Outcomes and Complications of Vertebral Body Tethering by Patient Sex

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INTRODUCTION: Non-fusion surgical options for pediatric scoliosis management such as vertebral body tethering (VBT) continue to grow in popularity. With this study we aim to evaluate the postoperative outcomes in boys versus girls who have undergone VBT. Our hypothesis is that girls and boys will have similar outcomes by two-year follow-up.

METHODS: This study employed a review of retrospective data for patients who underwent VBT at 10 sites between 2011 and 2020. Patients were stratified based on sex assigned at birth. All patients had preoperative and two-year follow-up and were evaluated for curve correction, complications, surgery metrics, and patient reported outcomes.

RESULTS:

328 patients were included in this study: 277 girls and 51 boys. Mean age at surgery was 12.2 years for girls and 13.4 years for boys. Mean preoperative curve magnitude and curve flexibility was similar between both groups. Compared to girls, boys were older, heavier and taller at the time of surgery. Skeletal maturity was not different preoperatively or at 2-years.

Mean operative time was 233 minutes for girls and 240 minutes for boys, and mean EBL was 171 in girls and 163 in boys. Girls averaged 7.4 levels instrumented, while boys averaged 7.2. These differences were not significant. Postoperative stay was longer in the girls averaging 4.5 days compared to 3.9 days for the boys (p=0.026).

There were no statistically significant differences between boys and girls for the curve magnitude or percent correction at two-year follow-up. Girls measured 25° thoracic and 21° lumbar while boys measured 28° thoracic and 21° lumbar.

Overall, 98 girls experienced medical or surgical complications compared to 18 boys (35% and 39% of their cohorts, p=0.599). Boys experienced higher rates of tether breakage (33% vs. 17% at latest follow-up, p=0.008) and a more loss of correction >10° (10% vs. 3%, p=0.03). Rates of reoperation were 15.9% in the girls and 15.7% in the boys (p=0.972).

DISCUSSION AND CONCLUSION: Our study indicates similar perioperative outcomes in VBT in boys and girls, except regarding rates of complications. Boys were heavier and experienced higher rates of cord breakage and loss of correction, although reoperation rates were similar in both groups. Further work is needed to determine the relative impact of patient sex and weight on incidence of cord breakage.

	Girls (N=277)		Boys (N=51)		P Values
	N	%	N	%	
Overall	98	35.4%	20	39.2%	0.599
GI	2	0.7%	0	0.0%	0.543
Medical	8	2.9%	0	0.0%	0.219
Nerve (Numbness)	1	0.4%	0	0.0%	0.667
Pulmonary	14	5.1%	3	5.9%	0.806
Surgical Site Infection	1	0.4%	0	0.0%	0.667
Radiographic	35	12.6%	2	3.9%	**0.044**
Overcorrection	28	10.1%	2	3.9%	0.122
Loss of correction	9	3.3%	5	9.8%	**0.033**
New Curve	19	6.9%	3	5.9%	0.798
Instrumentation	52	18.8%	16	31.4%	**0.041**
Tether break	48	17.3%	17	33.3%	**0.008**
Other	5	1.8%	1	2.0%	0.939
Reoperations	44	15.9%	8	15.7%	0.972
Tether Release	20	7.2%	3	5.9%	0.731
PSF	17	6.1%	4	7.8%	0.647
Adding on	5	1.8%	1	2.0%	0.939
Other	7	2.5%	2	3.9%	0.575