Improvement of Pulmonary Function in Early-Onset Scoliosis with Serial EDF Casting

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BACKGROUND

Early-onset scoliosis is associated with progressive cardiopulmonary abnormalities. Serial EDF (elongation, derotation, flexion) casting has recently been proven as an effective method of improving spinal curvature while delaying or avoiding early surgical repair. Chest wall compliance decreases during EDF cast placement; however, as spinal curvature improves over time, compliance may similarly improve. No studies to date have examined long-term changes in pulmonary compliance associated with serial EDF casting.

METHODS

A total of 24 patients with early-onset scoliosis underwent EDF casting with general anesthesia utilizing a standardized protocol. Respiratory measurements were obtained, including lung compliance, tidal volume, airway resistance, and peak inspiratory pressure, using the Philips M1014A Spirometry Module. These measurements were collected at four major points: post-induction prior to casting, post-casting prior to cast cut-outs, post-cut-outs prior to spontaneous ventilation, and during spontaneous ventilation prior to extubation. Six of these patients underwent a second casting, thereby allowing follow-up measurements of pulmonary function.

RESULTS

Results were measured as deviations from the baseline measurement, post-induction after cast removal, which was defined as 100%. All patients demonstrated improved lung function at the time of the second casting. Lung compliance, peak inspiratory pressure, and tidal volume had normalized to near-baseline values. The most significant changes in lung function occurred after cast application prior to cut-outs; these changes were not as severe compared to initial casting.

CONCLUSIONS

Early-onset scoliosis and early spinal fusion have been associated with pulmonary insufficiency. EDF casting may allow for delayed surgical intervention and thus allow for improvement in pulmonary function. Further long-term follow-up is needed to assess additional improvements in pulmonary compliance associated with serial EDF casting.

REFERENCES


