Posterior spinal corrective surgery for Lenke 1 AIS with anatomically designed pre-bent rods: A comparative study with the conventional simultaneous double-rod rotation technique

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Introduction

The goal of adolescent idiopathic scoliosis (AIS) surgery is to correct the deformity in 3D. Although simultaneous double-rod rotation technique (SDRRT) for Lenke1 AIS was reported to provide sagittal correction of the main thoracic (MT) curve (Sudo et al. Spine2014), this technique had the limitations of insufficient and non-anatomical thoracic kyphosis (TK) formation. We reported that anatomical spinal corrective surgery (ASC) using anatomical pre-bent rods with multilevel facetectomy could provide anatomical sagittal correction with a

favorable TK (Sudo et al. SciRep2021). This study aimed to compare the surgical outcomes with conventional SDRRT and ASC.

Methods

Data from two consecutive series of patients who underwent posterior correction surgery for Lenke1 AIS were evaluated. 32 cases (mean age 15.0y) performed SDRRT from 2008 to 2011 and 37 cases (mean age 14.8y) performed ASC from 2015 to 2021 were included. All patients were followed up (f/u) for a minimum of 2 years (mean 3.6y/2.3y). Outcome measures included patient demographics and radiographic measurements.

Results

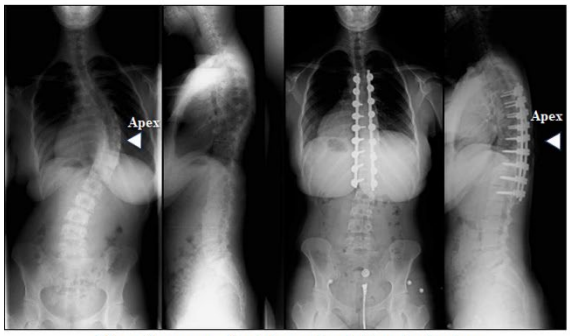
The mean preoperative (pre-op) MT Cobb angle was 55.6° in ACS and 63.4° in SDRRT ($P<0.01$). The average MT Cobb angle correction rate at the final f/u was 78.7 ° in ACS and 67.8% in SDRRT ($P<0.01$). Although the pre-op TK (T5-T12) was equivalent in two groups (12.8°, 11.9°), ACS had significantly higher TK than SDRRT at the final f/u (28.5°, 20.5°, $P<0.01$). The rates of patients with T6-T8 TK apex at the final f/u was 94.6% in ACS and 72.7% in SDRRT.

Conclusion

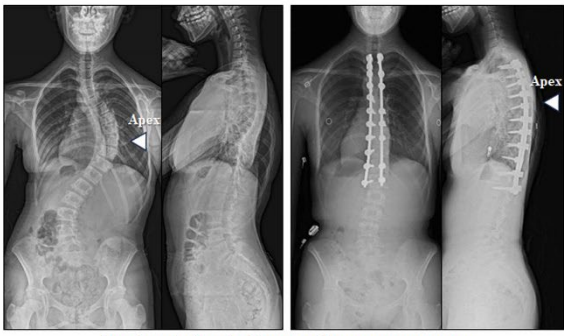
Patients who underwent corrective surgery using anatomically designed, pre-bent rods had a significantly higher TK than patients who underwent conventional SDRRT, , suggesting the benefit of this treatment in sagittal plane correction.

Disclosures

The authors declare no conflict of interest.



Simultaneous double-rod rotation technique (SDRRT)



Anatomical spinal corrective surgery using anatomically designed pre-bent rods (ASC)