

Congenital Scoliosis Patients can Attain Similar Curve Correction and Perioperative Outcomes to Adolescent Idiopathic Scoliosis Patients without the Need for Hemivertebra Excision

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INTRODUCTION:

Hemivertebra excision in patients with congenital scoliosis is believed to give the best possible correction of congenital scoliosis while decreasing the number of levels fused. However, it is a technically challenging procedure and complications can include spinal cord injury, nerve root injury, and cerebrospinal fluid (CSF) leak. We have utilized a hemivertebra-sparing approach in these patients alongside multi-level Ponte osteotomies and all pedicle screw constructs for the past many years. The fusion levels are determined similar to adolescent idiopathic scoliosis (AIS), as most of these patients have presented at a later age (>10 years) and have a deformity that extends over multiple segments. Our hypothesis is that this approach leads to similar perioperative correction and radiographic outcomes to AIS patients.

METHODS: Twenty-four patients with congenital scoliosis and associated hemivertebra were included. These 24 patients were compared with the most recent 54 AIS correction surgeries with 2-year follow up. An additional rigorous analysis was done to match hemivertebra patients from a database of 330 AIS patients. Patients were matched based on gender, age, BMI, and preoperative Cobb. Overall, 12 pairs (24 patients) were matched and analyzed to compare the surgeries after accounting for possible confounding variables. Wilcoxon signed-rank tests were used.

RESULTS:

When comparing hemivertebra to the most recent AIS patients, age ($p = 0.81$), BMI ($p = 0.24$), and preoperative Cobb ($p = 0.06$) were similar. Postoperative Cobb ($p = 0.048$) was significantly larger for AIS patients ($p = 0.048$), however, overall Cobb correction was similar between the groups ($p = 0.297$). Estimated blood loss was similar ($p = 0.095$) while surgical time ($p < 0.001$) and length of stay ($p < 0.001$) were significantly longer for hemivertebra patients.

After matching patients in both groups Age, BMI, and preoperative Cobb were found to be similar ($p > 0.05$). Postoperative Cobb (1.0) and overall correction ($p = 0.966$) were similar. Patients had a similar number of levels fused ($p = 0.227$) and a similar number of fixation points ($p = 0.23$). Surgical time ($p = 0.413$) and blood loss ($p = 0.954$) were similar between the groups. The only significant difference was that hemivertebra patients had longer hospital stay ($p = 0.001$).

DISCUSSION AND CONCLUSION: Patients with hemivertebra can benefit from hemivertebra sparing approach. The radiographic and perioperative outcomes were similar to AIS patients. This approach is safer compared to hemivertebra excision and has similar or better curve correction than previously reported. Choosing fusion levels on similar principles akin to AIS leads to avoidance of hemivertebra excision in most case including lumbosacral hemivertebra cases. The correction likely results at disc levels above and below the hemivertebra.