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Apophyseolysis of the fourth lumbar vertebra: an early postoperative complication following kyphectomy in myelomeningocele

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Abstract This is a report of a young girl with congenital kyphosis at the thoracolumbar spine in association with myelomeningocele. Kyphectomy and posterior stabilisation extending from the eighth thoracic to the fourth lumbar vertebra was done. Apophyseolysis occurred as an early postoperative complication at the level of the L4-L5 disc. This failure mode was treated by extending the fusion to the pelvis.

Key words Myelomeningocele · Failure mode · Apophyseolysis

Introduction

Congenital kyphosis in the myelomeningocele child represents the severest form of spinal dysraphism. Management of such a deformity remains a challenge to the spinal surgeon. Recurrence of the deformity with pseudarthrosis and metal failure are common biomechanical problems [1, 2].

Case report

K. E. is a 10-year-old girl with a known history of myelomeningocele. She was complaining of loss of sitting balance, inability to lie in the supine position, recurrent skin breakdown at the apex of a gibbus in the back and inability to use both lower limbs due to paralysis. K. E. was incontinent and had complete paraplegia with a sensory level at T8.

The preoperative imaging techniques showed a kyphotic angle of 92° measured between eighth thoracic and the first sacral vertebrae. The apex of the curve was at the level of the first lumbar vertebra (Fig. 1). The kyphus was absolutely rigid, manifesting no flexibility at all.

A Sharrad's kyphectomy [3, 4] was done, which necessitated excision of the vertebral bodies of the twelfth thoracic and the first and second lumbar vertebrae, together with the remnants of their dorsal components. A multi-segmental transpedicular fixation using a rod-screw system was carried out, extending from the eighth

thoracic vertebra to the fourth lumbar vertebra. The lower two segments were left free to allow some pelvic movement, with the aim of altering the pressure points in sitting and preventing decubitus ulcers. To increase the stability of the construct, a titanium cage of appropriate size was filled with cancellous bone graft taken from the resected vertebrae and was inserted at the site of the kyphectomy. The rest of the cancellous bone was applied to augment the lateral fusion.

The immediate postoperative lateral view of the spine done in the sitting position showed correction of the kyphosis from 92° to 12° over the instrumented area, with residual kyphosis of 23° as measured between T9 and L3. The plumb line was still anterior to the lumbosacral spine (Fig. 2). Sitting was not restricted, and external support was not applied. At the 15th postoperative day, a gibbus in the lumbar spine was noticed. Accordingly, radiological examination of the spine in the prone position was done and the lateral view showed angular slippage at the level of the L4-L5 intervertebral disc (Fig. 3). The patient was nursed in the supine position and was prepared for a re-stabilising procedure. At the time of the second intervention, the lower end plate of the fourth lumbar vertebra was facing posteriorly. The separation occurred at the level of the lower end plate of the fourth lumbar vertebra. Part of the cartilaginous end plate was attached to the vertebral body of the fourth lumbar vertebra. The remaining part, together with the disc, was still attached to the superior end plate of the fifth lumbar vertebra. The disc was resected, the end plates were decorticated and an intervertebral cage filled with cancellous bone was inserted. The fixation was extended to the iliac wings and the construct was augmented by direct short fixation of the L4-L5 segment using a screw-rod system.

The postoperative course was smooth. We were happy to obtain a back without any bony prominences likely to produce pres-

Fig.1 Preoperative lateral magnetic resonance (MR) image of the thoracic and lumbar spine. The neural structures are lacking at the apex of the kyphosis

Fig.2 Postoperative lateral view of the spine in the sitting position in the immediate postoperative period

Fig.3 Lateral view of the spine in the prone position taken at the 15th postoperative day, showing angular kyphosis resulting from vertebral dislocation at the L4-L5 disc level

Fig.4 Lateral view of the spine in the sitting position 1 year after extending the fusion down to the pelvis

sure sores. The obtained correction was sufficient to allow the patient to sit upright and have independent use of her arms. The radiologic control done 1 year after the revision surgery showed solid fusion with maintenance of the achieved correction (Fig.4).

Discussion

To our knowledge, there are no previous reports in the literature about apophyseolysis as a failure mode occurring at

the early postoperative period in myelomeningocele children. Although this biomechanical problem was solved by extending the instrumentation down to the pelvis, re-surgery could present an added risk to those patients. Biomechanically speaking, spinal fusion and instrumentation in myelomeningocele patients should extend down to the sacrum and or the pelvis. To provide a biomechanical margin of safety, any motion segment in which the posterior elements are lacking should be considered unstable.

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