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Case Report

A rare cause of low back pain in adolescence – Bertolotti syndrome: A case report

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ABSTRACT

Background: Bertolotti syndrome (BS) is defined as a congenital anomaly of the spine that includes sacralization of the lowest lumbar vertebra or lumbarization of the first sacral vertebra (i.e., lumbosacral transitional vertebra- LSTV) and the pain associated with this condition. The incidence of BS in adolescence is rare; we found only three such case reports of patients under the age of 18 in the literature, here will add a fourth.

Case Description: A 17-year-old female presented with a 2-month history of low back pain exacerbated by physical activity. Her neurological examination was normal, except for pain elicited when applying pressure over the sacroiliac joints bilaterally, and over the spinous process of the L5 vertebra. The computed tomography scan documented BS: (i.e., LSTV – Castellvi classification: Type IIa on the left side). She was successfully treated with nonsteroidal anti-inflammatory drugs (NSAIDs) alone.

Conclusion: Here, we report a 17-year-old female who was symptomatic from BS and was successfully treated with NSAIDs.

Keywords: Bertolotti syndrome, Low back pain, Lumbarization, Lumbosacral transitional vertebra, Sacralization

INTRODUCTION

Bertolotti syndrome (BS) is defined as a congenital anomaly of the distal lumbar spine; specifically, sacralization of L5 vertebra or lumbarization of S1 vertebra (i.e., lumbosacral transitional vertebra – LSTV) and the pain associated with LSTV.[3] LSTV occurs in 4–36% of patients who demonstrate either sacralization of L5 (7.5%) or lumbarization of S1 (5.5%).[5] For these anomalies, the vertebral morphology varies from a broadened transverse process (TP) to a complete fusion.[4] BS can be diagnosed using magnetic resonance imaging (MRI), computed tomography (CT) scan, scintigraphy, and diagnostic injections combined with patient history and physical examination.[6,8] Treatment of BS starts with nonsteroidal anti-inflammatory drugs (NSAIDs) and physical therapy. Operative treatment may warrant spinal decompression and/or fusion.[3,9]

CASE REPORT

A 17-year-old female presented with a 2-month history of low back pain (LBP) exacerbated with activity. Her only finding on the neurological examination was focal pain over the sacroiliac joints bilaterally and over the spinous process of the L5 vertebra. The CT demonstrated findings consistent with the diagnosis of BS: a pseudoarticulation on the left between the TP of the L5 vertebra, sacral ala, and ilium (i.e., Castellvi classification: Type IIa [Table 1]) [Figure 1]. She was successfully treated with NSAIDs, was told to pursue physical therapy, and 9 months later, was doing well.

DISCUSSION

Pain is seen with BS

Pain in BS may be due to disc, spinal canal, and posterior element pathology; degeneration of abnormous articulation between LSTV and sacrum; extraforaminal stenosis; and facet joint arthrosis.[4] Quinlan *et al.* found BS in 4.6% of patients with LBP, with only 11.4% of these patients being under the age of 30.[7] We found only three case reports of patients under 18 years of age with BS and their complaints included pain in the hip, lower back, and abdominal pain exacerbated with physical activity[2,8,9][Table 2].

Table 1: Castellvi *et al.* LSTV classification.[1]

Type I	Unilateral (Ia)/Bilateral (Ib) triangular-shaped transverse process, at least 19 mm in width
Type II	Unilateral (IIa)/Bilateral (IIb) lumbarization/ sacralization with a large transverse process that has a diarthrodial joint between the transverse process and the sacrum
Type III	Unilateral (IIIa)/Bilateral (IIIb) lumbarization/ sacralization with a complete bone fusion of the transverse process to the sacrum
Type IV	Mixed (e.g., Type IIa on one side with a Type IIIa on the contralateral side.)

LSTV: Lumbosacral transitional vertebra

Radiological diagnosis of BS

The CT scan in this case was diagnostic for Castellvi classification: Type IIa LSTV/BS on the left side. [Figure 1] The other three cases of children with BS were also with Type II LSTV on the left side.[2,8,9] Notably, Types I and II are approximately 80% of all LSTV cases.[5] X-ray, bone scintigraphy, and MRI also can be used for the diagnosis of LSTV.[1,4,8] A reconstructed three-dimensional CT may help to understand the specific bone anatomy.[4,8]

Treatment of BS: Conservative

Treatment options for BS typically include physical therapy, NSAIDS, and rarely, surgery.[2,3,9] There is no standard treatment for adolescents due to the small number of reports of BS in this age group. The two children with respective complaints from 2 years and 4 years were treated with surgical resection of the transitional articulation; the child with complaints of 3-month duration underwent a CT-guided epidural steroid injection[2,8,9] [Table 2]. Cuenca *et al.* proposed a decision tree for the management of BS in children that first recommended NSAIDs;[2] second, injection of local anesthetics; and third, consideration of surgery (i.e., if symptoms return within 8 weeks after the infiltration of local anesthetics).[2,3,6,8,9]

Surgery

Surgical options include decompression, resection, and/ or fusion.[3,6] Cuenca *et al.* recommended resection of the transitional joint if conservative treatment was ineffective.[2] Some report improvement with decompressions alone, others with additional posterolateral fusions.[2,3,6]

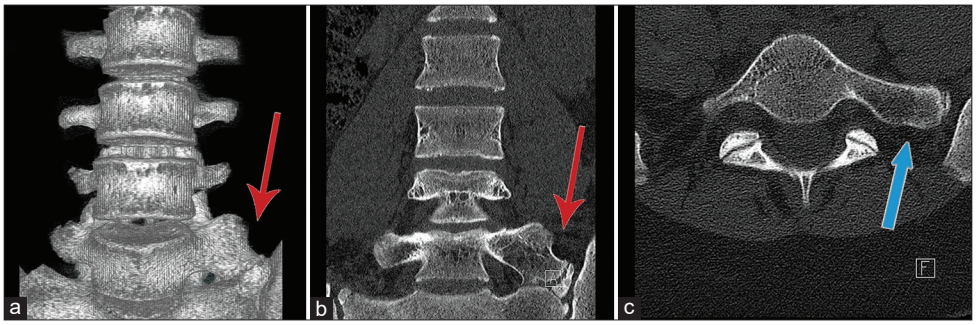

Figure 1: (a and b) Three-dimensional reconstruction and coronal plane of the computed tomography (CT) scan demonstrates the pseudoarticulation on the left side between the transverse process (TP) of the L5 vertebra, sacral ala, and ilium (red arrow). (c) Axial CT scan demonstrates the enlarged TP (blue arrow).

Table 2: Case reports of patients under 18 years of age with BS.

Author and year	Age	Sex	Symptoms	Duration of complaints	Castellvi classification	Treatment
Rodriguez *et al*. 2015[8]	10	M	Pain on the left side of his back, which radiates to the left abdominal flank	3 months	IIa on the left side	Anesthetic infiltration
Cuenca *et al*. 2019[2]	13	F	Low back pain with painful seizures of the left hip	4 years	IIb with pseudo articulation on the left side	Surgical resection
Sumarriva *et al*. 2022[9]	17	M	Left-sided low back pain	2 years	IIa on the left side	Surgical resection
Ali 2023 (Present Case)	17	F	Low back pain	2 months	IIa on the left side	NSAID and physiotherapy

BS: Bertolotti syndrome, NSAID: Nonsteroidal anti-inflammatory drug, M: Male, F: Female

CONCLUSION

BS must be considered a differential diagnosis in patients with LBP, including those in the adolescent age group. Notably, NSAIDs and conservative management should be the predominant management strategy.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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