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Cervical Spondylolysis in Child with Four Levels of Simultaneous Involvement: A Case Report[1]

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Cervical spondylolysis is a rare condition, and less than 100 cases have been reported in the world literature. Cervical spondylolysis is defined as a well corticated defect in the posterior element of a cervical vertebra. Although the etiology of cervical spondylolysis is unknown, its association with dysplastic changes and spina bifida occulta suggest that the lesion is congenital. Here, we describe the radiographs and CT images of cervical spondylolysis involving four levels in a 9 year old boy.

Index words : Spondylolysis
Neck, abnormalities
Neck, CT

Cervical spondylolysis is a rare condition, and fewer than 100 cases have been reported in the English literature since Perlman and Hawes first described the condition in 1951 (1). Cervical spondylolysis is a bilateral defect in the posterior element of a cervical vertebra, and is condition usually diagnosed in patients after minor trauma or as an incidental finding on routine radiographs. However, the etiology of cervical spondylolysis is unknown. We report a case of cervical spondylolysis involving four levels in a child, and include radiographs and CT images.

Case Report

A 9-year-old boy visited to our hospital complaining of posterior neck pain of two days duration. The physical examination of the cervical spine conducted at the time, was unremarkable.

However, a plain lateral radiographic view of the cervical spine revealed radiolucent defects in the pedicle-neural arch regions at C2 (Fig. 1A), representing spondylolysis. Additionally, 2-mm of anterolisthesis of the C2 vertebral body upon C3 was observed, but there was no evidence of hypermobility or instability of the cervical spine. Associated spina bifida occulta was also observed to involve the C5, C6 and C7 levels (Fig. 1B).

Computerized tomography (CT, Somatom Sensation 16, Siemens, Erlangen, Germany) demonstrated bilateral neural arch defects at the C2, C6 and C7 levels, with a unilateral defect at the C5 level on the left (Fig. 2 & 3). In addition, spina bifida occulta and dysplastic changes were evident at three abnormal cervical levels (C5-C7).

The patient was treated conservatively, and no manipulation was performed over the levels affected by spondylolysis. The presenting clinical symptom resolved spontaneously.

Discussion

Cervical spondylolysis is defined as a corticated cleft

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between the superior and inferior articular facets of the articular pillar; the cervical equivalent of pars interarticularis in the lumbar spine (2). Patients experience markedly varied symptoms, ranging from asymptomatic to a mild nonspecific neck pain, neck stiffness, and radiculopathy, and the majority present after an episode of minor trauma or with chronic neck and shoulder pain. Pateint ages range from 20 to 81 years at diagnosis, and the C6 level and the left side of the neck are most often affected. The fulcrum of motion in the cervical spine in children is at the C2-C3 level, whereas in the adult cervical spine it is located at the C5-C6 level (3, 4). Cervical spine injuries in children usually occur in the upper cervical spine from the occiput to C3.

The principal imaging modalities used to diagnose cervical spondylolysis are radiography and CT. Reported imaging findings include a well-corticated cleft between facets, a triangular configuration of pillar fragments on

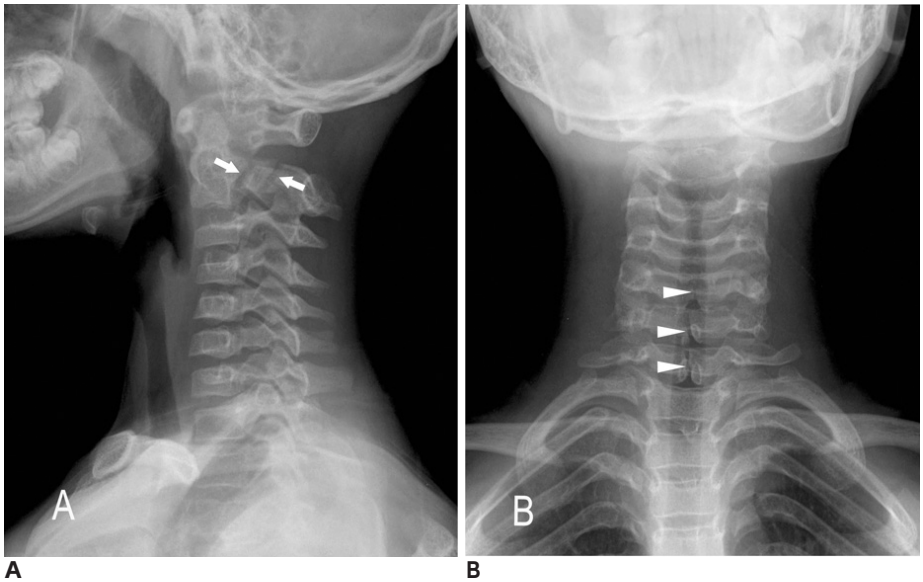


Fig. 1. Plain radiographs show spondylolytic defects (arrows) and associated spina bifida occulta (arrowhead).

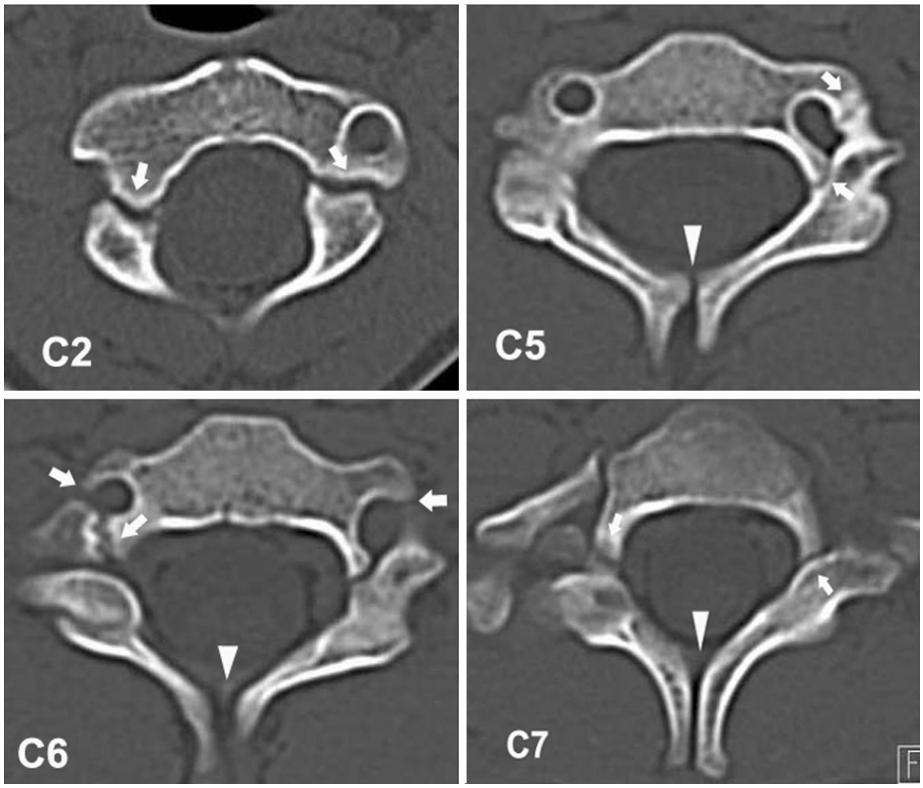
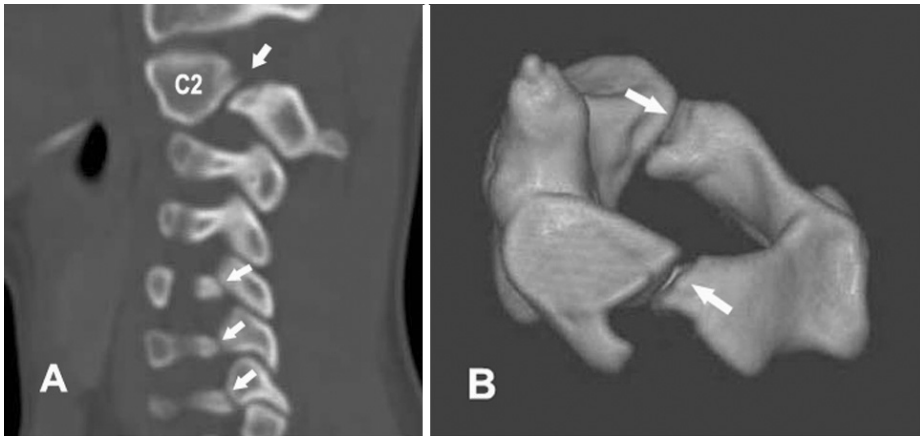


Fig. 2. Axial CT images showing the well-corticated, smoothly marginated spondylolytic defects (arrow) and spina bifida occulta (arrowhead).



A B

Fig. 3. (**A**) Left paramedian sagittal multiplanar reformation and (**B**) three-dimensional images show the spondylolytic defects (arrow).

either side of spondylolytic defects, posterior displacement of the dorsal triangular pillar fragment, hypoplasia of the ipsilateral pedicle, spina bifida at the involved level, compensatory hyper- or hypoplasia of the ipsilateral articular pillars at the levels above and/or below a defect, and spondylolisthesis (2, 3, 5, 6, 7).

The exact etiology of cervical spondylolysis remains unknown, although several theories have been proposed (8, 9). Failure of chondrification and ossification centers to unite is one such theory, and may account for the spectrum of observed posterior arch defects, which include cervical spondylolysis and an absent pedicle. However, the presence of associated anomalies favors a congenital cause, but autopsy studies of newborns have never mentioned spondylolysis (8). It may be that a dysplastic spine is simply more predisposed to the development of spondylolytic defects from whatever cause, and although repetitive microtrauma or post-traumatic nonunion have been suggested, no direct evidence supports these theories.

Numerous conditions must be considered in the differential diagnosis of defects affecting the neural arch. These include spinal cord tumors, bone tumors, trauma, abnormalities of the vertebral artery, and surgical laminectomy (5). Since the mainstay treatment is conservative, it is most important to differentiate cervical spondylolysis from an acute fracture, which may require acute surgical intervention (2, 6). Surgery should be considered when instability is present or when conservative therapy fails. Acute fractures are not smoothly corticated, and the presence of soft tissue swelling or neurologic symptoms favor a diagnosis of acute fracture. Differentiation from a chronic fracture can be difficult, but corticated margins and associated congenital anomalies favor spondylolysis.

In summary, cervical spondylolysis is a rare anomaly, but its radiologic features are distinctive, and diagnosis often can be strongly suspected from plain films. Moreover, CT can help confirm a diagnosis in equivocal cases. Well-corticated spondylolysis and spina bifida favor a congenital rather than acute fracture based etiology. An awareness of the radiologic features of cervical spondylolysis reduces the potential for misdiagnosis and inappropriate therapy.

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경추 척추분리증은 전 세계적으로 100예 이하로 보고된 드문 질환으로 피질화가 잘된 결손이 척추 후방의 신경궁에 있는 경우를 말한다. 원인은 아직 잘 모르나 동반된 이형성증이나 척추 이분증 등이 있어 선천성으로 알려져 있다. 저자들은 9세 소아에서 네 개의 경추에 발생한 척추분리증의 일반촬영과 CT 소견을 보고 한다.