Paper #6: The Effectiveness of Pre-operative Halo-gravity Traction (hgt) in Early Onset Scoliosis (eos) and Severe Kyphoscoliosis: Clinical and Radiographic Study

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Introduction: Treatment of complex spinal deformity in eos remains a challenge. A rigid spinal deformity, poor pulmonary function, malnourished patients and poor bone stock complicate surgical treatments, hgt is able to restore coronal and sagittal balance, improve pulmonary function and reduce the risk of neurological injury.

Methods: A retrospective review of 21 patients with severe rigid scoliosis or kyphoscoliosis was performed to assess the safety and efficacy of hgt. The use of hgt in 15 patients was preoperative and in 6 perioperative. The analysis was focused on the impact of HGT on curve flexibility, thoracic improvement, complications and surgical outcomes in a single spine center between 2005 and 2011 (mean follow-up: 35 months). Space Available For the Lung (safl) and T1-S1 distance were used to measure thoracic improvement. hgt traction protocol included 30 to 40% of patient weight (depending on patients condition) during 8 weeks.

Results: 21 patients, 8 males and 13 females. Mean age 9.33 (range: 3-17 years). Etiologies were 1 idiopathic, 1 congenital, 10 neuromuscular and 9 others (6 arthrogryposis, 2 osteogenesis imperfecta and 1 syndromic).

Mean pre-hgt values were: coronal Cobb: 99.3º (range:62-146), sagittal Cobb: 82º (34-125), safl index: 79 (48-127), T1-S1 distance: 235 mm (143-345). With hgt mean values were: coronal Cobb: 70º (27.7% of improvement), sagittal Cobb: 62.8º (21.5% of improvement), safl index: 83.2 (5.3% of improvement) and T1-S1 distance: 269.5mm (14.2% of improvement).

At end of follow-up mean values were: coronal Cobb: 57.5º (41% of improvement), sagittal Cobb: 53.7º (24.6% of improvement), safl: 86.6 (9.6% of improvement) and T1-S1 distance: 298.1mm (26.9% of improvement).

These results are consistent with others published in the literature. Despite 1 pin infection that needed removal and antibiotic treatment there were no serious complications.

Conclusions: We found that hgt is not only safe and useful as a preoperative treatment in patients with severe rigid scoliosis, but also as a perioperative adjuvant in complicated kyphoscoliosis. Significant deformity correction averaging 24.6% can be expected during HGT treatment; this correction is maintained or even improved with subsequent surgical correction.