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## Paper #11

### Hemivertebra Resection and Transpedicular Short Fusion in Children Younger than 5 Years. A Mid-Term Follow-Up Analysis



Jose Miguel Sánchez-Marquez, Mar Pérez, Javier Pizones, Nicomedes Fernández-Baíllo, Francisco Javier Pérez-Gruoso

**Summary:** Retrospective analysis of early hemivertebra resection and short fusion for children under the age of 5, with a 7.6-year follow-up. Early surgery allowed for a good coronal correction initially which was difficult to maintain at final follow-up, especially in the lumbosacral junction. Sagittal plane correction was excellent in thoracolumbar deformities and was maintained over time. Early surgery prevented the development of severe deformities and secondary structural curves, however results were more challenging in the lumbosacral group compared with thoracolumbar deformities.

**Hypothesis:** Early hemivertebra (HV) resection and short fusion is the ideal treatment for congenital deformities.

**Design:** Retrospective analysis of a consecutive cohort of patients with congenital scoliosis secondary to a single HV.

**Introduction:** Despite the successful published results regarding this surgical technique, literature lacks of mid-term results especially on very young children.

**Methods:** Inclusion criteria: patients under 5 years of age, operated on by HV resection and transpedicular short fusion, and follow-up longer than 5 years. Preoperative, postoperative (1-yr), final radiographic parameters, and complications were recorded.

**Results:** Twenty-three patients met inclusion criteria, 14 had thoracolumbar (TL) HV, while 9 were lumbosacral (LS) HV. Mean age was 3.5±1.7 years. Mean follow-up was 7.6 years (4.7-13.7). Mean preoperative Cobb angle was 40.3±6.7, which corrected postoperatively (65%) to 14±6.4, and final (50%) (19.9±10.7). TL curves corrected more than LS curves (TL=-29±7.9, 68% vs. LS=-20±9.2, 59%, P=0.043); and showed less loss at final follow-up (TL=2.3±4.6, 56% vs. LS=7±7.7, 39%; P=0.186). The compensatory cranial curve improved spontaneously from 25.3±14.8 to 13.5±12, and final 19.9±10.7. The LS-group had a bigger preoperative compensatory curve, which corrected less with surgery and lost more correction at final follow-up (P=0.016). Preoperative coronal balance was 14.3±12 mm, it was corrected to 8.9±10.7 mm, but worsened to 12.8±10.8 mm at final follow-up. Segmental kyphosis was corrected (TL:-14.2±8.6 vs. LS:-2±4 vs. P=0.018), and maintained over time. Four patients required revision surgery due to curve progression or instrumentation failure.

**Conclusions:** Early hemivertebra resection and transpedicular short fusion allowed for a good coronal correction initially which was difficult to maintain at mid-term follow-up, especially in the LS junction. Sagittal plane correction was excellent in TL deformities and was maintained over time. Early surgery prevented the development of severe deformities and secondary structural curves, however results were more challenging in the LS-group compared with TL deformities.

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Fernández-Baíllo: DePuy-Synthes Spine Medcomtech. Francisco Javier Pérez-Gruoso: K2M.

## Paper #12

### Wound Complication Risk Stratification in VEPTR Surgery



Anthony Capraro, Richard Campbell, Diane Hartman, Robert Camp, Nikita Lakomkin, John Flynn, Michael Nance, Thane Blinman, Oscar H. Mayer, Howard Pantich, Jesse Taylor, Brian Hanna, Keith Baldwin, Patrick Cahill

**Summary:** Wound complication is a significant concern with VEPTR implantation. This study retrospectively analyzes wound complication risk parameters in the largest available single institution series of VEPTR complications. Results demonstrate univariate associations between wound complications and 9 parameters. Multivariate analysis identified 4 independent predictors of wound complications: risk of patient age, gender, diaper use with lower back incision, and bilateral procedure. These variables were used to construct a predictive model for risk stratification.

**Hypothesis:** Patient specific pre- and intra-operative parameters predict VEPTR implant wound complications.

**Design:** Single-center retrospective analysis of a prospectively collected registry.

**Introduction:** VEPTR implants effectively corrects several skeletal deformities, including EOS. Unfortunately, VEPTR surgeries have a high rate of wound complications, often resulting in operative treatment. This creates an imperative to quantify patients' risk. This VEPTR complication risk stratification study analyzes the largest series of complications in VEPTR implant surgery across a comprehensive list of parameters.

**Methods:** A prospective registry of patients ages 0-18 who underwent a VEPTR implantation between Jan. 2011 and Sep. 2015 at a single institution was retrospectively reviewed. Various patient and surgical factors were retrospectively analyzed. The outcome variable was any wound complication requiring re-operation including infection or wound dehiscence. Parameter analysis was performed through binary logistic regression with a backwards stepwise approach. Threshold for significance was 0.10.

**Results:** 122 patients underwent 140 surgeries; 22 resulted in complications. Mean age at surgery was 5.2yrs. The following variables were included in the multivariate analysis, based on univariate significance: male gender, diapered patient with lower back incision, bilateral procedure, > 3 incisions, left iliac incision, right iliac incision, patient age &[le] 4 and operative time > 150 mins. There was also a correlation between complications and hospital length of stay. Multivariate analysis identified the following independent predictors: age of 4 or less, OR= 4.9 (1.5-15.4); p value 0.007, male gender, OR= 3.0 (1.0-9.1); p = 0.05, diapered patient with lower back incision, OR= 2.9 (.76-11.64) p value= 0.117, and bilateral procedure, OR= 8.5 (2.0-36.3); p = 0.004, (Fig. 1). The percent correctly predicted by the model was 84.3%.

**Conclusions:** A risk stratification model can predict wound complications in patients undergoing VEPTR implant surgery. This is beneficial for patient counseling and possibly for identification of patients who may benefit from additional prophylaxis and/or increased vigilance in post-op monitoring.

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