

Brief Communication

Reconstructive operations of serious scoliotic deformation in children

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The differential election of treatment option in spine deformation management depends on the age of patient, extent of deformation, spine mobility and neurological impairment. Application of high technologies allows achieving good results in these patients [5, 6].

Irrespective of etiology, spine deformations in adolescents represent the cause that influences the main peculiarities of the spinal column: its safety and stability; initially it is manifesting by pains, static's infringements, and internals' dysfunction, subsequently it leads to severe decrease of quality of the life [1, 2, 3, 10]. The choice of surgical and therapeutic options in the management of spine deformations at children is still controversial. [4, 7, 9, 10].

In Clinic of Vertebrology, Orthopedics and Traumatology of the "N. Georgiu" Scientifically-Practical Center of Children's Surgery 58 children with scoliosis ($>70^\circ$) of different etiology, for correction of deformation at which was used polysegmentary constructions, have been pre- and post-operatively examined with a follow-up of 1 to 5 years (2016 – 2020). The evaluation included collecting of anamnesis data, clinical examination, labs and imaging (standard radiography/ with functional tests, magnetic resonance). Children were aged between 5 and 17,5 years; they were predominantly girls – 61(56 %).

Patients were parted, on 3 categories: I category – 26 patients with complete growth (14-16 years) (medium – 14,8 years) and idiopathic mobile spine deformations, curvature angle to $70-85^\circ$, coefficient of Harrington >5 ; II category – 18 patients with complete growth (14-17 years) and idiopathic rigid forms of deformation (medium – 15,9 лет), curvature angle is more than $85-90^\circ$ and coefficient of Harrington < 5 ; III category – 16 patients with juvenile idiopathic and congenital deformations (5-12 years).

The main goals of surgical interventions were: elimination of deformation and disbalance correction and spine stabilization. Surgery allowed obtaining the following results: reconstruction of forward and average spine columns, restoration of physiological spine profiles (frontal and sagittal); restoration of normal anatomy of the vertebral channel; stabilization of the spine-impellent segment.

Tactics of surgical interventions, depending on category was following: the I category – 26 patients with complete body growth (13-15 years) and idiopathic plentiful spine deformations was carry out one-stage dorsal correction (fig. 1)

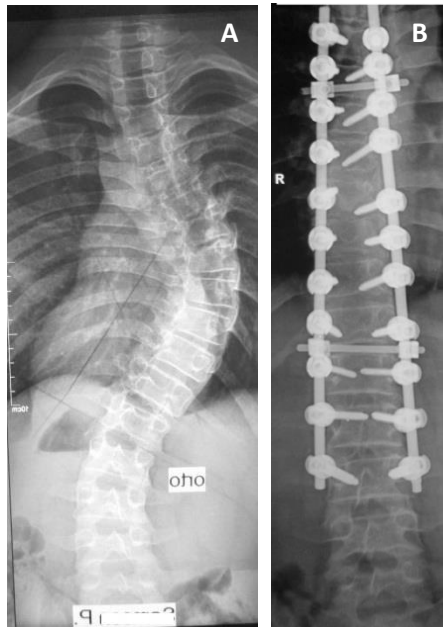


Fig. 1. A - Before operation the angle of deformation was 70°; B - After operation - 0 °, Correction of deformation is 100%



Fig. 2. A - Before operation the angle of deformation was 127 °; B - After operation - 29 °; Correction of deformation is 98 °

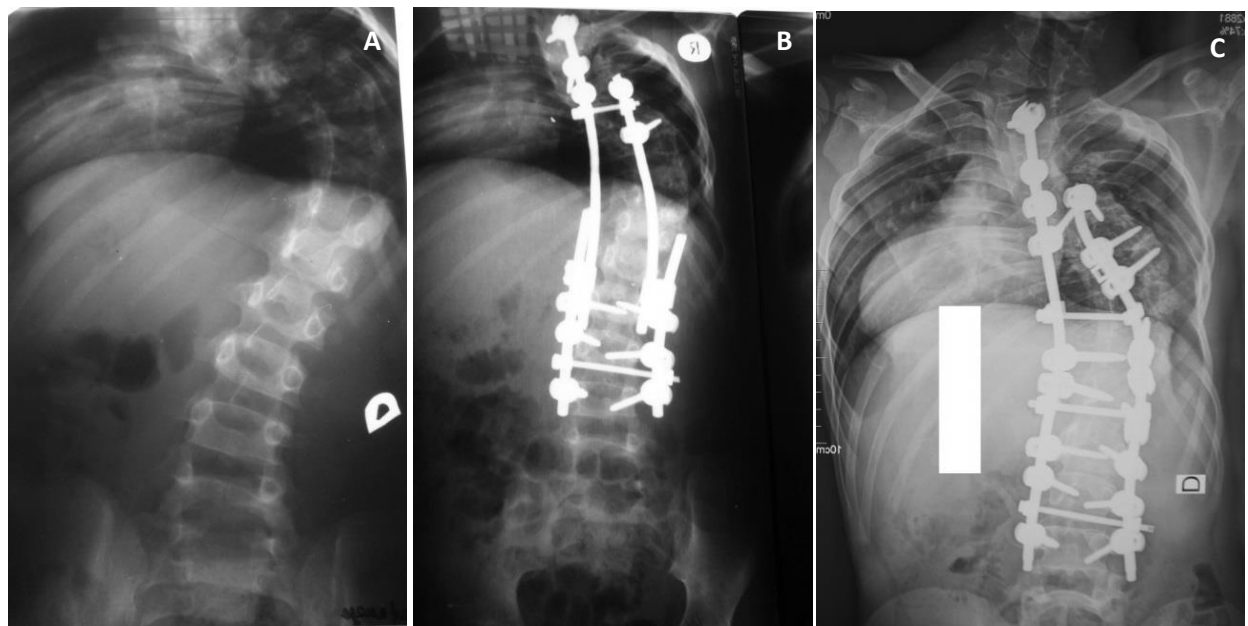


Fig. 3. A - Before operation; B - After operation of "blocking spondylosyndesis" at curvature top with the following dorsal correction by "a growing construction"; C - After

The II category – 18 patients with complete body growth (14,5-17,5 years) and idiopathic rigid forms of deformation by the first stage was executed forward spine mobilization (a multilevel discectomy), the second – dorsal correction of deformation by C-D system (fig. 2).

The III category–16 patients with juvenile idiopathic and congenital deformations (5,5-11 years) was carried out "blocking spondylosyndesis" at curvature top with the following dorsal correction by "a growing construction". In process of children growth through minimum invasive access the phased system's distraction is carried out. One step of a distraction equals 1-1,5 cm. Intervals of stage-by-stage correction depend on age growth activity and rates of deformation advance: from 6-8 months to 1,5-5 years (fig. 3).

The comparative analysis of the quality of the life of patients with severe spine deformations (according to a questionnaire „EQ-5D”), before and after surgical intervention, has shown that the quality of the life of patients in postoperative period essentially improved, in comparison with the preoperative period, from 12,7±0,3 points to 6,7±0,1. The distant results of surgical treatment were good: (correction > 55%) –39 (68, 4%), satisfactory (55%-40%) –12 (21,1%), and unsatisfactory (< 40%) –7 (12,3%). Complications took place in 9 (15,8%) cases.

At the present moment at scoliotic illness' treatment, surgical tactics remains discussed in the following aspects:

- At what age is it better to operate?
- What surgical technique will be more effective?
- Whether surgical intervention at the level of zones of growth and intervertebral disks will be expedient?

Data of epidemiological research, conducted Scientifically-Practical Center of Children's Surgery by randomization method, showed that in 2011 the frequency of scoliotic illness of RM reached on 7,8% at children and teenagers (till 18 years), from which 0,26% – the deformation angle was >70°. They make 5,2% in structure of diseases of a locomotorium apparatus [8, 11].

Conclusions.

1. The tactics of surgical treatment of spine deformations and further forecast depend on the type of neurological infringements and the character of bones' damages.
2. Optimum method of correction of difficult rigid scoliotic spine deformations were: forward spine release; dorsal correction and backbone fixation by a metal construction.
3. Surgical treatment of difficult juvenile scolioses began at 10-12 years old, and combined forward spine release with the following dorsal correction without posterior spine fusion execution.
4. In cases of congenital deformations primary operative defect's correction was carried out at children at the age of 3-7 years – "blocking spondylosyndesis" at curvature top with the following dorsal correction by "a growing construction" without posterior spine fusion execution.
5. Final correction of deformation, posterior spine spondylosyndesis and thoracoplasty are carried out on the end of spine growth.

REFERENCES

1. Antonescu D. Diformitățile coloanei vertebrale: scolioze-cifoze. Ann. Patol. Aparat. Locomot. 2008. 101:164-265.
2. Cotrel Y., Dubousset J., Guillaumat M. New universal instrumentation in spinal surgery. Clin. Orthopaed. Rel. Res. 1988. 227:10-29.
3. Jianu M. Scolioza pediatrică. Pro Editura și Tipografie. București. 2005. 141 p.
4. Jonge T., Dubousset J.F., Illes T. Sagittal plane correction in idiopathic scoliosis. Spine. 2002. 27(7):745-61.
5. Lenke L.G., Betz R.R., Haheer T.R., Lapp M.A. et al. Multisurgeon assessment of surgical decision-making in adolescent idiopathic scoliosis. Spine. 2001. 26(9):2347-53.
6. Lenke L.G., Bridwell K.H., Baldus C. Cotrel-Dubousset instrumentation for adolescent idiopathic scoliosis. J. Bone Jt Surg. 1992. 74-A(7):1056-67.
7. Merola A., Haheer T., Brkaric M., Panagopoulos G. et al. A multicenter study of the outcomes of the surgical treatment of idiopathic adolescent scoliosis using the SRS outcome instrument. Spine. 2002. 27(18): 2046-51.
8. Șavga N.N., Șavga N.G. Operații de reconstrucție în diformitățile scolioțice la copii. Bul. Perinatol. 2013. 59(3):148-51.
9. Suk S., Kim W., Lee C. Indication of proximal thoracic curve fusion in thoracic adolescent idiopathic scoliosis. Spine. 2000. 25(18): 2342-9.
10. Ulrich E.V. Spinal abnormalities in children. Manual for SPb doctors. ELBI-SPb. 1995. 364 p.
11. Villemure I., Aubin C., Grimand G., Dansereau J., Labelle H. Progression of vertebral and spinal three-dimensional deformities in adolescent idiopathic scoliosis. A longitudinal study. Spine. 2001. 26(20): 2244-50.