Dislocated lumbar vertebral epiphysis in adolescent children

Report of three cases

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Three teenagers operated on for suspected rupture of a lumbar intervertebral disc are presented. The finding at surgery in each case was a bony, cartilaginous, and nucleus pulposus ridge crossing the anterior spinal canal. Since the bony epiphyseal ring or apophysis is said to be deficient posteriorly, these patients presumably had a dislocation of an anomalous epiphyseal ring.

Key Words: dislocation, epiphysis, apophysis, intervertebral disc, adolescents

This report is an attempt to explain the unusual lesion found in three teenagers operated on for suspected rupture of a lumbar intervertebral disc. Ruptured lumbar discs are not common in patients under 20 years of age. Webb, et al., in reporting 6500 patients with ruptured lumbar intervertebral discs had only 60 patients 18 years of age or under, suggesting that about one in 100 disc patients is 18 or under. Several authors including Key, Love, Mandel, and Gurdjian et al., mention a similar incidence. Epstein and Lavine report that 10 of their 560 patients were between 15 and 19 years of age.

In a personal series of 565 patients operated on for lumbar intervertebral discs, 14 were 18 years of age or younger. Three of the 14 had a dislocated anomalous apophysis.

Clinical and X-ray Findings

There was nothing unusual in the clinical findings to differentiate these patients from the usual lumbar disc patient. They were all boys, ages 13, 14, and 15. Each one dated the onset of his symptoms to trauma occurring from 1 to 12 months previously. They all complained of back and leg pain and back stiffness. They all showed limitation of back motion and limited straight-leg raising. The 15-year-old with a year's history came from another island where specialty care is not available, and he showed a very stiff back, marked reduction of straight-leg raising, absent ankle jerks, inability to walk on heels or toes, and diminished sensation over the L-5 and S-1 dermatomes. Myelograms showed a complete block at L4-5 in two patients and a large extradural defect at the lumbosacral level in the third. Preoperative spine films were not remarkable except that in one patient the lateral film showed a bony spicule, apparently in the middle of the spinal canal. Considering the findings at surgery, I feel sure that tomograms would have demonstrated the bony ridge in all patients.

Surgical Findings and Results

At surgery, done with Dr. Ivar Larsen in two cases, all patients showed a bony and cartilaginous ridge across the anterior spinal canal. This ridge was composed of bone superiorly, and cartilage and disc inferiorly. In
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the most striking patient, the 15-year-old, the ridge projected 1 cm posterior to the back of the vertebral body. The posterior longitudinal ligament was missing. In each patient the entire ridge, covered only by thinned out connective tissue, was removed with all available disc material. One patient developed a wound infection postoperatively which responded to antibiotics, 8 years later he had a subcutaneous abscess drained. Otherwise, the postoperative course was unremarkable. Follow-up on two patients 8 and 13 years postoperatively showed they had led essentially normal lives, competing in such sports as basketball and baseball, with some intermittent low-back symptoms.

The histological appearance of the ridge found at surgery in the 15-year-old boy (Fig. 1) showed cancellous bone and hyaline cartilage, plus acellular hyaline tissue consistent with intervertebral disc. The bone trabeculae were normal with viable osteocytes and intervening fatty marrow. The underlying hyaline cartilage showed multiple small loci of basophilic degeneration of the cartilaginous matrix with small areas of hemorrhage. The adjacent disc appeared normal.

Discussion

Our surgical findings could easily be explained on the basis of a dislocation of the bony epiphyseal ring. Unfortunately, according to Bradford and Spurling, ossification centers form only in the anterior and lateral portions of the cartilaginous epiphyseal ring.

According to Turek, the epiphyseal ring is an apophysis, rather than an epiphysis, its formation responding to attachments of the longitudinal and intervertebral ligaments of the spine. He agrees the ring is deficient posteriorly. Turek goes on to say that “calcification of the ring occurs at 6, ossification begins at 13, and fusion with the body at 17. At 20 it cannot be identified and is covered over by the same articular cartilage plate which covers the end of the vertebra. At all times it develops outside of the epiphyseal plate and contributes nothing to growth.”

The ages of our three patients fit in nicely with the time when calcification is supposed to be present in the apophysis. The assumption that dislocation of the epiphyseal ring or apophysis carrying with it the edge of the cartilaginous plate and nucleus pulposus seems justified.

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References


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