Pre-Operative Lung Functions in Children with EOS

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Disclosures

- Pediatric Pulmonary section editor, UpToDate

Background and Rationale

- Children with EOS often have impaired lung function prior to spine surgery.

- Pre-operative assessments of children with EOS are not standardized and there are few predictors of longer post-operative hospital stays.

- Risk factors identified to date: a diagnosis of neuromuscular weakness, and with AIS, pre-operative lung function (FVC<40% predicted).

- In 3 studies of 53 children undergoing spine fusion at 11-13 years of age with mean pre-op FVCs of 18-36%, LOS averaged 14-17 days (range 7-33 days).

Gill I, et al. *Spine* 31(21):2478-2483, 2006.
Payo J, et al. *Eur Spine J* 18:1905-1910, 2009.
Wazeka AN, et al. *Spine* 29(5):528-535, 2004.

Methods

- A protocol for pre-op assessment before initial device insertion and spine fusion was developed for members of CSSG.

- Not all centers obtained data and not all patients from any one center were included.

- Forced Vital Capacity using arm span or height was included as a % predicted within 3 months prior to surgery.

- Primary outcome variable was post-operative length of hospital stay.
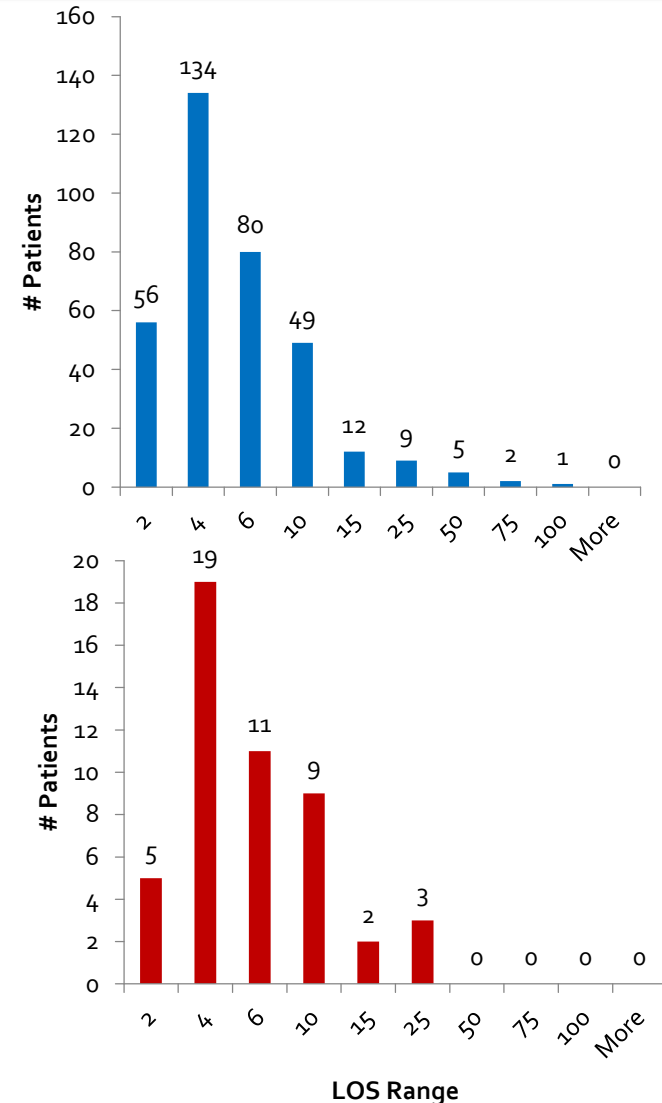
Results

- 49/88 enrolled patients >5 years old had pre-op spirometry (55%)
- Age: 9+/-4 years
- Pre-op Cobb angle: 68+/-26 degrees
- Diagnoses:
  - 11 Neuromuscular
  - 12 Congenital
  - 17 Idiopathic
  - 9 Syndromic
- Surgical Procedures:
  - 32 (65%) initial growth friendly device insertion
  - 17 (35%) had spine fusion

- 11 (22%) were on respiratory support pre-op
- Mean Pre-op FVC*as % predicted: 61+/-27%

LOS for children studied and the CSSG

CSSG Registry: n=336
　　　　　78 (23%) LOS>6 days

Pre-op Study: n=49
　　　　　14 (29%) LOS >7

Long LOS defined as >7 days

Results

- Dichotomous Analysis: threshold of FVC < or >50% predicted vs LOS < or $\geq$ 7 days.

- FVC<50% Group mean: 30+/-10%

- FVC>50% Group mean: 79+/-15%

- FVC<50%: % with LOS $\geq$ 7 days: 42%*

- FVC>50%: % with LOS $\geq$ 7 days: 17%

*P=.05

Summary

- There is a weak non-linear relationship between pre-op FVC% and LOS after initial device insertion or spine fusion.

- There were insufficient numbers of patients to derive more specific predictors of LOS using PFTs.

- Pre-op assessments should include lung function in children old enough to do them.

- Additional variables might improve the predictive value of a pre-op assessment.