Case Report

Congenital spondylolytic spondylolisthesis of the cervical spine: A case report and literature review

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ABSTRACT

Congenital spondylolytic spondylolisthesis (CSS) is characterized as a pars-interarticularis well-corticated cleft with antherolithesis. The presence of spina bifida and vertebral dysplastic changes corroborate the possibility of a congenital etiology. It is a rare condition, usually discovered incidentally, especially after a trauma and should be differentiated from traumatic spondylolisthesis, which requires aggressive treatments. The management is often conservative, with surgery being indicated for symptomatic or unstable lesions. We report the case of a sixth cervical vertebra Congenital Spondylolytic Spondylolisthesis (CSS), discovered fortuitously following a minor trauma, in a 19-year-old male patient, treated conservatively with a favorable evolution.

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Introduction

Congenital malformations of the cervical spine are not uncommon. CCS is a complex abnormality involving spondylolisthesis and spondylosis, which is a corticated bone defect in the junction of the superior and inferior facets of the cervical articular masses [1]. This abnormality must be well diagnosed radiologically to prevent mismanagement.

We report a case of C6 congenital spondylolytic spondylolisthesis, that was conservatively managed, and review the clinical and imaging findings with emphasis on optimal therapeutic possibilities.

Case report

A 19-year-old male driver was involved in a minor car accident. He presented to the emergency department seeking medical attention for persistent neck pain.

The clinical examination showed no evident sign of trauma or deformity.

On cervical spine plain radiographs, a C6 pars interarticularis fracture was diagnosed with associated grade I C6-7 spondylolisthesis, and C6 spina bifida (Fig. 1). CT demonstrated sclerotic borders of the bilateral C6 pars interarticularis vertical defects consistent with congenital spondylolisthesis, associated with spina bifida of C6 (Fig. 2). Flexion and extension maneuvers revealed no signs of mechanical instability.

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Fig. 1 – Lateral (A) and frontal (B) cervical spine radiographs show grade I C6-7 anterolisthesis (Black arrow head in A) alongside with vertical radiotransparent defects of the C6 pars interarticularis (Black arrow in A). Anteroposterior (AP) view (B) shows a C6 spinal bifida (Black arrow).

Table 1 – Imaging distinctive features between congenital cervical spondylolysis, absent cervical pedicle, articular mass fracture, and traumatic unilateral interfacet dislocation.

|                          | Congenital spondylolysis | Absent pedicle | Articular mass fracture | Traumatic unilateral interfacet dislocation |
|--------------------------|--------------------------|----------------|-------------------------|-------------------------------------------|
| Pedicle                  | Hypoplastic ipsilaterally| Absent Ipsilaterally | Normal                   | Normal                                    |
| Transverse process       | Normal                   | Dysplastic Ipsilaterally | Normal                   | Normal                                    |
| Spinous process          | Spina Bifida common      | Spina bifida possible | Normal                   | Malalignment                              |
| Lateral mass             | Well corticated           | Dysplastic Ipsilaterally | Anteriorly displaced articular mass fracture on the sagittal plane with a normal configuration |
| Articular facets         | Present but dysplastic and displaced | Absent or hypoplastic superior articular facet | Rotation with a lack of superimposition |
| Spondylolisthesis        | Could be present         | Absent            | > 3 mm                   |
| Foramen                  | Could be widened         | Always widened  | Normal                   |
| Soft tissue swelling     | Absent if uncomplicated by other injuries | Absent if uncomplicated by other injuries | May be present | May be present |
| Neurologic injury        |                          |                  |                          |

(Fig. 3). The cervical MRI eliminated a medullary or paravertebral soft tissue lesion (Fig. 4).

Considering the normal neurologic examination and radiographic stability, the patient was conservatively managed with a cervical collar, and analgesics. He was pain free after 10 days, and restarted his normal activity. At 6 months follow-up the patient was asymptomatic.

Discussion

Cervical spondylolysis is an uncommon condition. Only 104 cases have been documented in the literature [1]. It is a complex abnormality involving spondylolisthesis and spondyloly-

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Discussion

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spondylotic defect [3]. Microtrauma and post-traumatic disjunction with pseudoarthritis are suggested as well [4]. Some authors believe that the process is similar to that proposed for lumbar spondylolisthesis, and it would be caused by stress fractures to the pars region due to repetitive microtrauma [5]. Being a transitional vertebra, C6 is the most involved vertebra, for it undergoes greater stress than the other cervical segments.

In all reported cases, men are the most affected with an average age ranging between 5 and 57 years.

Clinically, the symptoms are variable. Some patients suffer from neck or arm and/or shoulder pain. Other patients are diagnosed fortuitously after a minor trauma, as in our patient’s case [6].

On imaging, congenital cervical spondylolisthesis appears as a vertical articular mass defect, at the junction of the superior and inferior facets, with 2 triangular fragments, each presenting smooth sclerotic edges, and producing a cleft-bow-tie configuration in the sagittal plane. The ipsilateral hypoplastic pedicle is constantly dysplastic. The articular pillar superior and/or inferior to the involved site is generally hypoplastic or hyperplastic. In older patients, osteoarthritis secondary to abnormal spine mechanics may arise [6]. Spina Bifida is frequently found. Widening of the ipsilateral vertebral foramen is noted [7].

Oblique conventional radiographs are the first line of investigation, and show the deformed articular masses [6].

CT delineates the spondylolytic defect anatomy and associated dysplastic and degenerative articular mass anomalies. It determines whether the defect is unilateral or bilateral. The axial plane allows good analysis of the posterior arch. The sagittal plane is most helpful [6].

Magnetic resonance imaging only provides further diagnostic elements in the presence of neurologic symptoms. It eliminates spinal cord and soft tissue lesions that are generally associated with trauma, mainly subluxations, and disc herniations [8].

Confusing CSS with traumatic unilateral interfacet dislocation, articular mass fracture, or absent pedicle is frequent. Distinctive imaging features are reported in Table 1 [9].

The management depends on the patient’s symptoms. In most cases, conservative treatment with a cervical collar, and analgesics is indicated because of the absence of a neurologic deficit [10]. Since Perlman and Hawes in 1951 who reported the first case of CSS, only 12 patients with this anomaly were treated surgically. Surgical treatment is required in cases of failure of the conservative management, the presence of a neurologic deficit, or instability as a result of the defect or due to trauma [11].

**Conclusion**

CSS is an uncommon congenital anomaly usually affecting C6. Its correct diagnosis and distinction from traumatic articular pillar fracture or dislocation are of paramount importance in patients who have sustained cervical spine trauma, to prevent unnecessary surgical management. The majority of patients are treated conservatively. Surgery is indicated in cases of con-
Fig. 3 – Cervical spine CT dynamic acquisitions in flexion (A) and extension (B) show no signs of C6-7 mechanical instability.
Fig. 4 – Sagittal (A) and axial (B) T2WI MRI images of the cervical spine demonstrate no abnormal spinal cord high signal intensity nor paravertebral soft tissue injuries.

Conservative management ineffectiveness, mechanical instability or the presence of a neurologic deficit.

Patient consent

Patient consent: written, informed consent for publication was obtained from the patient.

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