Treatment of Spinal Deformity Associated with Myelomeningocele in Young Children with the use of the Four-Rib Construct

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Abstract

Surgery for myelomeningocele spinal deformity is accompanied by a high rate of complications. These include infection, pathological skin breakage, instrumentation failure, and neurological deterioration. The four-rib construct associated with the percutaneous technique in immature children with myelomeningocele and spinal deformity is introduced. The four-rib construct serves to correct for deformity and to allow for growth, with minimal complications. The study was small and retrospective, a level four case series. The results of four patients who underwent the four-rib construct surgery in 2008 and 2009 was revised. All four were nonambulatory, skeletally immature children, not previously corrected by bracing, with the progressive spinal deformity associated with myelomeningocele affecting their sitting position. Furthermore, the research protocol was approved by our institutional review board. Three patients were females and one was male. Two cases of kyphoscoliosis, one of kyphosis, and one of scoliosis. Age at the time of the initial procedure ranged between 64 and 82 months, with a mean age of 70 months. Follow-up time after surgery ranged from 24 to 39 months, with a mean of 31 months. Preoperatively, deformity angles were severe, averaging 55° for thoracic scoliosis, 67° for thoracolumbar scoliosis, and 85° for thoracolumbar kyphosis. Surgery mitigated the deformities markedly. Postoperative angles measured were 42° for thoracic scoliosis, 21° for thoracolumbar scoliosis, and 45° for thoracolumbar kyphosis. These observations indicate significant reductions in spinal deformity, by 24, 69, and 48%, respectively. In total, 14 procedures were performed: four initial implants and 10 lengthening and exchange procedures. There were no intraoperative complications. The postoperative complications that did arise consisted of two instances of skin breakage, one distal iliac screw dislodgement, and one shunt displacement. Significantly, no proximal fixation dislodgement, deep-seated infection, or damage in the pathological skin were detected. The four-rib construct technique can be considered as a potential surgical option in treating spinal deformity associated with myelomeningocele, but still more patients with long term follow-up are needed to prove the efficacy of this procedure. The four-rib construct is simple, minimally invasive, and does not exclude alternative treatment. Moreover, the incidence of complications associated with the four-rib construct compares favorably with other growth techniques.