Lung Function Before and After Spine Fusion in Children With EOS Who Have Been Treated With Growing Rods

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- Matsumoto, Bompadre, Krengel: None
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Introduction/Rationale

- Children with AIS who undergo spine fusion have similar lung functions before and after the procedure if the posterior approach is used. (1,2)

- Children with EOS who have lower lung functions prior to fusion have similar lung functions to their pre-op values after fusion. (3)

- Children with EOS have the lowest lung functions if they have received growing rods prior to fusion. However the changes after a fusion procedure have not been reported.

Methods

- We reviewed Forced Vital Capacity (FVC%) values as a % of predicted based on arm span ≤6 months before spine fusion with values obtained <2 years after surgery among children with EOS of different etiologies from 2 spine centers.
- Data was compared as mean values for the groups before and after fusion.
- Data was also compared as % of each group based on etiology that experienced FVC>8% change, a value that is 2 standard deviations greater than day to day and week to week variability among normal children.
- Changes on Cobb angle before and after fusion were correlated with changes in FVC% for the entire group.

Patient Characteristics and Results

N=47 Nagoya=33; Seattle=14 patients

Age at Fusion: 12.4+/-1.5 years (range 8-16 years)

- Etiology of EOS:
  - Congenital 25 (53%
  - Neuromuscular 12 (26%)
  - Syndromic 6 (13%)
  - Idiopathic 3 (6%)
  - Other 1 (2%)

- Pre-op Cobb angle 65.8+/-23°
- Post-op Cobb angle 47.6+/-23°

- Pre-op FVC% 56+/-18% (range 20-88%)
- Post-op FVC% 51+/-20% (range 13-99%) Paired t-test, P>.10

Proportions of Children with >8% Improvement or Worsening after Spine Fusion by Etiology of EOS

Etiology Change	Improvement	Worse	No change
Congenital (25)*	8%	60%	32%
Neuromuscular (12)	50%	42%	8%
Syndromic (6)	17%	17%	66%
Idiopathic (3)	66%	0%	33%

Correlation of Change in Cobb vs Change in FVC%; R=0.77; p>.40

*P<.05 Multi-Chi Square between groups

Conclusions

- Although mean values for FVC% from each center did not change significantly after spine fusion, 48% patients with EOS worsened; 30% remained unchanged, and 22% improved by 8% FVC compared to pre-operative values.

- Children with EOS due to congenital scoliosis who received growing rods before fusion worsened more frequently by ≥8% FVC than other diagnoses.