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CASE REPORT OPEN ACCESS

Congenitally Missing Cervical Pedicle

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Background: A congenitally missing cervical pedicle should be part of the differential diagnosis when evaluating a patient with a traumatic injury to the cervical spine to prevent unnecessary surgical intervention. Patients having this congenital abnormality usually present after traumatic incidents and therefore are commonly misdiagnosed as a cervical fracture or dislocation. Radiographic imaging showing a missing cervical pedicle should be further investigated in order to avoid misdiagnosis and needless treatment. This report is published to increase awareness among physicians about congenitally missing cervical pedicle.

Case presentation: A 17 year old obese female patient presented to the ER with neck pain after a motor vehicle crash. Neurological and physical exam were unremarkable except for neck stiffness. Computed tomography scan of the cervical spine revealed a missing left C6 pedicle. The patient was initially diagnosed with a C5-C6 subluxation and prescribed a halo vest until further evaluation and additional imaging. A CT scan confirmed a left side C6 congenital missing pedicle, and therefore, the halo-vest was removed and patient was treated with conservative measures.

Conclusion: In reviewing more than 70 articles from literature, congenital missing cervical pedicles are identified as a rare finding and often misdiagnosed especially when presenting after traumatic accidents. Careful review of literature proves that conservative measures are treatment of choice. Also restrictions regarding physical activity imposed after diagnosis are more precautionary rather than absolute.

Keywords: Missing pedicle, congenital missing pedicle, missing cervical pedicle

Introduction

Hadley first reported a congenital missing cervical pedicle in 1946 (1,2,3) followed by many published articles discussing the topic over last 70 years (4). Patients with congenital missing cervical pedicles (CMCP) are usually diagnosed as an incidental finding after radiological investigations (2). These patients often present after traumatic accidents and are subsequently found to have missing pedicles after careful review of images.

Majority of patients with a CMCP have never complained of neck pain or neurological deficits. In the 57 cases reported from 1946 to 2000, misdiagnosis occurred approximately 23% of the time and commonly mistaken as jumped and locked facets, enlarged vertebral foramens, spondylolysis and tumors (5). This can unfortunately lead to needless surgical intervention when treatment for such cases are conservative measures.

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Clinical Presentation

A 17-year-old obese white female presented to the ER after a motor vehicle accident. Patient initially complained of upper back pain and dull sensation in the left upper and lower extremities with some mild weakness. However, physical and neurological exams were unremarkable. A MRI was the first initial test ordered which was interpreted as a C5-C6 subluxation (Figure 1), Patient was subsequently immobilized with a halo vest until further imaging studies of her cervical spine could confirm the diagnosis. After a 3 view XRAY and further evaluation of the cervical MRI, patient was then diagnosed with a jumped and locked facet on the left at C5-C6.

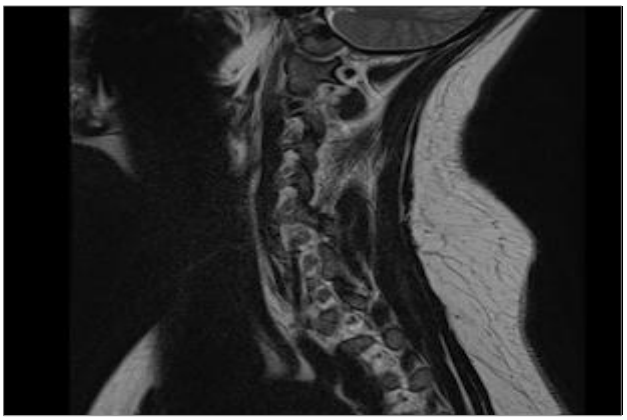

Figure-1. Left sided sagittal MRI view of the missing C6 pedicle giving the appearance of a jumped facet.

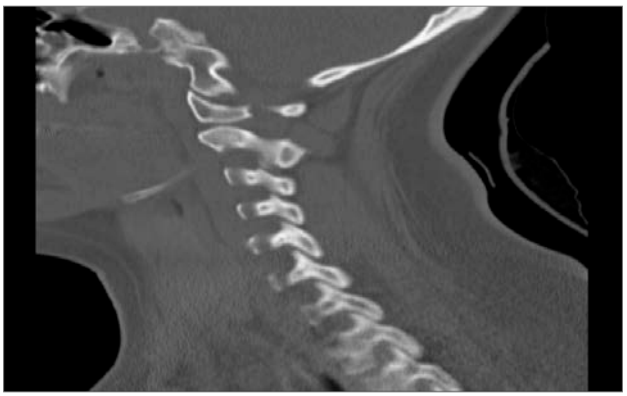

Figure-2. Unremarkable appearing two dimensional sagittal view of the cervical spine from the right side.

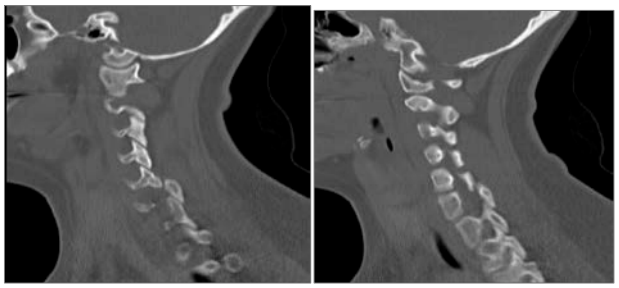

Figure 3 and 4: Two-dimensional sagittal views of the cervical spine demonstrating a missing C6 pedicle while also resembling a jumped facet from the left.

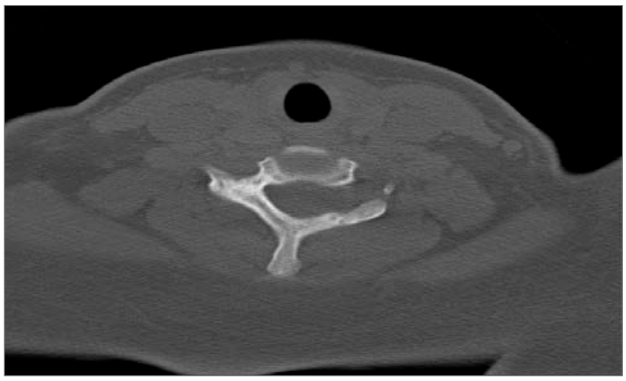

Figure-5. Axial CT scan of the C6 vertebra clearly demonstrating missing cervical pedicle on the left side.

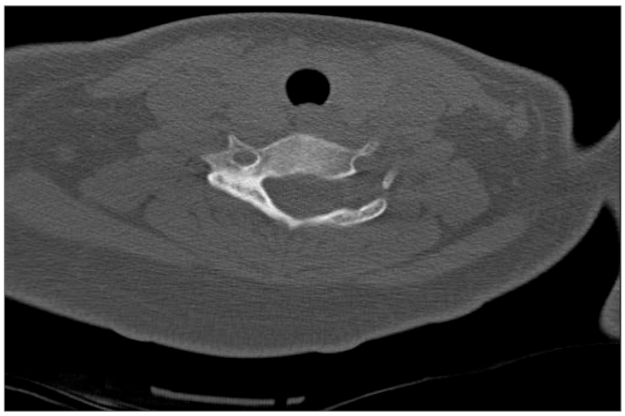

Figure-6. Another axial CT section of C6 vertebra clearly demonstrating missing cervical pedicle on left side.

The neurosurgery team was consulted and a CT scan of cervical spine eventually proved that the patient in fact has a C5-C6 congenital absence of the left pedicle of the C6 vertebra (Figure 2 to 6), which can give appearance of a jumped and locked facet. Patient had the halo vest removed and was discharged home

3 days later after complete resolution of initial complaints. She was sent home with a Miami J cervical collar for comfort, which was then removed at her 2 week up follow up.

Study Design

Our search included multiple electronic health databases,including MEDLINE "OvidSP", EMBASE "OvidSP" and Cochrane database of systematic reviews for all articles and systematic reviews published between January 1966 to December 2015. Using a keyword search mapped to subject heading "MESH terms in MEDLINE and EMTREE thesaurus in EMBASE", then these subject headings were "exploded" using advanced keyword searches to include all subtopics. We then included all the subheadings of those terms to provide the widest capture of most relevant studies, terms used were missing cervical pedicles and cervical pedicle abnormalities. More than 70 articles were retrieved from health databases, summary was outlined in the discussion.

Discussion

In reviewing all case reports regarding congenital missing pedicles, general consensus regarding the treatment is a conservative approach. Surgical intervention is only necessary if a patient is found to have cervical instability or neurological deterioration (6).

The pathogensis of CMCP stems from the failure of development of a vertebral chondrification center of particular sclerotome or failure of ossification, which occurs in the seventh to eighth weeks of gestation (4, 6). The most common levels in the cervical spine to be affected are C6 (39%) and C5 (27%) with the condition almost always unilateral (3). The most common misdiagnosis of a CMCP is a locked facet joint which is a type of facet dislocation resulting from an injury to the apophyseal joint ligaments which leads to inferior articular facet jumping over the superior articular facet of the inferior vertebral body usually affecting the C4-C5 and C5-C6 levels (Figure 3, 4) (5).

Congenitally missing pedicles may be interpreted as a jumped and locked facet on a magnetic resonance image owing to lack of specificity. This type of injury very commonly occurs after traumatic accidents whereby the cervical spine is flexed forcefully causing injury. Congenitally missing pedicles are therefore commonly misdiagnosed for facet dislocation due the nature of accident and appearance on MRIs and X-rays. MRI of the cervical spine is commonly used to investigate patients with mild cervical injury or neck pain, seen electively at clinics. It is the most superior test used for detecting soft tissue injuries such as cord lesions and compression. A CT scan however, is superior to an MRI and X-Ray in visualizing bony structures (7, 8). Compared to an X-Ray, which detects 60 to 80 percent of fractures, a CT scan has a higher sensitivity and specificity for spinal cord injuries being able to detect 97-100 percent of fractures (8).

CT scans should be recommended in all patients with traumatic cervical spine injuries who present with neurological symptoms (1, 8, 10). A 3D reconstruction will also be useful and should be performed if available to enhance viewing of the abnormality. In regards to a CMCP, almost all reports have recommended conservative treatment for a successful outcome (9, 2). Neurological deterioration and instability are uncommon however, surgery is only indicated if patients demonstrate instability with flexion and extension x-rays (1, 11).

Conclusion

Congenitally missing cervical pedicles may be interpreted as fractures, subluxations and dislocations and therefore difficult to diagnose. Magnetic resonance images, X-Rays and most importantly, CT scans need to be obtained before a final diagnosis can be confirmed. A congenitally missing pedicle may be confused for a jumped and locked facet, which may lead to unnecessary surgery and therefore must be part of the spine injury differential diagnosis.

Conservative treatment is the appropriate first line of management for a successful outcome. Our patient in this report suffered a stable injury and was prescribed a hard collar and physical therapy. The life long limitations for contact sports are precautionary rather than absolute owing to the lack of research regarding the absence of a congenital cervical pedicle and its long-term effects.

Acknowledgement

The authors declared no conflicts of interest.

Reference

1. Moon, Sung-Jun, Jung-Kil Lee, Bo-Ra Seo, and Soo-Han Kim. Traumatic Subluxation Associated With Absent Cervical Pedicle. Spine 3.18 (2008): 663-66.

2. Kitzing, Bjoern, and Yu Xuan Kitzing. The Role of CT Imaging in the Congenital Absence of a Cervical Spine Pedicle: A Case Report and Review of the Literature. Neuroradiology 3.5 (2009): 7-10.

3. Oh, Young-Min, Jong-Pil Ei. Congenital Absence of a Cervical Spine Pedicle: Report of Two Cases and Review of the Literature. The Korean Neurosurgical Society 44 (2008): 389-91.

4. Fowler, John R. Absent C6 Cervical Pedicle in a Collegiate Football Player. Clinical Orthopaedics and Related Research (2010): 1693-696.

5. Jonas Sheehan, George Kaptain, John Jane. Congenital Absence of a Cervical Pedicle: Report of Two Cases and Review of the Literature. Neurosurgery 47.6 (2000): 1439-442.

6. Mays, Simon. Absent Cervical Spine Pedicle: Report of a Case in a Mediaeval Skeleton. Skeletal Radiol 36 (2007): 773-77.

7. Taguchi, Yoshio, Motoshi Matsuzawa, Jun Ming Ye, Masahiko Uzura, Hiroyuki Watanabe, Minako Hayakawa. Posttraumatic Cervical Epidural Hematoma Associated with Congenital Absence of a Cervical Spine Pedicle: Case Report and Lierature Review. The Journal of Trauma 51 (2001): 579-82.

8. Parizel, P. M., T. Van Der Zijden, S. Gaudino, M. Spaepen, M. H.J. Voormolen, C. Venstermans, F. De Belder, L. Van Den Hauwe, and J. Van Goethem. Trauma of the Spine and Spinal Cord: Imaging Strategies. European Spine Journal 6 (2009): 8-17.

9. Wiener, David, Salutario Martinez, David A. Congenital Absence of a Cervical Spine Pedicle: Clinical and Radiologic Findings. American Journal of Roentgenology 155 (1990): 1037-041.

10. Rodriguez, Romero R. Congenital Absence of the Neural Arch in the Cervical Spine: An Extreme Form of Pedicle Absence. European Journal of Radiology 20 (1995): 100-04.

11. Oestreich, Alan E, Lionel W. Young. The Absent Cervical Pedicle Syndrome: A Case in Childhood. Department of Radiology, University of Rochester Medical Center 107.3 (1969): 505.

12. O'Donnell, Chris. Bilateral Cervical Locked Facets | Radiology Case Radiopaedia.org. Radiopaedia Blog RSS.

13. CAT Scan (CT) - Spine. CAT Scan (CT)-Spine. Radiology Society of North America, 5 June 2015.

14. Guille, James T, Henry H. Sherk. Congenital Osseous Anomalies of the Upper and Lower Cervical Spine in Children. The Journal of Bone and Joint Surgery 84 - A (2002): 277-88. JBJS.org. Feb. 2002.

15. Cox, Harrell E, William F. Computed Tomography of Absent Cervical Pedicle. Journal of Computer Assisted Tomography 8.3 (1984): 537-39.

16. Lauten, Gregory J, William D. Computed Tomography in Absent Cervical Pedicle. American Journal of Roentgenology 1 (1980):201-03.

17. Oh, Young-Min, Jong-Pil Eun, Eun-Jeong Koh, Ha-Young Choi. Posterior Arch Defects of the Cervical Spine: A Comparison between Absent Pedicle Syndrome and Spondylosis. Spine Journal (2009): 1-5.

18. Goel, Ayush. Locked Facet Joint | Radiology Case Reference Article Radiopaedia.org. Radiopaedia Blog RSS.

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