**Paper #13: Pulmonary Pressures Substantially Change during Derotational Casting for Early Onset Scoliosis**

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**Background:** Serial derotational casts used in Early Onset Scoliosis (EOS) imply a limitation to physiologic chest and abdominal expansion consistent with a reduction of chest wall distension capacity. Previous reports have confirmed a significant Peak Inspiratory Pressure (PIP) increase during their placement. However, Plateau Inspiratory Pressure (PlIP) would seem to be a more approximate measurement as it directly correlates with Pulmonary Compliance (PC). Our goal was to examine changes in PLIP during serial derotational casting for EOS.

**Methods:** We retrospectively reviewed data obtained from 13 serial derotational castings in 8 patients with EOS. All eight patients received general endotracheal anesthesia with a standard anesthetic technique. Muscle relaxants were not used to facilitate intubation. The lungs were mechanically ventilated using volume control. Pulmonary compliance, PIP and PlIP were measured during different phases of the casting process: baseline after intubation, during derotational maneuver after cast application, after derotational maneuver without cutouts and after cutouts. Demographic data, radiographic measurements and anesthetic data were recorded. We assessed the data obtained with Wilcoxon non parametric test.

**Results:** Mean age at casting was 74.4 months (range, 36 to 124 months). Mean major Cobb angle precasting was 42 degrees (range, 22 to 63 degrees) and mean major Cobb angle postcasting was 31 degrees (range 15 to 50 degrees) with an average correction of 22.3%. Baseline measurements were PIP 22.750 cmH2O (SD 8.89), PlIP 16.250 cmH2O (SD 5.8) and PC 10.850 (SD 3.55). After casting application PIP increased 64.24%, PlIP increased 89.23% and PC decreased 52.19%. During derotational manoeuvres PIP increased 78.02%, PlIP increased 116.15% and PC decreased 56.8%. After cutouts were made PIP decreased 16.3%, PlIP decreased 16.6% and PC increased 22.3%. No complications were detected.

**Conclusions:** Serial derotational casting resulted in a significant increase in PIP and even more in PlIP, associated to a considerable decrease in PC. During derotational manoeuvres PlIP measurements exceeded pressures required to cause lung barotrauma as other authors have previously reported. After cutouts were made, PIP and PlIP decreased and PC increased but not reaching baseline values. Derotational casts imply a considerable limitation to pulmonary function, and may require an observation period after application. Long term effects over pulmonary function should be studied.