

How I do it

A Retrospective Clinical Study of 640 Scoliosis Treated by Posterior Segmental Rachisynthesis

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REZUMAT

Studiu clinic asupra unui număr de 640 scolioze operate prin rahisinteză segmentară posterioară

Lucrarea prezintă un studiu retrospectiv asupra unui număr de 640 scolioze operate în Clinica de Ortopedie Pediatrică a Spitalului Clinic de Urgență pentru Copii "Grigore Alexandrescu" din București și în clinicile private "Regina Maria" și "Sanador" într-un interval de 14 ani, cuprins între 1999-2012. Studiul se referă la scoliozele operate prin rahisinteză vertebrală segmentară cu abord posterior, combinat în cazuri severe cu eliberare anterioară. Pacienții luați în studiu au avut vârste între 6 și 44 de ani, iar pentru efectuarea rahisitezei vertebrale s-au folosit tehnici diferite SCS (Spinal Clip System), Moss-Miami, XIA, CD-Legacy, USS II. În marea majoritate a cazurilor, pacienții au fost de sex feminin - (82%). Referitor la etiologie s-a constatat că 92,95% dintre scolioze au fost idiopatice, 2,04% congenitale, 1,14% în cadrul maladiei Recklinghausen, 1,14% în cadrul bolii Marfan, 0,91% în paralizii cerebrale, câte 0,68% în amiotrofii spinale și respectiv scolioze de cauze traumatiche, 0,45% în distrofiile musculare. În funcție de forma topografică situația se prezintă astfel: scolioze duble toracale și lombare (40,45%), scolioze toracale (33,64%), toracolombare (18,63%), lombare (6,14%), duble toracale (0,68%), triple (0,46%).

Cuvinte cheie: scolioză, rahisinteză posterioară

ABSTRACT

This is a retrospective study of 640 patients with scoliosis who underwent surgery in Pediatric Orthopedic Department of Central Emergency Hospital for Children "Grigore Alexandrescu" Bucharest and also in the private hospitals "Regina Maria" and "Sanador" in a 14 years period between 1999 and 2012. The study relates to the cases of scoliosis treated by segmental rachisynthesis by posterior approach, but also includes some cases in which the posterior and the anterior approach were combined. The patients were between 6 and 44 years old and most of them were female (82%). We used different techniques of rachisynthesis such as: SCS (Spinal Clip System), Moss-Miami, XIA, CD-Legacy, USS II. Regarding etiology, 93,12 % of scoliosis were idiopathic forms, 2,03% congenital, 1,09% in patients with Recklinghausen disease, 1,09 % in Marfan syndrome, 0,94% in cerebral palsy, 0,63 % in both spinal amyotrophy and posttraumatic and 0,47 % in muscular dystrophies. According to topographic form, 37,66 % were double thoracal and lumbar scoliosis, 29,06 % thoracal scoliosis, 18,28% thoracolumbar, 13,12 % lumbar, 1,25 cervicothoracal and 0,63 % triple curve scoliosis.

Key words: scoliosis, segmental rachisynthesis

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INTRODUCTION

Although the scoliosis has in Romania relatively the same incidence as in most of the European countries, it is usually late diagnosed, when the Cobb angle has significant values.

Since 2010, Romania has a program of screening and early treatment of spine deformities funded by The Ministry of Health.

In a 14 years period in Pediatric Orthopedic Department of Central Emergency Hospital for Children "Grigore Alexandrescu" Bucharest and also in the private hospitals "Regina Maria" and "Sanador" were examined and diagnosed 14.853 patients with scoliosis.

The segmental rachisynthesis by posterior approach is the golden standard in surgical treatment of scoliosis. Before 1999 in our clinic we performed Harrington technique, but those cases were not included in in this study

Other surgical techniques used besides the posterior rachisynthesis were: muscle detachment followed by bracing or casting, thoracoplasties, posterior vertebral arthrodesis (such cases are not in the study).

MATERIAL AND METHOD

For the preparation of the study we selected 640 cases of scoliosis who underwent surgery between 01.01.1999 and 31.12.2012.

For each patient we recorded: age, gender, curve pattern according to Lenke, surgical technique, pre and post operative Cobb angle, early and late post-operative evolution and complications.

The follow up period ranged between 3 months and 13 years, with an average of 6,5 years.

RESULTS

Of 640 patients, 82 % were female and 18 % were male.

Distribution of cases by etiology:

Idiopathic	93,12%
Congenital	2,03%
Recklinghausen	1,09%
Marfan	1,09%
Cerebral palsy	0,94%
Spinal amyotrophy	0,63%

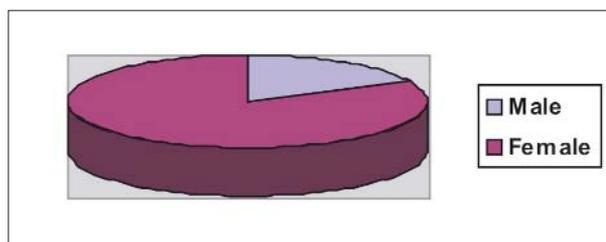


Figure 1. Distribution of cases by gender

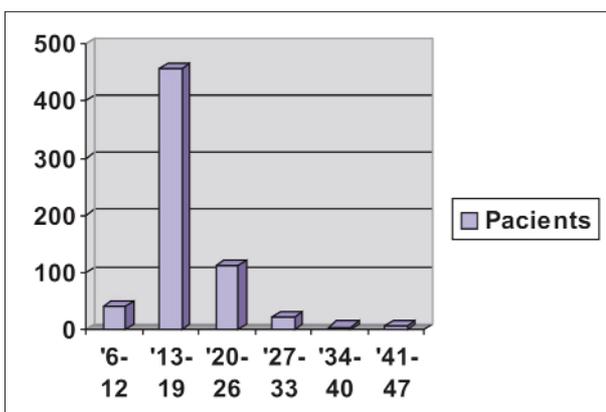


Figure 2. Distribution of cases by age

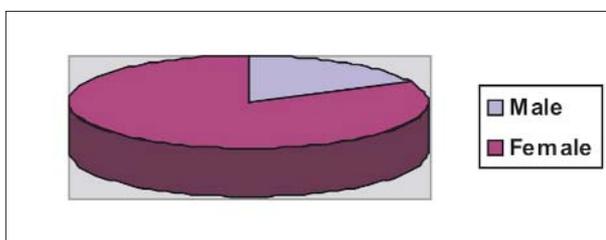


Figure 3. Distribution of cases by topographic form

Posttraumatic	0,63%
Muscular dystrophies	0,47%

Distribution of cases by surgical technique

We used several types of segmental spinal instrumentation: SCS, Moss-Miami, CD-Legacy, XIA, USS II. The choice of the technique was circumstantial and dependent on the experience of surgical team and the availability of the implants (fig.1, 2, 3).

Of 640 cases, surgical techniques were:

- SCS	45,93%
- USS II	23,91%
- CD-Legacy	19,22%
- Moss-Miami	10,47%
- XIA	0,47%

Complications and incidents

Intraoperative complications:

- high blood loss 2 (0,31%)
- transverse process fracture 7 (1,09%)
- hook pulled out 6 (0,93%)
- injury of the dura 3 (0,47%)

Postoperative complications

- pseudarthrosis 6 (0,93%)
- 1 rod breakage 9 (1,40%)
- 2 rod breakage 3 (0,47%)
- screw breakage 11 (1,71%)
- implant migration 2 (0,31%)
- implant rejection 5 (0,78%)

General considerations

In the vast majority of cases, posterior rachisynthesis was performed when curve magnitude was over 50 degrees, but in some forms with significant progression of the curve, the surgery was performed for Cobb angle over 40 degrees.

The average time of surgery was 310 minutes, but in cases when bone grafts were used (stored in liquid nitrogen vapors at -196 degrees Celsius) it was 30 minutes shorter.

The average intraoperative blood loss was 720 ml, but in most of the cases blood loss was recovered using the cell-saver.

The patients were admitted in the Intensive Care Unit for one or two days post surgery, the drainage was removed after 3 days postoperatively and the mobilization of the patient began.

The patients were discharged after 6 days and they were allowed to return to their social activities after 30 days.

Table 1. Frontal plane correction

	Primary curve	Secondary curve
Pre-op	79,5° (35-140)	43,2° (8-78)
Bending	52,6° (26-86)	16,6° (0-42)
Correction	33,8%	61,57%
Post-op	28,4° (4-68)	12,7° (0-28)
Correction	64,27%	70,6%
Follow-up	32,6° (7-76)	14,9° (3-31)
Correction	59%	65,5%
Loss of correction		4,2° 2,2°

Table 2. Sagittal plane correction

	Thoracic kyphosis	Lumbar lordosis
Pre-op	17,2° (-18-62)	28,1° (-16-67)
Post-op	29,4° (12-48)	42,3° (18-59)
Follow-up	34,1° (14-51)	44,7° (19-61)

The curve correction was achieved by in situ remodeling or by derotation, depending of the technique.

In order to obtain an optimal correction, we performed multiple arthrotomies and osteotomies in cases of rigid scoliosis and in cases of severe curves.

One important goal for us was to maintain the sagittal alignment of the spine. This is an example of preoperative x-ray (Fig. 4) and postoperative x-rays showing correction in frontal (Fig. 5) and sagittal plane (Fig. 6).

The patients started physical therapy 3 month



Figure 4. preoperative x-ray



Figure 5. postoperative frontal plane correction



Figure 6. postoperative sagittal plane correction

post surgery.

The cases of implant rejection had fistulas that did not healed with local surgical treatment or antibiotherapy, but only by complete removal of the implants. In the 5 cases of implant intolerance, the fistulas occurred in a 3 to 11 years postoperative period.

CONCLUSIONS

- Most of the patients were female - 82%.
- The most frequent etiologic form was idiopathic scoliosis (93, 12 %), followed by congenital scoliosis (2,03%) and other forms of scoliosis (all with very small percentage).
- Most scoliosis who underwent surgery were double thoracic and lumbar ones (37,66%).
- The optimal age for surgery was 13-15 years for female patients and 15-17 for male patients with Risser sign grade above 1.
- For the adult and the adolescent patients, the age of surgery was the age of scoliosis detection.
- Only the stainless steel rod and screw broke.
- Curve correction was determined mainly by the flexibility of the spine, the age of the patient, the surgical team experience and less by the surgical technique.