

PEDICLE MORPHOMETRY IN ADOLESCENT IDIOPATHIC SCOLIOSIS: DOES IT CORRELATE WITH PERFORATION RATE

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INTRODUCTION:

Posterior Instrumentation and Spinal Fusion (PSIF) has become the mainstay surgical intervention for most Adolescent Idiopathic Scoliosis (AIS). The use of multiple pedicle screws in thoracic and lumbar spine allows superior 3-dimensional deformity correction. In spite of this excellent biomechanical feature and better surgical outcome, there are potential complications such as adjacent neurovascular injury and visceral injury which could occur due to misplacement of the screw.

METHODS:

The objective of this study is to analyse the prevalence of dysplastic pedicles in AIS and its correlation with pedicle perforation in scoliosis surgery. Sixty-eight patients with AIS were studied. The pre-operative axial CT scans were used to evaluate the pedicle morphology of thoracic and lumbar spines in AIS. Post-operative axial and sagittal CT scans were used to evaluate the position of pedicle screws and presence of the pedicle perforation.

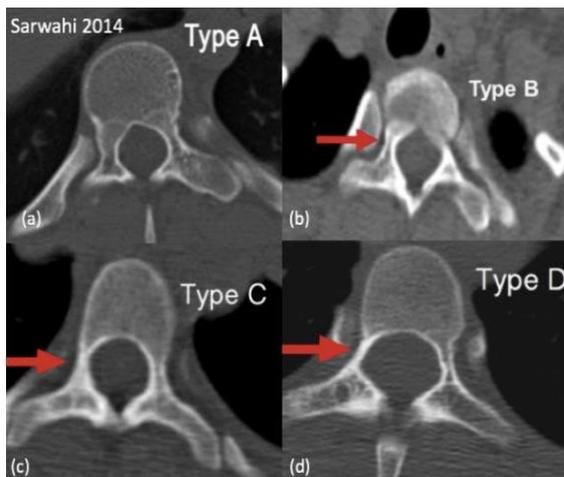
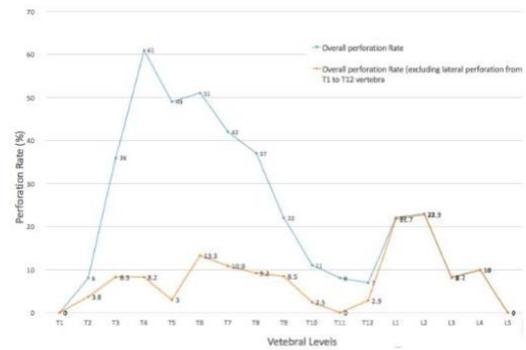


Figure 2.1: CT images demonstrating pedicle morphology taken from Sarwahi et al paper 2014

RESULTS:



Our study shows significant number of dysplastic pedicles distributed over the concave side of proximal thoracic curve and main thoracic curve. These dysplastic pedicles were significantly smaller size pedicle diameter compared to the pedicles on the convex side of the curve. Higher rate of perforation was observed in presence of dysplastic pedicles especially on the concave side of the curve. The pedicle morphology significantly varies in AIS. Presence of dysplastic pedicles clearly affect the accuracy of pedicle insertion and increases the risk of perforation. A thorough understanding of this variation on pedicle anatomy in scoliotic spine is absolutely essential for safe and accurate pedicle screw placement

CONCLUSION:

This study has analyzed pedicle morphometry in AIS in our population. We found that, presence of dysplastic pedicles are predominantly in upper thoracic and main thoracic curve in AIS. We established presence of asymmetry in pedicle diameter on the concave and convex site of scoliotic curve. The size of pedicle on the concave site is significantly smaller than the convex side especially in the upper and main thoracic spine. A thorough understanding of these variations of pedicle morphology in AIS is essential for safe, precise and accurate placement of pedicle screws in AIS patients.