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Conservative Management of Bertolotti Syndrome in Adult Patients: A Rare Case Report

Hafidz Ubaidillah[1,*]
[1]Puskesmas Kejajar 2, Bumireso, Wonosobo, Indonesia
* Correspondence author: dr.ubaihafidz@gmail.com

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ABSTRACT

Bertolotti syndrome (BS) is characterized by low back pain associated with Lumbosacral Transitional Vertebrae (LSTV), a sacralization of the lowest lumbar segment of vertebrae. LSTV is a common finding among the general population, with a reported prevalence ranging from 4% to 35%. This case study examines a 30-year-old woman who has low-back pain in her left paralumbar region without any neurologic or radiculopathic symptoms. The transverse process of the fifth lumbar vertebrae on the right side is fully sacralized. The International Classification of Functioning, Disability, and Health (ICF) was used to evaluate the patient's functional disability. A multimodal treatment approach was used to reduce the symptoms and improve function, which included stretching, infrared therapy, medication, behavioral changes, and workplace adjustments. This case shows an uncommon incidence of contralateral low back pain in a patient with Castellvi type IIIa LSTV who is of working age and has BS. The pain may be due to the weakness of the surrounding muscles and hypermobility of the ipsilateral and contralateral facet joints above the LSTV segment. Conservative treatment is the first choice for this patient. A thorough approach to diagnosis and therapy may yield the best results for the patient, and clinicians should consider BS as a differential diagnosis when treating low back pain. Conservative treatment for BS is appropriate for most patients and can be administered in primary or secondary care settings.

Keywords: Low Back Pain, Bertolotti Syndrome, Lumbosacral Transitional Vertebrae, Physical Medicine and Rehabilitation, Case Report.

1. Introduction

A patient with chronic pain/ functional impairment due to Lumbosacral Transitional Vertebrae (LSTV), a type of congenital deformity of the spine, is diagnosed with Bertolotti Syndrome (BS). Mario Bertolotti first reported this syndrome in 1917 [(1)]. LSTV refers to the total/partial fusion of the transverse process of the lowest lumbar vertebrae with the sacrum, unilaterally or bilaterally [(2)]. There are four forms of LSTV, which are often categorized using Castellvi radiologic criteria. Castellvi Type I is characterized by unilateral (Castellvi Ia) or bilateral (Castellvi Ib) dysplasia of the transverse process in the craniocaudal dimension of ≥19 mm. A visible diarthrodial joint with the sacrum and transverse process expansion defines type II. It can be unilateral (Castellvi IIa) or bilateral (Castellvi IIb). Type III is distinguished by complete ossification of the lumbosacral joint unilaterally (Castellvi IIIa) or bilaterally (Castellvi IIIb). Castellvi Type IV is a hybrid of Type III on one side and Type II on the other [(3)]

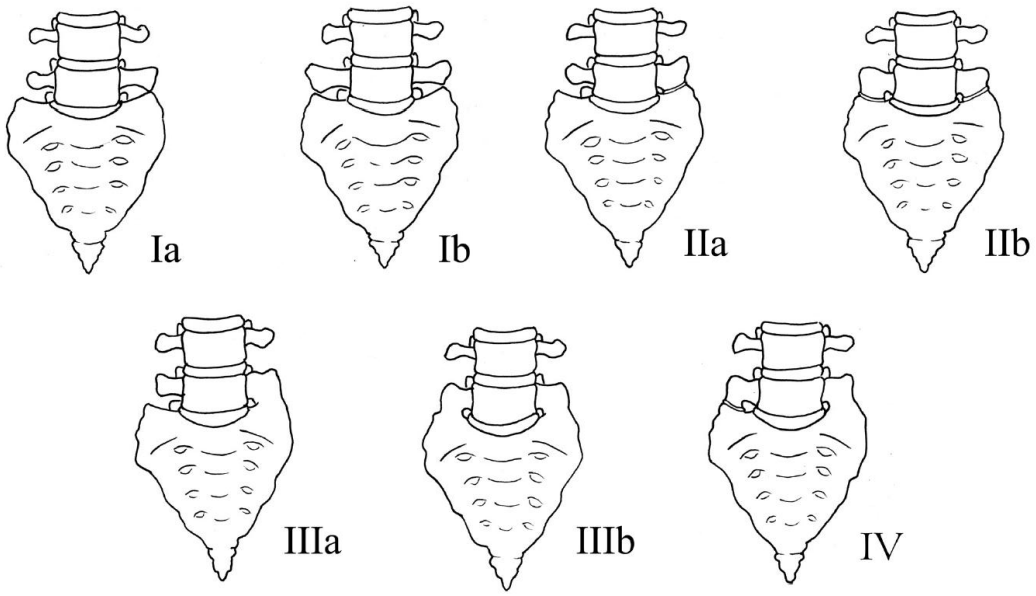

Figure 1. Illustration of Castellvi Classifications in BS [(1)]

In Indonesia, reports of Low Back Pain correlated with LSTV are rarely found, especially in primary care settings. This causes BS not to be considered a differential diagnosis of low back pain by many physicians, and the appropriate treatment for BS in primary care is also difficult to determine.

2. Case Presentation

A 30-year-old female healthcare worker came into the primary care clinic with recurrent lower back pain on the left side for the last four months, which worsened 12 hours before the examination. The pain is dull with a Visual Analogue Score (VAS) of 8 and localized to the left paralumbar and midsection region without radiculopathy or other neurological symptoms. The symptoms worsen with lateral body movement, making it difficult to hold an upright posture or do basic daily activities. The patient is obese (BMI=27,12) with no history of medication, past illness, trauma, or surgery. Potential risk factors include prolonged daily work in a non-ergonomic position and regular high-mobility exercise (pound fit) for the last 3 months.

During physical examination, no visible deformity is found. Reduced Range of Movement (ROM) was found due to pain during axial lumbar movement, with no rotation movement limitation. There are no leg-length discrepancies, neoplasm, or instability. Tenderness is found in the left paralumbar region, with negative findings during straight-leg and cross-straight-leg raising tests. In manual muscle testing, the posterior muscle of the left lower extremities is slightly stronger than the right side. A lumbar X-ray in supine and left lateral decubitus (LLD) position was done on the patient in the primary clinic; there was no fracture, compression, or spondylolisthesis. Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) scans were not conducted since they were unavailable in primary care. The sacralization of the 5th lumbar transverse process matches the characteristics of Castellvi Type IIIa, as seen in Figure 2.

Figure 2. Lumbar and LLD X-Ray

In primary care, the patient is given oral treatment for two days with Diclofenac Sodium 50mg/12 hours and Prednisone 5mg/12 hours. The patient is referred to Orthopedic in secondary care for assessing the need for surgery, then given conservative treatment for 7 days with Eperisone HCl

50mg/12 hours, Ranitidine HCl 150mg/hours, Meloxicam 7,5mg/hours, Methylprednisolone 4mg/12 hours, and Diclofenac Diethylamine Emulgel 1% topical once a day, then referred to Psychiatrist for physical medicine assessment and rehabilitation. Infrared therapy is prescribed once a week, but the patient only took it once in the hospital, then continued the treatment in home care settings daily for a week. The patient was also recommended to change her exercise to stretching and strengthening exercises, modify her workplace with extra lumbar ergonomic support, and avoid unnatural working posture. After two days of oral treatment, the symptoms gradually improved, but the patient still hesitated to do the usual work or exercise due to the pain still felt, even though on a VAS of 2-3. The symptoms are significantly reduced after a week with physiotherapy, light exercise, regular stretching, workplace adjustments, and work habit modification. The patient is asymptomatic and can work normally after two weeks of conservative treatment.

3. Discussion

The patient is a 30-year-old female with a chief complaint of recurrent, dull low back pain in the left paralumbar and midline without symptoms of radiculopathy. From the literature, we know that of chronic low back pain patients, only 4,6%-10,6% are diagnosed with BS, more often in women [1,4]. The incidence of BS varies from 4-35% in the general population [1]. By symptoms, the pain is localized in 95% of the patients, with 66,7% reporting pain in the midline region and >60% of patients experiencing radiculopathy [1,4].

By age group, only 22,5% of BS patients are between the age group of 20-40 years old [1]. Our patient's physical examination shows tenderness in the left paralumbar region. During lumbar X-ray, complete sacralization of the 5th lumbar transverse process on the contralateral side, categorized to Castellvi type IIIa can be found. The pain in the contralateral side of the affected lumbosacral joint occurs in 8,3% of BS patients [2], and Castellvi Type III is found in 9,2% of the patients with 83% of those patients belonging to the Castellvi Type IIIa group [1]. This makes our case a rare one because our patient was in an adult age group with low back pain without radiculopathy on the contralateral side of LSTV Castellvi Type IIIa.

The pain in BS could arise from many anatomical components such as discs, spinal canal, pathology of the posterior element of LSTV, and extraforaminal stenosis due to a widened transverse process [3]. Physiologically, LSTV could change the biomechanics of the lumbar spine [3,5]. LSTV decreases mobility between the sacrum and lumbar process in the affected level, so the load is absorbed more effectively due to increased stability on the ipsilateral side. This increased stability causes hypermobility in the ipsilateral and contralateral facet joints of the segment directly above the transitional vertebrae, adding more risks of accelerated degenerative process of the spinal discs and facet joint [3,5]. Weakness of the iliolumbar ligament above the LSTV also contributes to hypermobility and further accelerates the degenerative process [3].

Radiodiagnostic imaging, including MRI, CT, and X-ray, is the main method used to diagnose BS. This method determines the LSTV and rules out other causes of LBP as a differential diagnosis [3,5]. Although LSTV and the resulting low back pain are sufficient to diagnose BS, it is rarely necessary to identify the precise location of the LBP because the biomechanical alterations brought on by BS may result in other issues with the surrounding structure.

The functional diagnostic approach for our patient was based on WHO's International Classification of Functioning, Disability, and Health (ICF), which evaluates all health and welfare elements of the patient. ICF is divided into two parts: function and disability components (structure, function, activity, and participation limitation) and contextual elements that influence health outcomes (personal and environmental factors) [6]. This assessment could assist clinicians in providing the patient with an appropriate care plan. Figure 3 shows our patient's ICF model

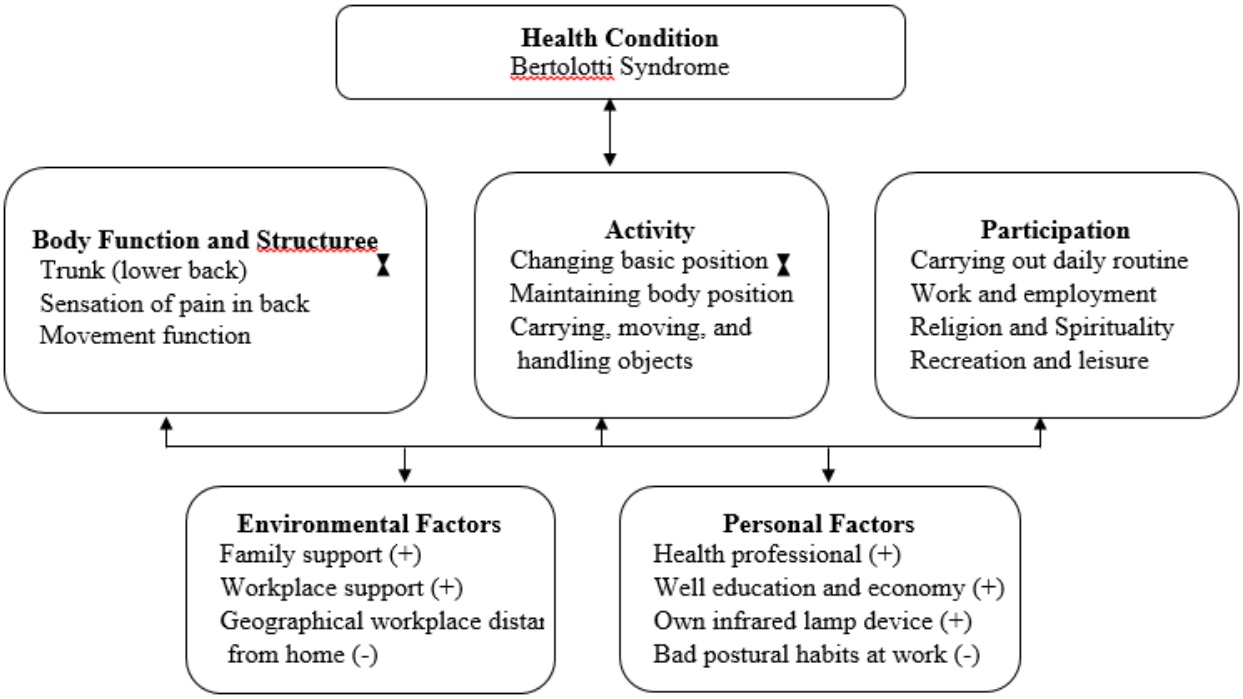

Figure 3. ICF Models of the Patient

There is a lack of consensus regarding the treatment for BS, with options encompassing conservative, surgical, and nonsurgical interventions [2,3]. Table 1 shows some prior reports on the treatment of BS.

Table 1. Previous Reports on Treatment of BS

No	Author	Year	Age	LSTV Type	Treatment	Results
1	Brown [7]	2023	36	IIa	Conservative (PT, lumbar epidural steroid injections, lumbar facet injections, SIJ injections), resection of right LSTV pseudoarticulation with imaging guidance.	No improvement after conservative treatment, pain relieved after 2 weeks, asymptomatic until 3 years postoperative treatment.
2	Ali [8]	2023	17	IIa	NSAIDs and physical therapy	Asymptomatic until 9 months follow-up.
3	Barkhane [9]	2022	65	IIIb	Fluoroscopic guided infiltration with 1mL of lidocaine and 35 mg of Triamcinolone in the pseudo articulation between the left transverse process and the sacrum; physical therapy, core strengthening, stretching for one month	Total pain relief after injection, asymptomatic until 6-month follow-up.
4	Alonzo [5]	2018	42	IIa	Fluoroscopic guided infiltration with 1mL of lidocaine and 40mg of Triamcinolone in the pseudo articulation between the left transverse process and the sacrum; lumbar strengthening and stabilization exercise after 3 months of intervention	Pain-free after the procedure, asymptomatic until 12 months follow-up.
5	Muir [10]	2012	51	IIIa	Physical therapy 3 times a week for 6 weeks	Partial pain relief after 2 weeks, general improvements but tightness and nagging pain remained.
		2012	62	IIa	Physical therapy once per week for 4 weeks	Drop out after 4 weeks due to limited benefits.
6	Paraskevas [11]	2009	40	IIa	Injection with a local anesthetic; conservative treatment was offered, including analgesics, non steroidal anti-inflammatory drugs, physiotherapy, and exercise programs.	Pain alleviation after injection, pain-free until 18 months follow up.

The ICF model for our patient indicates that the objectives of the treatment should be to reduce pain and restore functional ability so that the patient can work, engage, and participate in everyday activities in the best possible condition. After surgical interventions are ruled out, oral analgesic and anti-inflammatory drugs could reduce pain in days, and the combination of drugs and physical medicine approaches such as physiotherapy, light exercise, regular stretching, workplace adjustments, and work habit modification give good results so that the patient can return to work pain-free after two weeks of treatment.

4. Conclusion

A combination of oral, physiotherapy, behavioral changes, and environmental modifications could relieve the symptoms and get the patient back to regular activity after 2 weeks. The conservative treatment for BS can be administered in primary or secondary care settings, making it accessible to most patients.

5. Acknowledgements and Conflict of Interest

There is no conflict of interest in the preparation of this case report.

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