Dual growth rods for infantile scoliosis

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Introduction

Early onset scoliosis (<5 years) with progressive curves require surgical intervention. The goals of surgery in this age group include scoliosis correction, maintenance of spinal growth along with expansion of the thorax, assisting in lung maturation. Fusion procedures in this age group adversely affects spinal growth and pulmonary alveolar development, leading to development of possible thoracic insufficiency. Instrumented nonfusion surgeries with dual growing rod technique have been shown to achieve good correction of scoliosis with maintenance of spinal growth and expansion of the thorax [1]. The dual growing rods have been shown to have better biomechanical stability and fewer implant related complications as compared with the subcutaneous harrington rods or the single growing rod techniques [2]. Dual growth rod techniques have now been accepted as a reliable method for surgical management of progressive early onset scoliosis with growth maintenance.

Case description

The patient is a 5 year old girl with progressive infantile idiopathic scoliosis with a right thoracic curve of 52°. The RVAD of Mehta et al. [3] was 37°, which signifies progressive nature of the curve. The child had a normal perinatal period with normal developmental milestones. The MR imaging of the spine revealed no abnormality in the spinal cord. A dual growth rod application was planned for this patient to arrest the progression of the curve along with maintenance of spinal growth. The upper anchors were planned at T3, T4 and the lower anchors at L1, L2 and connecting the proximal and the distal rods using a domino side-to-side connector. Standard adult spinal instrumentation with 5.5 mm rods and pedicle screws starting with 4 mm diameter were used for the procedure.

Surgical procedure

The patient was placed prone and the levels of instrumentation marked using an image intensifier. Through a single midline skin incision, bilateral Wiltse approach was used to insert 5 mm × 30 mm pedicle screws at L1 and L2. Fusion was prevented at the lower levels by preservation of facet capsule and by avoiding subperiosteal dissection of the muscles. This provides an option of fusion at a higher level during the final fusion procedure at 11–12 years of age. A subperiosteal dissection is made at upper anchors and 4 mm × 25 mm pedicle screws were inserted bilaterally at T3 and T4. Fusion of T3–T4 facet was done. The concave anchors were first connected with one longer proximal rod and a shorter distal rod, tunnelled in the submuscular plane between the proximal and distal exposures. The rods were connected with a side-to-side domino and sufficient overlap was maintained to allow for

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later distractions. Rod derotation and concave distraction was done to achieve curve correction. Similarly the convex anchors were connected by two rods with submuscular tunnelling. The rods and dominos are tightened under sufficient tension after curve correction.

Post-op procedure

Postoperatively the patient was mobilized with a CTLSO brace once the child was comfortable. Serial distractions at every 6 months interval is planned up to the age of 11–12 years and the parents are counselled about the same preoperatively. The child is allowed to attend school as soon as comfortable but is advised to avoid any body contact sports activities.

Discussion and conclusion

The present technique differs from the Isola technique with use of side-to-side dominos as rod connectors and the distal anchor levels are left unfused. Non-fusion at the lower anchors provides option of fusion at a higher level during

the final fusion procedure at 11–12 years of age. The technique described can be performed with any standard spinal instrumentation sets with dominos as side-to-side connectors. Dual growing rod technique is a promising alternative in the management of progressive early onset scoliosis and achieves the goals of growth maintenance along with curve correction with minimal complications.

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