EXPERIENCE IN THE USE OF HYBRID INSTRUMENTATION IN SURGICAL TREATMENT OF THORACIC IDIOPATHIC SCOLIOSIS WITH LUMBAR COUNTER-CURVE*

A.S. Vasyura, V.V. Novikov, V.V. Belozerov, I.G. Udalova
Ya.L. Tsivyan Novosibirsk Research Institute of Traumatology and Orthopedics, Russia

Objective. To analyze results of surgical treatment of patients with thoracic idiopathic scoliosis with lumbar counter-curve using hybrid instrumentations.
Material and Methods. A total of 86 patients (10 males and 76 females) with Lenke type III idiopathic scoliosis were operated on. The average age of patients was 15.3 ± 1.8 (range: 10.3–18.0) years, with mean follow-up of 3.5 ± 0.7 (range: 2.2–5.7) years. All patients underwent correction of spinal deformity by hybrid instrumentation with laminar fixation of the thoracic spine and lumbar transpedicular fixation of the thoracolumbar spine. Postoperatively, patients were interviewed using the SRS-24 questionnaire.
Results. The average initial magnitude of primary thoracic curve was 63.4° ± 19.2°, immediately after surgery – 19.0° ± 10.0°; correction – 45.3° ± 15.5°; postoperative progression was 1.3° ± 3.7°. The initial magnitude of counter-curve was 41.0° ± 19.9°, immediately after surgery 10.4° ± 11.9°; correction 28.9° ± 17.8°; postoperative progression was 0.6° ± 2.1°. The tilt angle of the lower instrumented vertebra decreased after surgery from 21.2° ± 9.7° to 5.5° ± 4.2°, at the last follow-up examination it almost did not change – 5.4° ± 3.9°. The questionnaire results demonstrated a high degree of patient satisfaction with the treatment. Severe complications were not observed.
Conclusion. The use of hybrid instrumentation in the treatment of patients with thoracic idiopathic scoliosis and lumbar counter-curve allows achieving good correction of spinal deformity and sustain the achieved correction.
Key Words: hybrid instrumentation, scoliosis, surgical treatment.

**Vasyura AS, Novikov VV, Belozerov VV, Udalova IG. [Experience in the Use of Hybrid Instrumentation in Surgical Treatment of Thoracic Idiopathic Scoliosis with Lumbar Counter-curve]. Hirurgia pozvonocnika. 2015;12(4):30–35. DOI: https://doi.org/10.14531/ss2015.4.30-35*

In the initial variant of third-generation segmental instrumentation (Cotrel – Dubousset instrumentation) only hooks arranged in checkboard order, one on the left and one on the right side, were used as anchoring elements [9]. After the invention made by Roy-Camille [15] it would be strange if orthopedists had not soon understood the benefits of combining CDI (the ideology, procedure, and planning principles) and the reliability of transpedicular fixation (TPF). The combination was a relatively slow-going process as many surgeons initially preferred to deal with hooks only. We were the first Russian surgeons who started using CDI (in 1996) and initially were rather satisfied with using hooks only. The outcomes seemed fairly good both for us and our patients [5, 6]. However, as years passed, it became clear that the deformed lumbar spine (regardless of whether it was the primary curve or counter-curve) and the thoracolumbar junction need more reliable fixation, mostly to prevent displacement of the caudal anchor [1]. The term 'hybrid instrumentation' or 'hybrid fixation' already existed at that time (2009), since the approach to using TPF was originally rather ambiguous; combining screws, hooks, and, in some cases, wire was not rare [7, 8, 10, 13]. When proceeding to the new stage of work, we made our best to avoid unnecessary radicalism and started to use hybrid fixation (except for wire loops). Subsequently, we also started to use the so-called total TPF for specific indications (as it is demonstrated below). Having accumulated a rather large number of clinical cases (~900) of surgeries using TPF, we adhere to the opinion that the use of this type of fixation along the entire thoracic spine is not necessary in all cases without exception. We believe that the use of hook fixation in the upper and middle thoracic spine does not reduce the quality and extent of correction, does not make the intervention longer, and reduces the risk of complications (PJK, neurological disorder).
Our study aimed at analyzing the outcomes of using hybrid instrumentation in patients with Lenke type 3 idiopathic scoliosis.

Material and Methods

A total of 86 patients (10 males and 76 females) with type III scoliosis according to the classification proposed by Lenke et al. [12] were operated from December 2008 till December 2011. The mean age of patients was 15.3 ± 1.7 (range: