OUTCOME OF SINGLE STAGE POSTERIOR SPINAL FUSION (PSF) USING SKIP-LEVEL PEDICLE SCREW INSTRUMENTATION IN ADOLESCENT IDIOPATHIC SCOLIOSIS (AIS) PATIENTS WITH COBB ANGLE > 90°

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Introduction:
Combined anterior-posterior approach, pre-operative halo-traction or posterior vertebral column resection in severe scoliosis leads to good correction but has higher operative risks.

Materials and Methods:
Single stage PSF using skip-level pedicle screw instrumentation was performed in 70 AIS patients with Cobb angle > 90° and followed up for a minimum of 2 years. Outcome measures included side bending correction index (SBCI), C7-CSVL distance, apical vertebral translation (AVT), clavicle angle, T1 tilt, cervical axis and radiographic shoulder height (RSH). Spinal fusion was assessed using computed tomography and plain radiographs. Clinical complications and SRS 22r scores were documented.

Results:
The average age was 15.8 ± 5.2 years. Mean screw density was 1.3 ± 0.1. Operative time averaged 200.4 ± 50.6 minutes with blood loss of 1749.5 ± 1005.2 ml. C7-CSVL distance improved from 15.8 ± 9.3 to 8.4 ± 6.0mm ($p < 0.001$) at final follow up. T1 tilt, cervical axis, clavicle angle and RSH also significantly improved. The Cobb angle improved from 104.3 ± 12.5° to 40.8 ± 13.1° at final follow-up ($p < 0.001$) leading to a mean correction rate of 61.0 ± 10.7%. At 2 years, the SRS 22r overall scores (3.6 ± 0.4 to 3.9 ± 0.5, $p < 0.001$), self-image domain (2.5 ± 0.6 to 3.7 ± 0.7, $p < 0.001$) and satisfaction domain (3.8 ± 0.9 to 4.2 ± 0.7, $p = 0.009$) showed significant improvement. Fusion rate was 98.5%. There was one patient who had intra-operative seizures and two patients who had superficial wound infections.

Conclusion:
Single stage PSF using skip-level instrumentation led to an average correction rate of 61.0 ± 10.7% with good spinal balance after 2 years. The fusion rate was 98.5%. Overall SRS 22r scores, self-image domain and satisfaction domain demonstrated significant improvement at 2 years.