



Early Failures of Fixation after Hemivertebra Excision with Monosegment Posterior Instrumented Spinal Fusion

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11/15/2012

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Introduction

- Hemivertebrae are one of the most common causes of congenital scoliosis¹
- Depending on the type and location, hemivertebrae may require surgical treatment
- Hemivertebra excision and instrumented spinal fusion has been reported to produce the largest amount of correction with the least amount of segments fused²
- While transpedicular instrumentation has been reported to be safe in young children, the compressive loads needed with large wedge osteotomy corrections may be too high for traditional monosegment fixation in the immature spine³
- In reviewing our series, we identified two cases of early pedicle screw pullout after hemivertebra excision and monosegment posterior instrumented fusion.



Methods

- Both cases were large focal deformities from thoracolumbar hemivertebrae in young males
- Case 1: 3+6 yr old with L L1 hemivertebra, 44 degree L T12-L2 curve, 26 deg focal kyphosis
 - Underwent anterior resection, structural allograft with PSF T12-L2
- Case 2 (Figure 1) was a 2+11 yr old male with R T12 hemivertebra, 58 deg R T11-L1 curve, 53 deg focal kyphosis.
 - Underwent posterior-only excision with PSF T11-L1.
- Post-op, both patients were placed in full time TLSO.
- Sagittal correction was 85/96%, coronal correction was 55/83% for case 1 and 2 respectively.



Results

- In both cases, fixation failure and significant loss of correction was seen at the first post-op visit requiring immediate revision
- Case 1 was revised using 3 bar construct by adding laminar hooks on the convex side of deformity. No additional segments were fused
- Case 2 was revised by extending fusion one level cephalad and adding laminar hooks on the convex side of deformity
- No neurologic sequelae occurred due to these complications



Figure



A

B

C

Figure D: A: R T12 Hemivertebra with 58 degree R T11-L1 and 53 deg kyphosis; B: Immediate post op after hemivertebra excision and PSF T11-L1; C: First post op visit showing failure of fixation and significant loss of correction; D: Revision PSF T10-L1 with laminar hooks on convexity of deformity



Conclusions

- Hemivertebra excision with transpedicular monosegment fusion may not provide sufficient strength to withstand the large forces placed on immature pedicles
- In our series, male gender, age 3 or younger, and significant kyphosis in addition to the scoliosis, were risk factors for early hardware pullout
- To balance goals of limiting segments fused and achieving adequate construct stability, additional points of fixation may be required on the convex side of deformity⁴



References

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