

Background There is a paucity of information on mid to long term clinical and radiographic outcomes of VBT surgery. **Purpose** The aim of the study was to report mid-term outcomes of thoracoscopic thoracic-only anterior VBT surgery. **Methods** Data were collected preoperatively, at 6-weeks, 1-year, 2-years and ≥ 5 -years follow-up. Demographic, perioperative, clinical, radiographic data and complications were analyzed. Curve sizes at each follow-up were compared using repeated measures ANOVA. Clinical outcome was assessed by using SRS-22r questionnaire. **Results** 23 AIS patients (22F, 1M; 12.1 \pm 1.5 years) with a mean follow-up of 63 (60-92) months were included. 96% were Lenke 1 (11A, 2Ar, 9B and 1C) and 4% were Lenke 2. Preoperatively, 14 (64%) patients were premenarchal (median Sanders: 3 (1-7), median Risser: 0 (0-5)). A median of 7 (7-9) levels were tethered. Mean surgical time was 245 \pm 75 (123-360) minutes. Patients grew 7 cm on average; height measurements showing significant increase at each follow-up timepoint ($p < 0.001$) (Fig). All patients reached skeletal maturity at final follow-up. Upper Thoracic (UT), Main Thoracic (MT) and Thoracolumbar/lumbar (TLL) curves showed significant decrease in each follow-up timepoint. No significant changes were noted in kyphosis and lordosis ($p < 0.05$) (Fig). Pulmonary, mechanical and curve behavior complications rates were 13%, 22% and 35%, respectively (Fig). 2 (8.7%) patients were converted to fusion (Fig). At final follow-up, 91% patients had a $\leq 30^\circ$ residual curve. SRS-22 mental health, self-image and subtotal scores increased significantly (Fig). **Conclusion** This study reports a single European center experience on 23 consecutive patients with ≥ 5 -years follow-up who had undergone thoracic-only VBT surgery. Surgical correction was followed by growth-dependent correction attained during follow-up. Spontaneous correction in the non-operated upper thoracic and thoracolumbar levels were also noted. Thoracoscopic VBT surgery prevented fusion following ≥ 5 -years after surgery in 91% of the patients. 90% of patients that are not converted to fusion had good radiographic and clinical outcomes at latest follow-up; however, it is not without complications. Some complications may be avoided with a better understanding of the growth modulation and advancement of technical skills and technology.

	Pre-Operative		6 weeks		1 year		2 years		≥ 5 years follow-up	
	n	Mean \pm SD	n	Mean \pm SD	n	Mean \pm SD	n	Mean \pm SD	n	Mean \pm SD
Height, cm	23	155.3 \pm 7.7	23	156.6 \pm 7.5	23	160.5 \pm 6.8	23	162.4 \pm 6.5	23	163.7 \pm 7.1

	Pre-Operative		6 weeks		1 year		2 years		≥ 5 years follow-up	
	Mean \pm SD	Min - Max	Mean \pm SD	Min - Max						
UT, Degree	28.0 \pm 9.3	14 - 55	20.1 \pm 7.5	8 - 37	16.7 \pm 7.2	3 - 33	15.3 \pm 7.3	2 - 36	16.1 \pm 7.9	2 - 38
TLL, Degree	30 \pm 7.3	12 - 42	17.5 \pm 8.0	3 - 38	11.3 \pm 9.1	-12 - 34	9.1 \pm 10.1	-10 - 31	10.9 \pm 10.9	-10 - 29
MT, Degree	45.6 \pm 6.4	35 - 60	21.8 \pm 5.1	13 - 30	15.6 \pm 7.7	-2 - 28	12.7 \pm 10.1	-16 - 28	16.2 \pm 12.9	-16 - 36
Kyphosis, Degree	27.6 \pm 9.7	15 - 59	25.3 \pm 9.6	6 - 47	27.2 \pm 7.2	15 - 39	27.3 \pm 8.2	16 - 48	26.4 \pm 8.4	11 - 40
Lordosis, Degree	60.7 \pm 11.9	37 - 91	55.5 \pm 11.8	35 - 90	57.3 \pm 11.2	34 - 88	54.0 \pm 9.5	37 - 74	52.4 \pm 8.8	38 - 69

	Pre-Operative		6 weeks		1 year		2 years		≥ 5 years follow-up	
	n	Mean \pm SD	n/a	n/a	n	Mean \pm SD	n/a	n/a	n	Mean \pm SD
SRS-22r, F	21	4.7 \pm 0.4			21	4.6 \pm 0.5	20	4.7 \pm 0.4	18	4.4 \pm 0.4
SRS-22r, P	21	4.4 \pm 0.6			21	4.6 \pm 0.4	20	4.6 \pm 0.6	18	4.5 \pm 0.4
SRS-22r, SI	21	3.9 \pm 0.6			21	4.2 \pm 0.7	20	4.3 \pm 0.6	18	4.2 \pm 0.6
SRS-22r, MH	21	3.7 \pm 0.5			21	3.8 \pm 0.5	20	3.8 \pm 0.7	18	4.0 \pm 0.7
SRS-22r, Subtotal	21	4.0 \pm 0.3			21	4.3 \pm 0.4	20	4.3 \pm 0.4	18	4.2 \pm 0.4
SRS-22r, Satisfaction	n/a	n/a			21	4.7 \pm 0.6	20	4.7 \pm 0.4	18	4.0 \pm 0.7

	n (%)		n (%)		n (%)		n (%)
Curve Behavior Complications	8 (34.7)	<i>Overcorrection</i>	5 (21.7)	<i>Distal adding on</i>	2 (8.6)	<i>Worsening</i>	3 (13.0)
Mechanical Complications	5 (21.7)	<i>Broken Tether</i>	3 (13.0)	<i>UIV Loosening</i>	1 (4.3)	<i>LIV Migration</i>	1 (4.3)
Pulmonary Complications	3 (13.0)	<i>Atelectasis</i>	2 (8.7)	<i>Pleural Effusion</i>	1 (4.3)		
Readmission	1 (4.3)						
Revised Patients	3 (13.0)						
Reoperations	4 (17.4)	<i>Tether Release</i>	2 (8.7)	<i>Conversion to Fusion</i>	2 (8.7)		