Paper #21

Vancomycin Powder Lowers Infection Rate in Growing Rod Surgery in Early Onset Scoliosis: A Preliminary Report

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Summary: Vancomycin powder (VP) results in a statistically significant decrease in infection rates per procedure in early onset scoliosis (EOS) surgery.

Hypothesis: Intra-wound VP decreases surgical site infections (SSI) in EOS surgery.

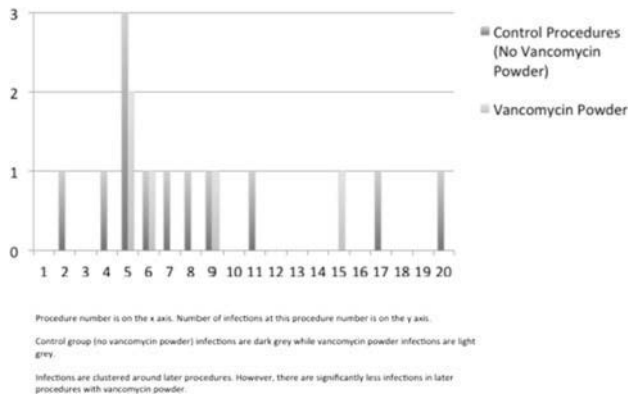
Design: Retrospective Cohort Study.

Introduction: VP is safe in children yet there is no data on its use to reduce SSI in EOS surgery.

Methods: Using our IRB-approved pediatric spine database, we performed a retrospective review of our EOS program from 2010-2016. In 2010, we modified our growing spine care path and later added vancomycin powder. Therefore, we have a standardized perioperative protocol that was divided into a control group without VP and an experimental group with VP. Inclusion criteria were initial insertions, revisions, lengthenings, and final fusions. This preliminary study focused on the incidence all SSI with a minimum of 90-day follow up to capture all acute SSIs. We excluded patients who had SSI prior to 2010. However, patients with surgeries before 2010 and no prior infections were included for subsequent procedures.

Results: 36 patients with 191 procedures met inclusion criteria. Seven patients had VP for all procedures, 13 patients were mixed (initial surgeries without VP) and 16 patients never received VP. There were 14 patients (39%) that developed a SSI (12 acute and 2 late). Two patients had multiple infections, though not on consecutive procedures. There were 85 procedures and 12 infections in the control group (14% per procedure). Many control group infections occurred in later procedures (Table 1). There were 106 procedures in the VP group with 5 infections (4.7% per procedure). This decrease in SSI per procedure was statistically significant ($p=0.038$, 95% CI). The number needed to treat with vancomycin to prevent a SSI was 11. Within the vancomycin group, there were 40 procedures in patients where vancomycin powder used for every procedure. This subgroup had 2 infections (5%). Similarly, there were 3 infections (4.5%) in 66 procedures in patients having a history of earlier surgeries without vancomycin powder.

Conclusions: The use of vancomycin powder results in a reduction in SSI by 66% (RRR) and is statistically significant. It appears to be effective even when previous surgeries have been performed without its use.



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Paper #22

Construct Levels to Anchored Levels Ratio and Rod Diameter are Associated with Implant-Related Complications in Traditional Growing Rods

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Summary: In addition to patient characteristics consideration of length of construct to number of anchored levels ratio and rod diameter should be a part of preoperative planning to minimize implant-related complications.

Hypothesis: Anchor type and configuration are associated with implant-related complications in traditional growing rod (TGR) surgery for early-onset scoliosis (EOS).

Design: Multicenter review of retrospective and prospective data.

Introduction: IRC are among the most common adverse events in TGR. The current study hypothesized that anchor type and configuration is associated with IRC.

Methods: Patients with: 1) age ⩽10 years at surgery; 2) spine-based dual TGR; 3) minimum 2-year follow up; and 4) available imaging. Cephalad and caudal foundations were grouped based on number of instrumented levels and anchor type. All radiographs were reviewed and IRC was defined as rod fracture, anchor pull out, prominence, and loosening. Based on results a ''Construct Levels / Anchored Levels'' (CL/AL) ratio was calculated, which is the number of levels spanned by instrumentation divided by the number of levels with bone-anchor fixation. Receiver operating characteristic curve was used to define CL/AL threshold.

Results: 274 patients divided to complicated (n=140) and non-complicated (n=134) groups. Mean follow up was 6.3 years (2.1-18.0 years). No significant differences in age, gender, BMI, ambulatory status, etiology, primary curve size, T1-S1 height, coronal and sagittal balance, and rod material were observed between two groups. Comparative analysis showed that connector type, presence and location of crosslinks, number of levels instrumented, number and type of anchors, presence of pelvic fixation, and mirroring of cephalad and caudal foundations were not different (Table 1). However, maximum kyphosis and rod diameter were significantly different. CL/AL ratio threshold was 3.5. Multivariate analysis of kyphosis, rod diameter and CL/AL ratio showed a significant association with IRC ($p<0.05$).

Conclusions: While patient characteristics like kyphosis have been proven to be associated with instrumentation failure, it is a combination of

Table 1

Pre-operative Demorgraphics and Radiographic parameters

	Complicated	Non-Complicated	P value
N	140	134	
Age	6.5	6.9	0.186
BMI	16.7	17.4	0.325
Primary Curve (°)	76.9	73.1	0.109
Coronal Balance (min)	30.1	25	0.598
Sagittal Balance (mm)	22	20.3	0.941
T1-S1 height (mm)	261.5	266	0.393
Maximum Kyphosis (°)	55.2	46.1	0.014*

Comparisons After Controlling for Maximum Kyphosis

	Odds Ratio	Lower	Upper	P value
Max Kyphosis	1.1	0.97	1.24	0.123
CL/AL ratio				
<3.5	1	1.89	6.24	< 0.001*
3.5⩽	3.43			
Rod Diameter				
<4mm	5.52			0.019*
4-5mm	3.65	1.66	18.37	0.005*
5 min < (reference group)	1	1.29	10.31	0.015*

*Statistical significance was set at $p<0.05$