Use of VEPTR for Treatment of Congenital Scoliosis without Fused Ribs

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Disclosures

Murphy    AAOS
Moisan    None
Kelly     Elsevier, POSNA
Warner    Elsevier, COS
Sawyer    Elsevier, AAOS, POSNA
Introduction

Congenital scoliosis (CS) variable morphology spectrum

severe cases - thoracic insufficiency
Introduction

Congenital scoliosis (CS) variable morphology spectrum severe cases - thoracic insufficiency
Introduction

Congenital scoliosis treatment:

- observation
- casting
- growing rods
- Shilla
- VEPTR
Introduction

VEPTR effective:

- wide variety of conditions/deformities
- congenital scoliosis with fused ribs

No studies to date specifically evaluated VEPTR in CS patients w/o fused ribs.
Purpose

Characterize the use of VEPTR in patients with CS without fused ribs.
Methods

CWSD database – CS w/o fused ribs

Demographic information

Expansions/lengthenings

Complications – stratified
disease vs device
treatment plan alteration
Demographics

24 patients (12M, 12F)

Implantation age: 5.6 ± 3.4 years

mean follow-up: 4.2 years

mean # procedures: 9.3 ± 6.0

mean # expansions: 6.6 ± 4.6
Classification

PATIENT
EOS w/o fused ribs

Scoliosis +/- Kyphosis

Single Level

Multiple Levels

Generalized
> 10 levels (STD)

Regional

Multiple simple

Complex (Bar+hemi)

Abnormal segmentation with normal formation (Block)

Group 1

Group 2

Group 3

Group 4

Group 5

Deformity

Multiple Complex (bar + hemi): 17 (71%)

Single: 3

Generalized: 1

Multiple simple: 1

Abnormal segmentation: 1
Radiographic Parameters

- Scoliosis
- Kyphosis
- AP/Lat Spine height (T1-S1)
- Expected T1-T12 spine height

*All measurements performed by single observer*
Coronal Cobb Angle

<table>
<thead>
<tr>
<th></th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>Final Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>70°</td>
<td>55° (p = 0.0001)</td>
<td>54° (p &lt; 0.0001)</td>
</tr>
</tbody>
</table>
Sagittal Cobb Angle (Kyphosis)

Preoperative $37^\circ$

Postoperative $41^\circ$ ($p = 0.31$)

Final Follow-Up $47^\circ$ ($p = 0.6$)
Lateral Thoracic Height (T1-T12)

Preoperative 15.3cm
Postoperative 15.8cm (p = 0.026)
Final Follow-Up 17.4cm (p = 0.04)
Complications

15/24 patients (63%)

Total of 41 complications
  Average 2.8, range 1-12

Most common:
  infection (8)
  wound dehiscence (8)
  device migration (8)
Disease Related Complications

**Grade I:** can be treated as an outpatient.

**Grade II:** requires hospitalization.

**Grade III:** alters the treatment plan.
## Disease Related Complications

<table>
<thead>
<tr>
<th>Disease Related (n=13, 31%)</th>
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</thead>
<tbody>
<tr>
<td>Grade I (outpatient)</td>
<td>5</td>
<td>33%</td>
</tr>
<tr>
<td>Grade II (hospital)</td>
<td>6</td>
<td>50%</td>
</tr>
<tr>
<td>Grade III (Δ plan)</td>
<td>2</td>
<td>27%</td>
</tr>
</tbody>
</table>
Device Related Complications

**Grade I:** does not require return to OR.

**Grade II:** unplanned return to OR.

A: single trip to OR
IB: multiple trips to OR

**Grade III:** alters the treatment plan.
## Device Related Complications

<table>
<thead>
<tr>
<th>Grade</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I (no OR)</td>
<td>13</td>
<td>46%</td>
</tr>
<tr>
<td>Grade IIA (1 OR)</td>
<td>8</td>
<td>29%</td>
</tr>
<tr>
<td>Grade IIB (&gt; 1 OR)</td>
<td>3</td>
<td>11%</td>
</tr>
<tr>
<td>Grade III (Δ plan)</td>
<td>4</td>
<td>14%</td>
</tr>
</tbody>
</table>
Expected Height

Mean height gain: 2.4 cm

Expected height gain: 4.3 cm

% height gain: 79
Conclusions

VEPTR is effective in correcting and maintaining scoliosis with improved thoracic height.

Post-implantation kyphosis a concern.

Complications are similar to other studies.

New classification systems are helpful.
Thank You