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Case Report

Cervical congenital spondylolytic spondylolisthesis associated with duplication of the vertebral artery: case report

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Abstract

BACKGROUND CONTEXT: Cervical bilateral congenital spondylolysis with spondylolisthesis is an abnormality both of congenital and mechanical origin, characterized by its primary feature, cervical bilateral spondylolysis. We are unaware of any reports describing cervical congenital spondylolytic spondylolisthesis associated with duplication of the vertebral artery.

PURPOSE: To report the case of a patient affected with cervical bilateral congenital spondylolysis with spondylolisthesis associated with duplication of the vertebral artery.

STUDY DESIGN: A unique case report from a university hospital and a literature review.

PATIENT SAMPLE: An 18-year-old man who arrived at the emergency department complaining of neck pain starting from a car accident 5 days ago.

METHODS: Neurologic examination and images taken by ordinary radiographs, magnetic resonance imaging (MRI) scans, ordinary computed tomography (CT) scans, and CT angiograms with three-dimensional (3D) reconstruction.

RESULTS: Neurologic examination did not find evidence of strength deficit in upper extremities. Ordinary radiographs of the cervical spine showed spondylolisthesis of C6 and C7 and a cortical cleft between the superior and inferior articular facets of the C6 vertebra and spina bifida of the C6 and C2 vertebrae and an abnormal appearance of the remnant spinous processes of the cervical vertebrae. Magnetic resonance imaging confirmed the abnormalities that had been noted on the radiographs. Computed tomography scans of the cervical spine showed congenital spondylolytic spondylolisthesis and spina bifida of the C6 vertebra and duplication of the vertebral artery. They also showed double origins of the vertebral artery depicted by 3D angiographic reconstruction. Conservative treatment of wearing a cervical collar and receiving muscle relaxants and anti-inflammatory drugs was effective. With the pain completely subsided, the patient was discharged 5 days after arriving at the emergency department.

CONCLUSIONS: Vascular abnormalities should be suspected and investigated in cases of congenital spondylolysis or spondylolytic spondylolisthesis. We strongly suggest performing angio-CT or angio-MRI and 3D reconstruction in these cases. Awareness of the presence of a duplicated vertebral artery and the course of its limbs could significantly help planning in cases proceeding to surgery.

Keywords: Cervical spondylolysis; Spondylolisthesis; Congenital anomalies; Vertebral artery; Bifida; Vascular abnormalities

Introduction

Posterior arch defects are rare conditions usually diagnosed incidentally and unexpectedly on investigating a minor trauma or complaints of chronic neck pain [1,2]. Two complexes of abnormalities described as being among posterior arch defects are absent pedicle syndrome (congenital absence of pedicles) and congenital spondylolytic spondylolisthesis [2–4]. Cervical bilateral congenital spondylolysis with spondylolisthesis is an abnormality of both

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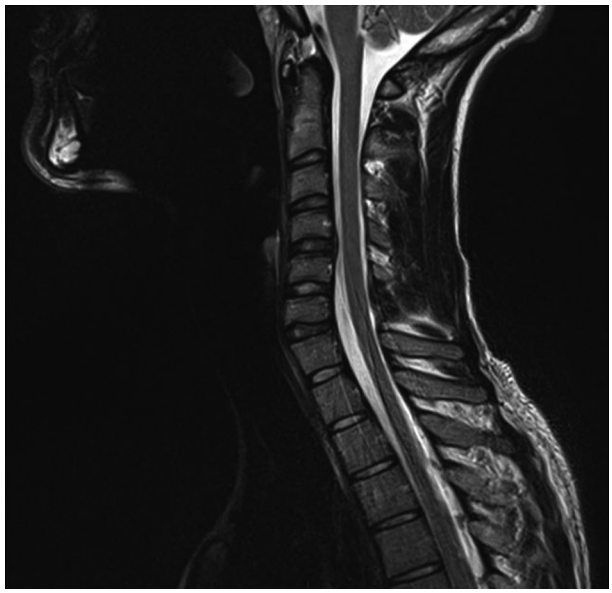

Fig. 1. T2-weighted sagittal magnetic resonance imaging showing normally appearing discoligamentous structures, medulla, and cervical nerve roots.

congenital and mechanical origin, characterized by its primary feature, cervical bilateral spondylolysis.

Cervical bilateral congenital spondylolysis, a rare disorder, is a cortical cleft between the superior and inferior articular facets of the articular pillar mainly localized at C6 [1,2,5–9], the cervical equivalent of the pars interarticularis of the lumbar spine [1,2,5,8,9]. Many other osseous malformations of the posterior arch of the cervical vertebra, including spina bifida and spondylolisthesis, have been described in association with cervical bilateral congenital spondylolysis [1,2,5–10].

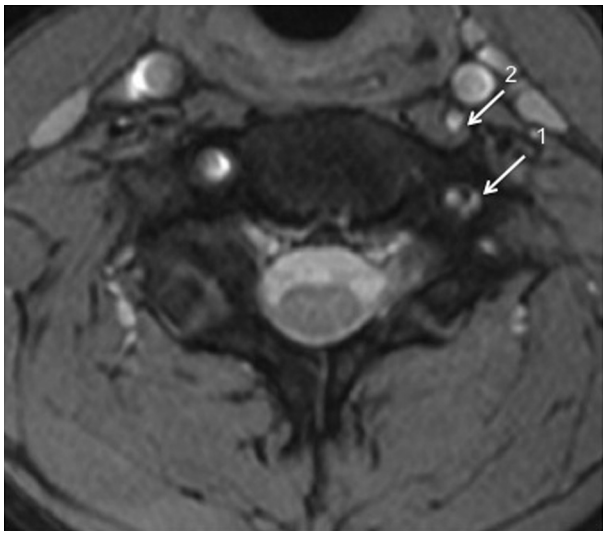

Fig. 2. T2-weighted axial magnetic resonance imaging of the C6 vertebra showing two hyperintense images, one localized at the level of the transverse foramina of C6 (Arrow 1) and the other just in front of the C6 transverse process (Arrow 2).

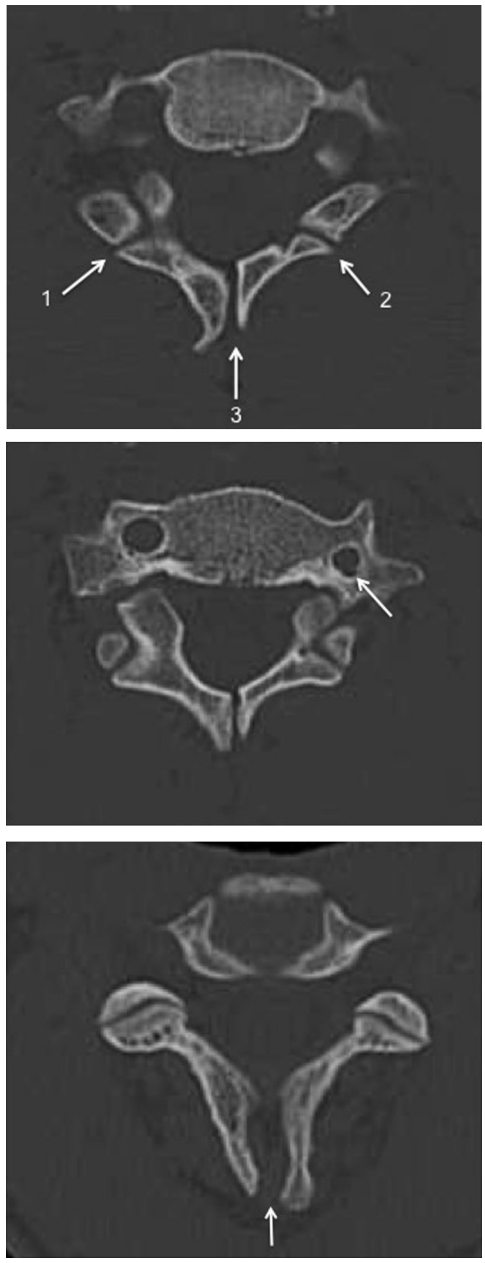

Fig. 3. (Top) Axial computed tomography (CT) scan of the cervical spine showing bilateral spondylolysis (Arrows 1 and 2) and spina bifida of the C6 vertebra (Arrow 3). (Middle) Axial CT scan of the cervical spine showing asymmetrical representation of the transverse foramina of the C6 vertebra, with the left foramina appearing dysplastic, narrower, and dorsally displaced (arrow). (Bottom) Axial CT scan of the cervical spine showing spina bifida of the C2 vertebra (arrow).

Cervical bilateral congenital spondylolysis belongs to a complex of abnormalities related to a defect in the development of the posterior arch of cervical vertebrae [2,5–8]. Several hypotheses have been proposed to explain the origin of cervical spondylolysis [1,10,11]. They include congenital and acquired origins. One hypothesis [1,10,11] combines congenital origin with acquired origin by suggesting that cervical spondylolysis is a mechanical response to microtrauma to a congenitally dysplastic cervical