Adolescent idiopathic scoliosis treatment

Treatment of adolescent idiopathic scoliosis falls into three main categories (observation, bracing and surgery), and is based on the risk of curve progression. In general, AIS curves progress in two ways: 1. during the rapid growth period of the patient, and 2. into adulthood if the curves are relatively large.

Surgery

Indications

Surgical treatment is used for patients whose curves are greater than 45º while still growing or greater than 50 º when growth has stopped.

Goal

The goal of surgical treatment is two-fold: First, to prevent curve progression and secondly to obtain some curve correction. Surgical treatment today utilizes metal implants which are attached to the spine, and then connected to a single rod or two rods. Implants are used to correct the spine and hold the spine in the corrected position until the spine segments which have been operated on are fused as one bone. The surgery can be performed from the back of the spine (posterior approach) through a straight incision along the midline of the back or through the front of the spine (anterior approach). Although there are advantages and disadvantages to both approaches, the posterior approach is utilized most often in the treatment of AIS and can be utilized for all curve types. The anterior approach is an option when a single thoracic curve or a single lumbar curve is being treated.

Following surgical treatment, no external bracing or casts are used. The hospital stay is generally between 5 and 7 days. The patient can perform regular daily activities and generally returns to school in 3-4 weeks. Depending on the activities of the patient, full participation is allowed between 3 and 6 months after surgery.

Case series

The purpose of this study was to identify risk factors for distal adding-on (AO) or distal junctional kyphosis (DJK) in adolescent idiopathic scoliosis (AIS) treated by posterior spinal fusion (PSF) to L3 with a minimum 2-year follow-up.

Methods: AIS patients undergoing PSF to L3 by two senior surgeons from 2000-2010 were analyzed. Distal AO and DJK were deemed poor radiographic results and defined as >3 cm of deviation from L3 to the center sacral vertical line (CSVL), or >10° angle at L3-4 on the posterior anterior- or lateral X-ray at ultimate follow-up. New stable vertebra (SV) and neutral vertebra (NV) scores were defined for this study. The total stability (TS) score was the sum of the SV and NV scores.

Results: Ten of 76 patients (13.1%) were included in the poor radiographic outcome group. The other 66 patients were included in the good radiographic outcome group. Lower Risser grade, more SV-3

(CSVL doesn't touch the lowest instrumented vertebra [LIV]) on standing and side bending films, lesser NV and TS score, rigid L3-4 disc, more rotation and deviation of L3 were identified risk factors for AO or DJK. Age, number of fused vertebrae, curve correction, preoperative coronal/sagittal L3-4 disc angle did not differ significantly between the two groups. Multiple logistic regression results indicated that preoperative Risser grade 0, 1 (odds ratio [OR], 1.8), SV-3 at L3 in standing and side benders (OR, 2.1 and 2.8, respectively), TS score -5, -6 at L3 (OR, 4.4), rigid disc at L3-4 (OR, 3.1), LIV rotation >15° (OR, 2.9), and LIV deviation >2 cm from CSVL (OR, 2.2) were independent predictive factors. Although there was significant improvement of the of Scoliosis Research Society-22 average scores only in the good radiographic outcome group, there was no significant difference in the scores between the groups.

Conclusion: The prevalence of AO or DJK at ultimate follow-up for AIS with LIV at L3 was 13.1%. To prevent AO or DJK following fusion to L3, we recommend that the CSVL touch L3 in both standing and side bending, TS score is -4 or less, the L3/4 [1)].

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Hyun SJ, Lenke LG, Kim Y, Bridwell KH, Cerpa M, Blanke KM. Adolescent Idiopathic Scoliosis Treated by Posterior Spinal Segmental Instrumented Fusion : When Is Fusion to L3 Stable? J Korean Neurosurg Soc. 2021 Jul 28. doi: 10.3340/jkns.2020.0348. Epub ahead of print. PMID: 34315199.