fusion
Results. **With HGT** mean values were:

<table>
<thead>
<tr>
<th>Mean values</th>
<th>Pre-Halo</th>
<th>With Halo</th>
<th>improvement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Preop. Coronal Cobb angle</td>
<td>99.3°</td>
<td>70°</td>
<td>27.7 %</td>
</tr>
<tr>
<td>Mean Preop. Sagittal Cobb angle</td>
<td>82°</td>
<td>62.8°</td>
<td>21.5 %</td>
</tr>
<tr>
<td>Mean SAFL index</td>
<td>79%</td>
<td>83.2%</td>
<td>5.3 %</td>
</tr>
<tr>
<td>Mean T1-S1 distance</td>
<td>235mm</td>
<td>269.5mm</td>
<td>14.2 %</td>
</tr>
</tbody>
</table>

T-Student test  p<0.05
Results: At the end of follow up the values were:

<table>
<thead>
<tr>
<th>Mean values</th>
<th>Pre - Halo (mean : 35 month)</th>
<th>End of follow up (mean : 35 month)</th>
<th>improvement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Preop. Coronal Cobb angle</td>
<td>99.3°</td>
<td>57.5°</td>
<td>41 %</td>
</tr>
<tr>
<td>Mean Preop. Sagittal Cobb angle</td>
<td>82°</td>
<td>53.7°</td>
<td>24.6 %</td>
</tr>
<tr>
<td>Mean SAFL index</td>
<td>79%</td>
<td>86.6%</td>
<td>9.6 %</td>
</tr>
<tr>
<td>Mean T1-S1 distance</td>
<td>235mm</td>
<td>298.1mm</td>
<td>26 %</td>
</tr>
</tbody>
</table>
Results

- **Complications**: 1 pin infection that required removal and antibiotic treatment
- These results are *consistent with others published* in the literature.

Conclusions

- Unfortunately, there are *too many variables* to establish a rigid algorithm for the *indications and duration of halo-gravity traction*
- No clear guidelines exist as to the duration of HGT, but to achieve maximal benefit, it seems ranging 2 to 3 weeks will be enough (Park DK et al)
A 9% improvement in pulmonary function and improvement of overall health status was seen in 19 of 22 patients reviewed by Ljiljana Bogunovicel (Spine Deformity, 2013)

HGT is a safe, well-tolerated method of applying gradual, traction to maximize postoperative correction (24.6%), pulmonary function and nutritional optimization
Thanks!
Gracias!

BARCELONA

CASTELLERS, HUMAN TOWERS