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MAGNETICALLY CONTROLLED GROWING ROD IN EARLY ONSET SCOLIOSIS: RETROSPECTIVE REVIEW FOCUSING ON COMPLICATIONS

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Backround

The "Growing rod" systems represent valid systems for the control of infantile scoliosis, when the vertebral arthrodesis is not indicated, as in patients under 10 years old.

PROBLEM: Multiple surgeries Several anesthetics Pre-, intra and postoperative risks (infections, etc.)

Complications of Growing-Rod Treatment for Early-Onset Scoliosis Analysis of One Hundred and Forty Patients Shay Bess, MD, Behrooz A. Akbarnia, MD, George H. et al

Hospitalization Expenses for the family Stress for young patients

Magnetically controlled growing rods for severe spinal curvature in young children: a prospective case series Kenneth Man-Chee Cheung, Behrooz A Akbarnia, et al. Lancet 2012

Caldas JC, Pais-Ribeiro JL, Carneiro SR. General anesthesia, surgery and hospitalization in children and their eff ects upon cognitive, academic, emotional and sociobehavioral development—a review. Paediatr Anaesth 2004; 14: 910–15.

21 Kain ZN, Wang SM, Mayes LC, Caramico LA, Hofstadter MB. Distress during the induction of anesthesia and postoperative behavioral outcomes. Anesth Analg 1999; 88: 1042–47.

Magnetically controlled growing rods (MCGR) are increasingly used for the treatment of early onset scoliosis. Aim of the study is to retrospectively review our patients treated with MCGR focusing on complications.





Material And Methods

6 patients 3 males 3 females

Age: from 4 to 11 years old Aethiology: early and late onset scoliosis (infantile or juvenile) <u>Charatteristics</u>: >40° Cobb, Lenke 1A No Mieloradicular Malformations at the MRI





- In one case a VEPTR and a GSP was first implanted before using MCGR.
- In all cases a dual growing rod was implanted, using as distal anchors pedicle screws, as proximal anchors hooks.

Follow-up 10 - 24 month Xray after each lengthening at the begining, then every 6-10 months. Clinical Out-come clinici with SRS-30 Questionaire. Daily Brace for every patient



PRE-OP	POST-OP	CORRECTION	F.U.	CORRECTION
62.7°	32°	49%	24.6°	47,6%
58°	31°	45%		48%
			+2 cm/yy	
	PRE-OP 62.7° 58°	PRE-OP POST-OP 62.7° 32° 58° 31°	PRE-OP POST-OP CORRECTION 62.7° 32° 49% 58° 31° 45% Image: Complete to the second secon	PRE-OP POST-OP CORRECTION F.U. 62.7° 32° 49% 24.6° 58° 31° 45% L L L L L L L L



The lengthening were perfomed every 60-90 days (min 3 mm - max 6 mm each) Day Surgery.

At a minimum follow up of 6 months, after performing 5.7 lengthening procedures per patient, main thoracic scoliosis was corrected from 62.7° to 32.0° (mean correction 49%), lumbar curve form 58.5° to 32.0° (45%).

SRS-30



Scoliosis correction and maintenance of correction during the elongations



Complications

INFECTIVE	NO	
NEUROLOGICAL	NO	
POST OPERATIVE PAIN	1	30%
MECHANICAL	1	

At final follow up, no patient presents pain or functional limitation.





Complications

A.M. 9 yy infantile idiopathic scoliosis + spondylolisthesi I° Meyerding



In one patient a revision surgery was performed due to persistent sciatica secondary to lumbar misplaced screw.









Complications



Complications

EL 12 yy severe scoliosis (?idiopathic?): T3-T4 / L2-L3, 1cross-link

In another one, a revision was performed due to proximal hooks mobilization.



Discussion and Conclusion

The extendable magnetic systems are safe and effective (poor literature).

The growth in segments T1-T12 is in line with the normal growth.

The systems have maintained the elongation performed.

Health care costs, in relation to the traditional growing systems, are similar to the individual patient and the quality of life of young patients and their families is satisfactory.

Indications: infantile idiopathic scoliosis

Contraindications: inability to perform MRI (mieloradicular malformations)

There were no complications related to the operation of elongation.

Those results showed that MCGR can be safely and effectively used in patients affected by early onset idiopathic scoliosis, with an acceptable complications incidence (33%) if compared with literature regarding growing spinal implants, offering excellent deformity control and functional outcome.

Early results of a remotely-operated magnetic growth rod in early-onset scoliosis. Dannawi Z, Altaf F, Harshavardhana NS, El Sebaie H, Noordeen H. *Bone Joint J. 2013 Jan;95-*.

Next Generation of Growth-Sparing Techniques: Preliminary Clinical Results of a Magnetically Controlled Growing Rod in 14 Patients With Early-Onset Scoliosis.

Akbarnia BA, Cheung K, Noordeen H, Elsebaie H, Yazici M, Dannawi Z, Kabirian N. *Spine (Phila Pa 1976). 2013 Apr 15*

Magnetically controlled growing rods for severe spinal curvature in young children: a prospective case series. Cheung KM, Cheung JP, Samartzis D, Mak KC, Wong YW, Cheung WY, Akbarnia BA, Luk KD. Lancet. 2012 May 26 THANK YOU

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