Evolution of Surgery for Adolescent Idiopathic Scoliosis over 20 Years: Have Outcomes Improved?

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INTRODUCTION:
Surgical techniques in adolescent idiopathic scoliosis (AIS) surgery have evolved considerably over the past 20 years. We study the trends in the operative management of AIS over this period and their impact on perioperative outcomes.

METHODS:
A retrospective review of 1,819 patients (1995-2013) from a prospective multicenter AIS surgery registry with two-year F/U were studied. Operative approach, perioperative parameters, major complication rates, and SRS outcomes were assessed. Linear regression was used to assess the trend of changes over five-year quartiles.

RESULTS:
Mean age at surgery was 14.6±2.1 years, 80.2% were females and this remained consistent throughout. Operative time, EBL/level, and LOS decreased over the 20 years (p<0.0001) (Table). The use of antifibrinolytic (AF) increased from 6.7 to 68.8% in the past 10 years (p<0.0001). Number of levels fused increased and LIV was more distal (in relation to stable vertebrae) over time in Lenke 1&2 curves (levels fused 7.97 to 9.94, p<0.0001 and 9.8 to 11.0, p=0.0134, respectively). Anterior spinal fusion (ASF) in Lenke 1 curves decreased from 81% in the 1st quartile to 0% in the last (p=0.0429). ASF for Lenke 5 curves evolved from 78% in the 2nd quartile to 0 in the last. Thoracoplasty performance decreased from 76% to 20.3% (p=0.1632). All screw constructs in PSF cases increased from 0 to 98.4% (p=0.0095). Anterior release was never performed in the 1st quartile but performed in 4% most recently (NS). Two-year major complication rates decreased over time (18.7% to 5.1%; p=0.0173). Increased improvement in SRS scores were observed in pain, image, function, and total domains over the three quartiles for which this was available.

DISCUSSION AND CONCLUSION:
Evolution of surgical technique in AIS over the past 20 years has resulted in a cessation of anterior only surgery, increasing use of all screw constructs, less blood loss, greater use of AF, shorter operative times and LOS, lower major complications rates, and greater improvements in SRS scores.