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Risk Factors of Proximal Junctional Kyphosis in Pediatric Neuromuscular Scoliosis

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Introduction

The development of PJK is a well documented complication after spinal fusion with strong correlations to poor health related quality of life measures. However, PJK has not been well described in patients with neuromuscular scoliosis (NMS).

Methods

This is a retrospective review of a high volume pediatric spinal deformity institution. All patients that underwent posterior spinal instrumented fusion for NMS were evaluated. Inclusion criteria were: complete x-rays preoperatively, immediate postoperatively and at last follow-up (minimum 6 months). Patients with missing imaging studies, incomplete follow-up or other causes of scoliosis were excluded. PJK was determined by a change in the proximal junctional angle of =15o from immediate postoperatively to follow-up. Radiographic, demographic, and surgical factors were assessed for their relations to PJK.

Results

Of the 106 NMS patients who underwent surgery, 73 met inclusion criteria. Mean follow-up was 28.7 months and mean age 14.47 years. PJK incidence was 5.5% (4). Radiographic factors that correlated to increased rate of PJK were: increase in sagittal vertical axis postoperatively (-9.94±70.44mm in non-PJK vs 105.00±12.73mm in PJK; p=0.029); final sagital vertical axis (0.68±46.17 vs 57.25±71.75mm; p=0.026), reduction in lumbar lordosis (9.22±17.27 vs -16.00±4.24 degree; p=0.048); and shoulder imbalance (p=0.038). A lower implant density was associated with higher PJK (1.62±0.26 vs 1.14±0.73; p=0.003).

PJK was not impacted by gender, age, cause of scoliosis (cerebral palsy, myelomeningocele, arthrogryposis, spinal cord traumatic brain injury), ambulatory status, presence of spasticity, fusion to pelvis, or pelvic obliquity.

Conclusions

The incidence of PJK after surgery for NMS is 5.5%. Postoperative increased positive sagittal alignment, reduced lumbar lordosis, shoulder imbalance, and low implant density are associated with higher risk of PJK.

Learning Objectives

1. Identify potential risk factors for PJK in NMS

2. Be able to appropriately counsel patients for risks of PJK preoperatively.

3. Be able to modify surgical goals to minimize PJK risks.

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