Comparison of Adolescent Idiopathic Scoliosis Correction-Open vs. Minimally Invasive Cohorts: A 2 Years Radiographic and Surgical Outcome Study

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INTRODUCTION: Both open and minimally invasive surgery (MIS) techniques are used to surgically address adolescent idiopathic scoliosis (AIS). MIS techniques are purported to preserve the midline spinal musculature and to decrease estimated blood loss (EBL) and hospital length of stay (LOS). We report the surgical and deformity corrections outcomes in matched cohorts of adolescent idiopathic scoliosis patients with similar Lenke types that had undergone either open or MIS at 2 years follow up at one institution.

METHODS: From a single surgeon's practice, 21 patients who underwent MIS correction were case matched with 19 patients that had open surgical correction. All were idiopathic Lenke 1A and 5C types. Age, surgery duration, estimated blood loss (EBL), length of hospital stays (LOS), preoperative (preop) and postoperative (postop) Cobb angles, Oswestry Disability Index (ODI), Visual Analogue Scale (VAS), and Scoliosis Research Society-22r (SRS-22r) were evaluated. MIS technique was uniform in all patients using two or three para-midline incisions.

RESULTS: Mean patient age was 16.5 years (11-47 years) in MIS group and 18 years (12-39 years) in open group. Mean preop Cobb angles for MIS and open were 53.7° (±3.1°) and 51.7°(±3.6°), respectively. The main curve's mean flexibility index was 55.4% and 56.1% for MIS and open group, respectively. Mean surgical time for MIS and open group were 343 and 393 minutes, respectively ($p<0.05$). Mean EBL were 156 mls (±89.4 mls) and 275 mls (±75.2 mls) for MIS and open group, respectively ($p<0.05$). Mean LOS for MIS was 3.0 days (±1.2 days) and 5.1 (±1.8 days) for open group ($p<0.05$). Mean corrections for MIS at postop 1 and 2 years were 75.6% (±8.2%) and 77.4 % (±6.8%) respectively. For open group, these corrections were 76.4% (±8.1%) and 76.8% (±7.4%) respectively. The differences in correction did not reach statistical significance. Mean 1- and 2-years postop VAS scores for MIS and open groups were 3.3 and 3.6, and 3.3 and 3.8, respectively ($p>0.05$). For MIS and open group, mean 1- and 2-years postop ODI scores were 6.4 and 10, and 4 and 8, respectively ($p>0.05$). Mean 1- and 2-years postop SRS scores for MIS and open groups were 4.3 and 4.1, and 4.6 and 4.2, respectively ($p>0.05$).

DISCUSSION AND CONCLUSION: In these specific curve types, our cohort data indicates that MIS technique for scoliosis correction is a viable option and can attain corrections equivalent to open surgery with lower EBL and shorter LOS. Additionally, patient-reported outcomes over 2 years follow up, as indicated by VAS, ODI and SRS were comparatively better in the MIS over the open group.