CT Morphometric Analysis of Central Airways in Patients with Right Thoracic Scoliosis and Abnormal Sagittal Profile

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Disclosures

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IRB approved retrospective CT imaging study

Background

- Prevalence of obstructive lung disease (↓ FEV1/FVC) is 39% in patients undergoing surgery for AIS[1]
- Decreased LF and central airway obstruction has been reported in TK < 10° [2,3,4]

Hypothesis and Methods

Hypothesis

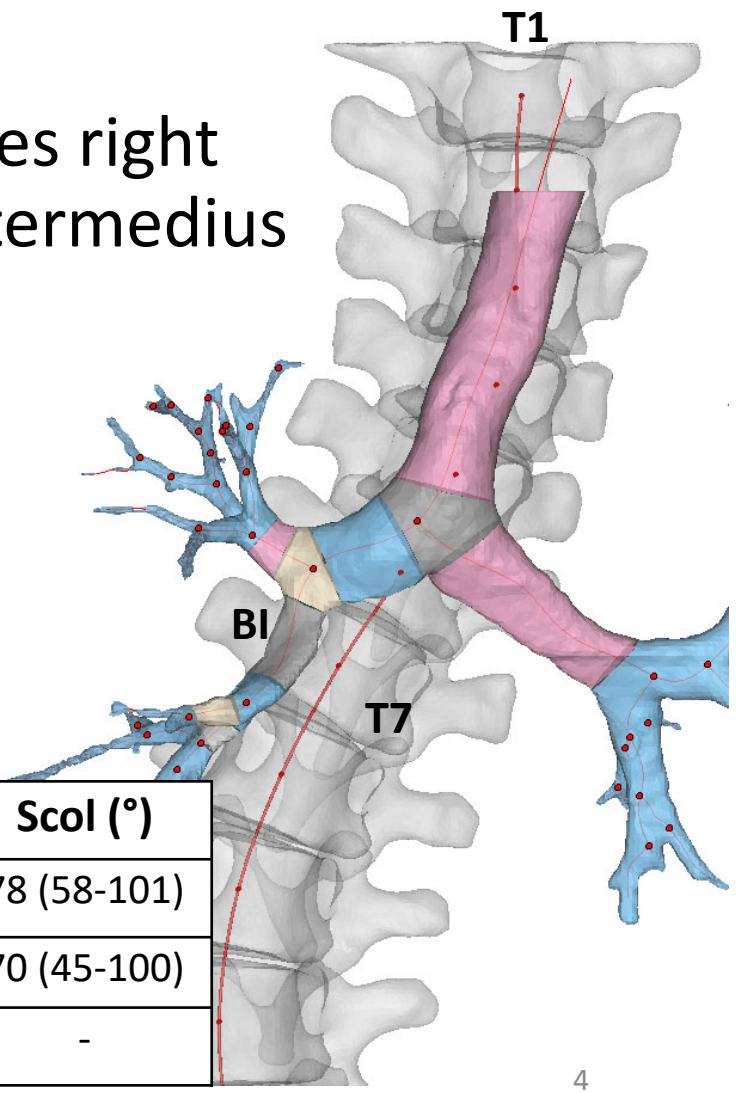
Thoracic scoliosis with TK<10 ° causes right sided narrowing of the bronchus intermedius (BI)

Sample

JIS and AIS

Right thoracic scoliosis

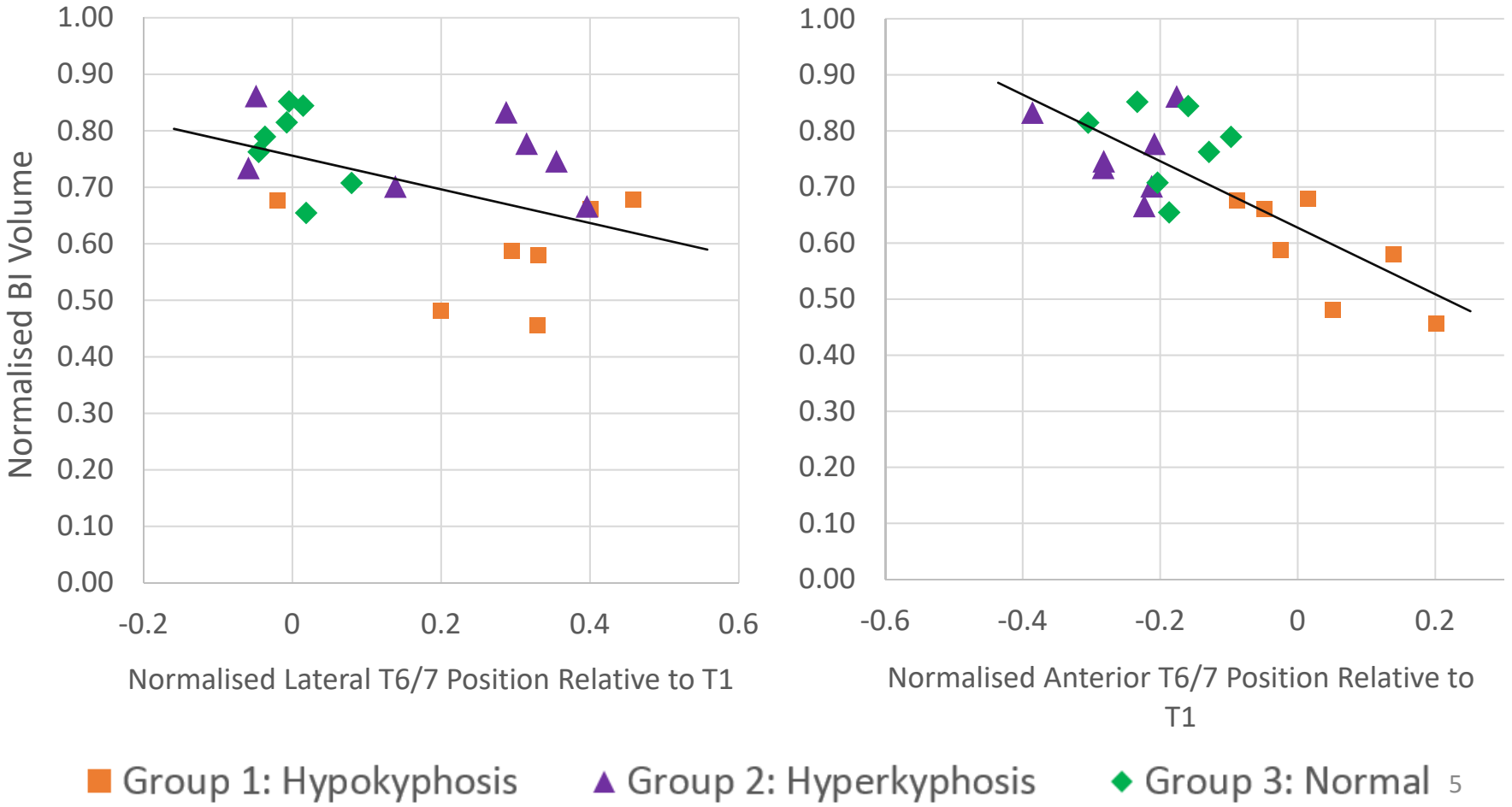
T8-T9 apex



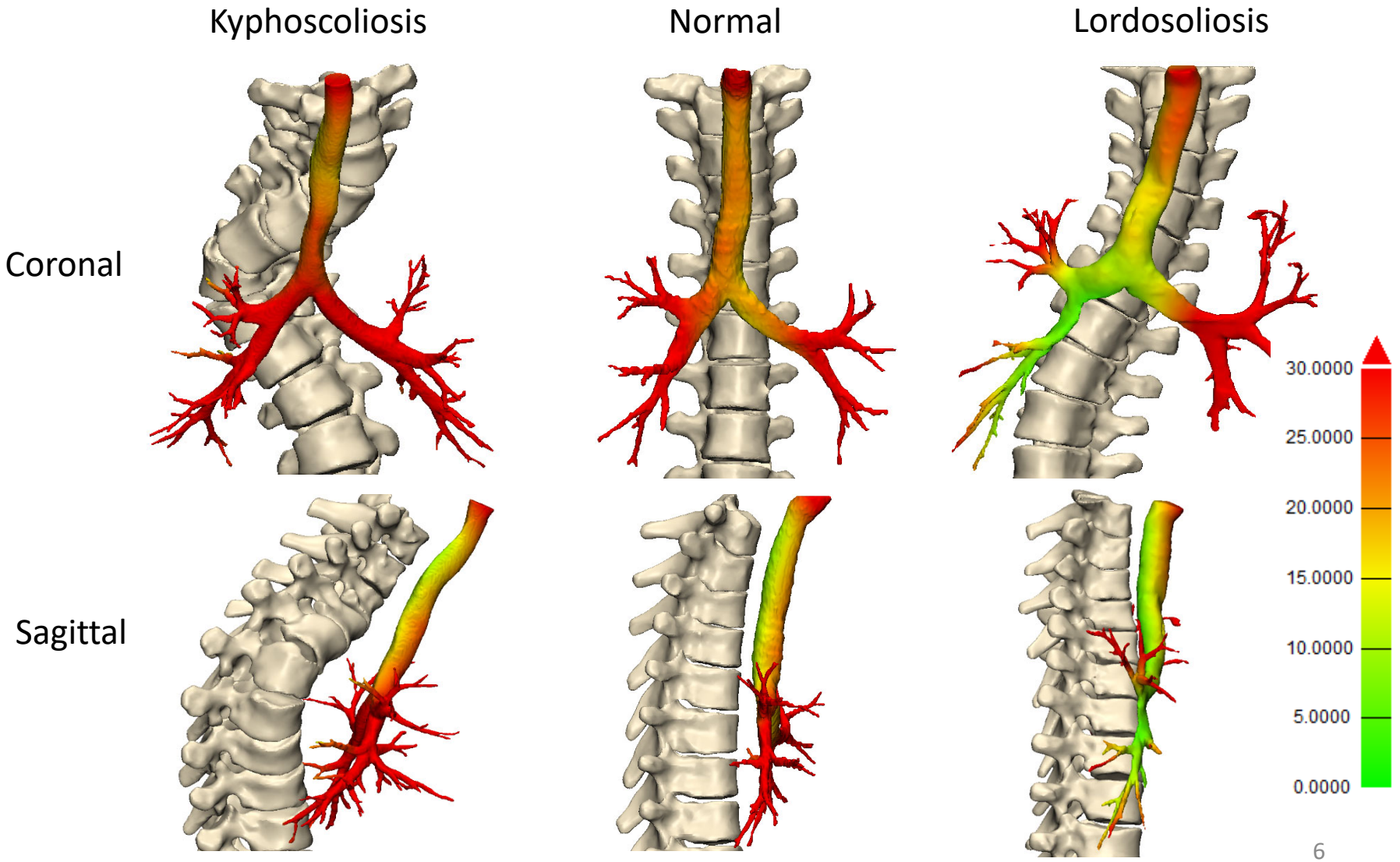
Group	Age (y)	♂:♀	Kypho(°)	Scol (°)
1. Hypokyphosis (<10°)	19 (14-30)	4:3	3 (-20-10)	78 (58-101)
2. Hyperkyphosis (>40°)	13.1 (9-19)	3:4	50 (43-67)	70 (45-100)
3. Oncology staging CT	14.1 (11-17)	3:4	28 (24-32)	-

T6/7 Position Relative to T1

- Scoliosis (r = - 0.57)
- Thoracic Kyphosis (r = 0.6)



Airway-Spine Minimum Distance (mm) (r = 0.79)



Summary of Correlations

Predictor	Coefficient of Correlation
Thoracic Kyphosis	r = 0.60
Thoracic Scoliosis	r = -0.57
Spinal Penetration Index	r = -0.68
Airway-Spine Distance	r = 0.79

$$v_{BI} = 0.7132 \; - 0.0016\,\theta_{Scol} + 0.0025\,\theta_{Kyph}$$

- Approximate volumes:

$$v_{BI}(normal) \approx 0.78$$
$$v_{BI}(narrow) < 0.60$$

Conclusion

- In thoracic scoliosis with severe hypokyphosis airway volumes and cross-sectional areas are reduced at BI
- Kyphoscoliosis: BI volumes are preserved

References

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