Poster #35

Research Study

Title: "Association between intraoperative T1 tilt and postoperative shoulder height in AIS patients"

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Category: Orthopedics; Surgery

Keywords: Adolescent Idiopathic Scoliosis; T1 Tilt; Shoulder Balance; Shoulder Height; Scoliosis

Introduction and Objective. It is important to identify any intraoperative radiographic measure that can potentially serve as predictor for postoperative shoulder height balance. Previous studies have shown that T1 tilt is positively correlated with postoperative shoulder balance. The aim of this study was to explore intraoperative T1 tilt, among other shoulder parameters as a potential proxy for postoperative shoulder balance in AIS.

Methods. 55 AIS patients with type 1,2,3,4, or 6 curves with minimum 2 yr. follow up radiographs were retrospectively reviewed. Preoperative erect, intraoperative, and postoperative erect radiographs at 6 weeks, 1 year, and 2 years were reviewed along with clinical data. Patients were further stratified into cohorts: T1-intraoperative tilt within 5 degrees and greater than 5 degrees, baseline shoulder height, and UIV.

Results. At surgery mean age was 15.1 ± 2.6 yrs., 43 females, and a mean BMI- 22 ± 4.8. Mean thoracic cobb was 49.8 ±11.3; mean thoracolumbar cobb was 41.3 ±14.2. Preoperative T1 tilt had significant correlation with preoperative first rib angle (FRA) (p<0.001), but not with cervical angle distance (CAD), or shoulder height (SH). T1 tilt was significantly correlated with corresponding FRA, CAD, SH, and upper instrumented vertebrae (UIV) at 6 weeks, 1 year, and 2 years (Table 1 or image). 40 patients with baseline right shoulder high had significant correlation with 2 yr. SH (p=0.04) and CAD (p<0.001) when intraoperative T1 tilt was restored <5 degrees. 28 patients with an UIV of T2 that had an intraoperative T1 tilt <5 degrees had a significant correlation with 2 yr. CAD (p= 0.009). 27 patients with an UIV of T3/T4 that had an intraoperative T1 tilt <5 degrees had a significant correlation with 2 yr. SH(p=0.04) and CAD (p< 0.001).

Conclusions-Implications. T1 tilt did not correlate with lateral shoulder parameters at pre-op except with first rib angle. However, T1 tilt which represents medial shoulder balance does correlate with lateral shoulder parameters at first erect, 1 year, and 2 year radiographs. Thus, this forms the basis that intraoperative T1 tilt can be used as a surrogate for postoperative shoulder balance. Irrespective of the UIV level selection or which shoulder is higher pre-op, it is found that when intra-operative T1 tilt is <5 degrees, the 2-year SH and CAD are better restored. Intraoperative T1 tilt in AIS patients can be used as a good indicator for surgeons on how much to correct the shoulder intra-operatively in order to achieve postoperative shoulder balance. While clinical outcome measures cannot be directly assessed, the correlation of lateral shoulder parameters with intraoperative T1 tilt helps predict the postoperative shoulder balance while in the operative room.