Bilateral rib-to-pelvis Eiffel Tower VEPTR construct for children with neuromuscular scoliosis: a preliminary report

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Abstract:

BACKGROUND CONTEXT: Neuromuscular scoliosis could develop at a young age and progress beyond skeletal maturity. An early spinal fusion arrests growth of the spine and thorax, risking the development of secondary thoracic insufficiency syndrome. Vertical expandable prosthetic titanium rib (VEPTR) is a fusionless technique aiming at correction of the deformity with preservation of growth potential. PURPOSE: To demonstrate the preliminary results of the use of VEPTR in an Eiffel Tower construct in children with neuromuscular scoliosis in regard to coronal and sagittal profiles, space available for the lungs (SAL), and spinal growth. The report lists the complications we faced during the follow-up of 1.33 years after the index procedure. STUDY DESIGN: A retrospective analysis of prospectively collected data of a case series. PATIENT SAMPLE: Twenty nonambulatory children (mean 8.9 years) with neuromuscular scoliosis. Their primary diagnoses were myelomeningocele in seven, cerebral palsy in three, spinal muscular atrophy in two, myopathies in three, arthrogryposis in one, and syndromic scoliosis in four patients. METHODS: All 20 patients received percutaneous rib-to-pelvis VEPTR implantation. Mean operative time was 2 hours, and mean hospital stay was 12 days. None of them needed blood transfusion. They underwent 20 primary implantations and 39 lengthenings. OUTCOME MEASURES: The patients were assessed based on physiologic measures, that is, the radiographic improvement of their scoliosis, SAL, pelvic tilt, spinal height, and sagittal and coronal decompensation. RESULTS: At the latest follow-up, thoracolumbar curvature improved significantly (65.7±620.5° to 49.9±615.7°), as did lumbar curvature (61.6±619.5° to 35±621.2°), thoracic (17.262.3 to 2062.3 cm) and lumbar spinal height (9.961.7 to 11.961.8 cm), SAL (86.568.9 to 97610), pelvic obliquity (12.5±68° to 5.2±6 5.2°), and the iliolumbar angle (15±68° to 10.0±67.1°). Nine patients suffered complications in the form of proximal cradle migration (five), implant breakage (five), deep wound infection (three), and dislodged iliac hooks (two). CONCLUSIONS: Early results of VEPTR for neuromuscular scoliosis are encouraging. Follow-up till skeletal maturity will best determine future indications.

Keywords:

Neuromuscular; Scoliosis; VEPTR; Eiffel Tower; Rib to pelvis

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