

Images in Clinical Rheumatology

Butterfly Vertebra[☆]

Vértebra en mariposa

Walter Alberto Sifuentes Giraldo,^{a,*} José Ignacio Gallego Rivera,^b Mónica Vázquez Díaz^a

^a Servicio de Reumatología, Hospital Universitario Ramón y Cajal, Madrid, Spain

^b Servicio de Radiología, Hospital Universitario Ramón y Cajal, Madrid, Spain



ARTICLE INFO

Article history:

Received 31 July 2013

Accepted 8 January 2014

Available online 6 April 2014

A female 62-year-old patient was diagnosed with osteoporotic compression fractures at the D10 level and referred to a tertiary center for study and initiation of antiresorptive therapy. She reported her menarche at age 15 and menopause at age 45. She had a calcium intake over 1000 mg/day, as well as adequate sun exposure and physical activity, and had no history of previous fractures, thyroid disease or urolithiasis. She had recently been diagnosed with hypercholesterolemia and received simvastatin, but denied using other drugs. The vertebral collapse was assumed to be asymptomatic as there was no pain or a history of previous trauma. On examination, her height was 147 cm, and she weighed 58 kg (BMI 26), and presented mild thoracolumbar kyphosis with left convexity scoliosis but the spinal mobility and neurological examination were normal. Laboratory tests, including calcium, phosphorus, parathyroid hormone, thyrotropin, 25 (OH) vitamin D3, calciuria and tubular reabsorption of phosphate, were normal. Densitometry showed spinal (*T* score: -2.8) and femoral neck osteoporosis (*T* score: -3.2). A lateral spine X-ray showed an apparent severe anterior vertebral collapse at D10, but magnetic resonance imaging (MRI) revealed that this actually corresponded to a typical 'butterfly vertebra' (Figs. 1 and 2). The patient was diagnosed with densitometric osteoporosis and the onset of antiresorptive therapy was postponed.

Butterfly vertebra (also known as vertebral sagittal cleft, anterior rachischisis, somatoschysis, spina bifida or above)¹ is a rare congenital malformation caused by the failure of fusion of the lateral chondrification nuclei of vertebrae developing,^{2,3} secondary to incomplete embryological regression originating in the

notochordal sagittal funnel shaped groove into the vertebral body, through which the adjacent vertebral discs⁴ are connected. This defect occurs between the third and sixth weeks of gestation^{2,3} and is located most frequently at^{5–7} the lumbar level. It is associated with other congenital abnormalities such as Mullerian hypo/aplasia and Jarcho-Levin, Pfeiffer, Crouzon, Alagille and Kallmann syndromes, although it can also occur in isolation.^{1,2,7,8} Patients are usually asymptomatic and this malformation is usually detected incidentally, but it may alter the biomechanics of the spine causing atypical back pain or increasing the chance of disk herniation.^{5–7} The lateral X-rays show a trapezoidal or anterior cuneiform morphology, so it may be confused with osteoporotic vertebral collapse or other pathological vertebral fractures, including traumatic, infectious or metastatic ones.^{1,2,7,9} The wedging is caused by anterior hypo/aplasia due to a congenital deficiency of vascularization.^{3,9} In the anteroposterior radiograph it is easily detected because the vertebra is divided into two hemivertebrae (usually symmetrical, but may be of different size conditioning scoliosis), which look like the wings of a butterfly,^{1,2,4} although this X-ray image was not seen in our case. CT and MRI are recommended in doubtful cases or to exclude other associated congenital anomalies such as vertebral bars, supernumerary lumbar vertebrae, spina bifida, kyphoscoliosis or diastematomyelia.⁶ The use of three-dimensional fetal ultrasonography has been recently described for the prenatal diagnosis of butterfly vertebra.¹⁰ In conclusion, although butterfly vertebra is uncommon, it should be considered in the differential diagnosis of osteoporotic compression fractures.

[☆] Please cite this article as: Sifuentes Giraldo WA, Gallego Rivera JI, Vázquez Díaz M. Vértebra en mariposa. Reumatol Clin. 2015;11:52–53.

* Corresponding author.

E-mail address: albertosifuentesg@gmail.com (W.A. Sifuentes Giraldo).

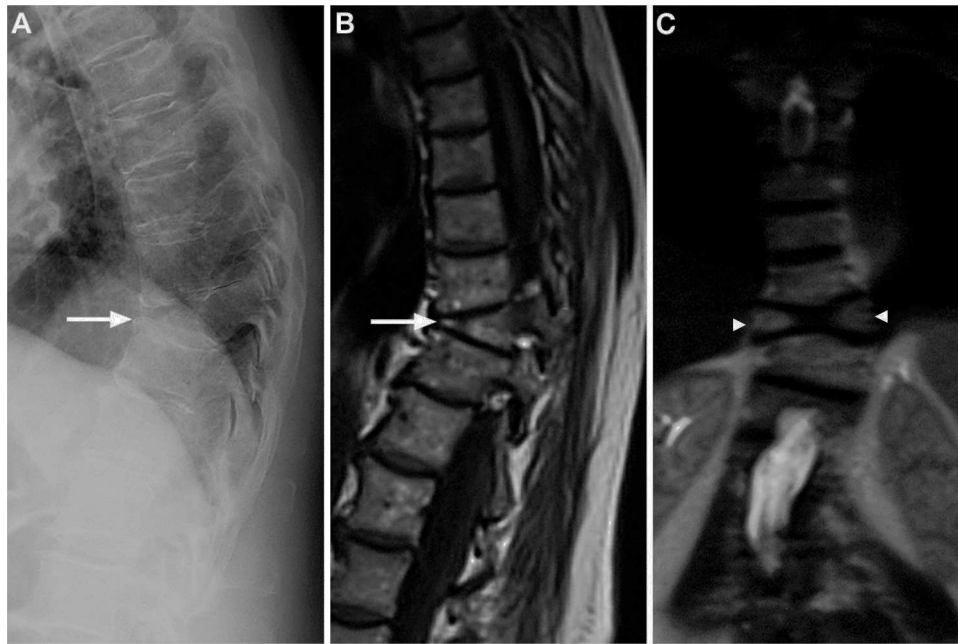


Fig. 1. Lateral X-ray of the thoracic spine showing apparent anterior wedge compression fractures at the D10 level (A, arrow). MRI showing, in the sagittal T1-weighted sequence, anterior wedging similar to that seen on the radiograph (B, arrow), but the coronal sections show that it actually corresponded to a defect in the fusion of the vertebral body, which originated the presence of 2 hemivertebrae, the right slightly smaller than the left, with the typical appearance of a “butterfly vertebra” (C, arrowheads).

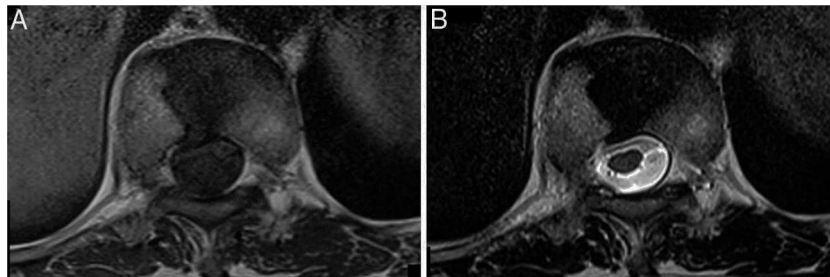


Fig. 2. MRI axial images obtained at the D10 level with T1 (A) and T2 (B) potentiated sequences, confirming the presence of the above defect, with unaffected laminae and pedicles, and no spinal canal compression.

Ethical Responsibilities

Protection of people and animals. The authors declare that this research has not performed experiments on humans or animals.

Confidentiality of data. The authors declare that they have followed the protocols of their workplace regarding the publication of data from patients and all patients included in the study have received sufficient information and gave written informed consent to participate in the study.

Right to privacy and informed consent. The authors have obtained informed consent from patients and/or subjects referred to in the article. This document is in the possession of the corresponding author.

Conflict of Interest

The authors have no conflicts of interest

References

- Ekim A. Butterfly vertebra anomaly: a case report. *J Back Musculoskelet Rehabil.* 2010;23:161–4.
- Satpathy A, Sloan R, Bhoora IG. Compression fracture or butterfly vertebra: diagnostic importance in a trauma setting. *Ann R Coll Surg Engl.* 2004;86:W41–3.
- Sonel B, Yalçın P, Oztürk EA, Bökesoy I. Butterfly vertebra: a case report. *Clin Imaging.* 2001;25:206–8.
- Resnick D, Niwayana G. Osteoporosis. In: Resnick D, Niwayana G, editors. *Diagnosis of bone and joint disorders.* Philadelphia: WB Saunders; 1981. p. 1663–9.
- Cho HL, Kim JS, Paeng SS, Lee SH. Butterfly vertebra with lumbar intervertebral disc herniation. *J Neurosurg Spine.* 2011;15:567–70.
- Patinharayil G, Han CW, Marthya A, Meethall KC, Surendran S, Rudrappa GH. Butterfly vertebra: an uncommon congenital spinal anomaly. *Spine (Phila Pa 1976).* 2008;33:E926–8.
- Zuo K, Asenjo JF, Colmegna I. Butterfly vertebra. *Arthritis Rheum.* 2013;65:196.
- Jarzabek K, Wolczynski S, Lesniewicz R, Plessis G, Kottler ML. Evidence that *FGFR1* loss-of-function mutations may cause variable skeletal malformations in patients with Kallmann syndrome. *Adv Med Sci.* 2012;57:314–21.
- García F, Florez MT, Conejero JA. A butterfly vertebra or a wedge fracture. *Int Orthop.* 1993;17:7–10.
- Wei Q, Cai A, Wang X, Xie L, Wang B, Wang X. Value of 3-dimensional sonography for prenatal diagnosis of vertebral formation failure. *J Ultrasound Med.* 2013;32:595–607.