



Case Report

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AYURVEDIC INSIGHTS ON BERTOLOTTI'S SYNDROME: A CASE REPORT

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ABSTRACT

Introduction: Bertolotti's syndrome, also known as Lumbosacral Transitional Vertebra (LSTV), is a congenital anomaly characterised by pseudo-articulation or fusion of the L₅ transverse process with the sacrum or ilium, leading to chronic low back pain. This condition is correlated with Katigraha, through the lens of Ayurveda, predominantly involving vitiation of Vata Dosha. **Methods:** A 38-year-old male patient presented with low back pain radiating to the left lower limb for 1 month. Clinical examination was done through Straight Leg Raising (SLR) test, Bragard's Test, FABER's test and Slump test. MRI of the Lumbar spine confirmed Castellvi type IIa Lumbosacral Transitional Vertebra (LSTV). The patient was treated with both Shamana and Shodhana chikitsa. **Results:** Significant symptomatic improvement was observed. Pain intensity reduced from 7/10 to 2/10 on the visual analogue scale (VAS). Stiffness resolved completely (from grade 3 to 0). Range of motion improved with no radiating pain. **Conclusion:** The present case suggests that Ayurvedic management, including Shodhana and Shamana therapies, can effectively reduce pain, improve mobility, and enhance quality of life.

Keywords: Lumbosacral Transitional vertebra, Katigraha, Castellvi classification, Low Back Pain, Straight Leg Raising (SLR) test

INTRODUCTION

Bertolotti's syndrome, also known as Lumbo-sacral Transitional Vertebrae (LSTV), discovered by Mario Bertolotti, is a congenital, developmental anomaly characterised by an enlargement of the caudal lumbar transverse process or subsidence at L₅ or S₁ leading to pseudo-articulation or fusion of the transverse process of L₅ with either the sacrum or the ilium¹. This pseudoarthrosis can cause lower back pain associated with restricted movement. Quinlan *et al.* stated that the prevalence of Bertolotti's syndrome is 4.6% in the general population and 11.4% in patients under the age of 30 years². In India, 60%–80% of the general population suffer from low back pain (LBP) during their lifetime, and the prevalence of LSTV in patients taking treatment for LBP ranges from 4.6% to 35.6%³. According to Castellvi classification, detailing about anatomical changes of Lumbosacral Vertebrae, the transitional vertebrae is of 4 types i.e., Type I is Dysplastic transverse process (unilateral or bilateral), Type II is Incomplete lumbarization or sacralization (unilateral or bilateral), Type III is Complete lumbarization or sacralization (unilateral or bilateral) and Type IV is Combination (Types II and III) (Figure 1)⁴. It can be viewed through the lens of Ayurveda as Katigraha with an underlying structural defect manifesting itself as pain in the lower back (lumbosacral) region along with stiffness. The terms Kati, Shroni, Trika, and Prishtha are used interchangeably and include the lumbar, sacral, and Sacroiliac joints⁵. The pathophysiology can be understood as the vitiation of Vata dosha, particularly Apana Vata, with dominance of vitiated Kapha localizing in Katipradesh, causing pain, stiffness and reduced mobility. Structural anomalies leading to

nerve compression or muscle stiffness could be interpreted as vitiated Vata affecting the Asthi (bones) and Majja Dhatu (nervous tissue).

The management of Vata vyadhi, as per Acharya Charak⁶, includes Snehan (oleation therapy), Swedan (fomentation), Basti (medicated enema), Vata Shaman Yogas (conservative treatment), etc. Bhavaprakash specifically mentions Valuka swedan⁷ as a treatment for Triakashoola, which is easy to administer and cost-effective.

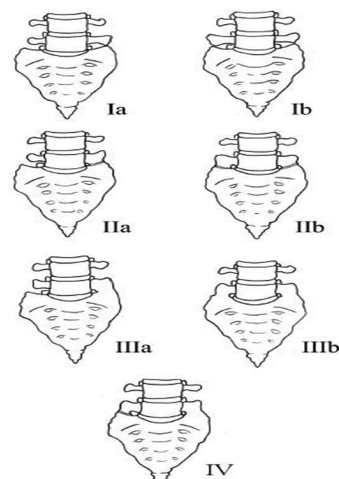


Figure 1: Types of Lumbosacral Transitional vertebra (Castellvi classification)⁴

CASE PRESENTATION

Adyatana Vrutanta (History of Present Illness)

A 38-year-old male patient who was a farmer by profession complained of pain in the lower back and left gluteal region for the last 1 month. It was a pulling-type pain that worsened at night or with prolonged standing, walking, and climbing stairs, and was relieved by rest or fomentation over the lower back.

He had an episode of fever 1 month back, which lasted for 10 days. He took allopathic treatment (Inj. PCM) and got relieved. Post treatment, he developed LBA, for which he consulted an Orthopedic Physician and was partially relieved by the conservative treatment then, but the pain re-occurred. Therefore, he approached to Kayachikitsa OPD of Sri Jayendra Saraswathi Ayurveda College and Hospital, Nazarathpet, Chennai, Tamil Nadu, and was admitted and prescribed the Shodhana and Shaman chikitsa.

The study is conducted in accordance with the ICMR National Ethical Guidelines for Biomedical and Health Research Involving Human Participants. Informed consent was taken prior to the study.

Purva Vyadhi Vrutanta (History of Past Illness)

The patient was not a known case of Hypertension, Thyroid Dysfunction, Diabetes Mellitus, Rheumatoid Arthritis, Bronchial Asthma, etc., with no Specific Family history.

Vaiyuktika Vrutanta (Personal history)

The appetite was regular, and he used to have a mixed diet including both veg and non-veg. Bowels were also regular. Micturition frequency was normal, without any burning sensation or itching. Sleep was sound, with an average span of 6-7 hours daily.

General Examination

BP	128/84 mm/Hg
RR	14 breaths/ min
PR	94 bpm
SPO ₂	99%
Height	158 cm
Weight	54 kgs
Pallor	Absent
Edema	Absent
Nails	Non-pallor
Cyanosis	Absent
Ichterus	Absent
Lymph Nodes	Non-palpable
Temperature	Afebrile

Samprapti Ghatak

Dosha Involved – Kapha-Vataj
Dushya Involved – Asthi and Majja Dhatu
Lakshanas – Pain in Lower Back and Hip Joint
Srotodusti – Sanga
Roga Marga – Madhyama

Dashavidha Pareeksha

Prakruti – Pitta-Kapha
Vikruti – Kapha- Vata
Sara – Twak
Samhana – Madhyama
Pramana – Madhyama

Satmaya - Sarva Rasa
Satva – Madhyama
Vayah – Madhyama
Ahara Shakthi – Madhyama
Vyayam Shakthi – Avara

Ashta-Sthana Pareeksa

Nadi – Vata-Pitta
Mala – Nirama
Mutra – Normal Frequency Without Burning Sensation
Jihwa – Nirlipta
Shabda – Pravara
Sparsha – Anushna-Sheeta
Drik – Pravara
Akruthi – Madhyama

Investigations

Patient had undergone an MRI scan of the lumbar spine with whole spine screening dated 16th May, 2024. The Bilateral transverse Processes of L₅ are enlarged and dysplastic (mega-apophysis). The left articular process articulates with the ipsilateral sacral ala, suggestive of pseudoarthrosis with marrow oedema (i.e., Type IIa lumbosacral transitional vertebra). Other findings include Lumbarization of the L₅ Vertebral body, minimal disc desiccation at the L₅-S₁ disc level, and a diffuse disc bulge with posterior annular tear causing thecal sac indentation.

Whole Spine Screening shows mild narrowing of C₆-C₇ disc space with high T₂/STIR signal of the C₆ and C₇ vertebral bodies (bone marrow edema). End plate sclerosis of the neighbouring endplates. Minimal soft tissue thickening of the prevertebral and anterior epidural spaces at the C₆-C₇ level of high signal on T₂/STIR with homogeneous signal. No evidence of abscess formation is seen.

The Axial Diameter of the lumbar Spinal canal is as follows (in mm):

Level	L1-L2	L2-L3	L3-L4	L4-L5	L5-S1
(mm)	12.0	13.2	13.7	13.8	12.8

Assessment Criteria

Straight Leg Test (SLR)

Bragard's test

Stiffness

Grade	Specifications
0	No stiffness
1	In morning, only 5 minutes
2	During daytime, for 15 minutes
3	During daytime, for more than 15 minutes

Faber's test

Slump test

Treatment Protocol

Shaman Chikitsa

1. Rasna Saptakam Kashayam – 10ml + 40 ml water twice daily before food (6AM and 6PM)
2. Trayodashang Guggulu – 2 Tab BD
3. Vatajankusha Ras – 1 Tab BD with honey
4. Agnitundi Vati – 1 Tab BD

Shodhana Chikitsa

Date	Procedure	Medicine and dosage
18/05/24 to 20/05/2024 (3 days)	Dhanyamla Dhara (sarvanga)	
18/05/2024 to 20/05/2024 (3 days)	Valuka Sweda (sarvanga)	
21/04/2024 to 29/05/2024 (9 days)	Abhyangam (sarvanga)	Dhanwantaram tailam
21/05/2024 to 29/05/2024 (9 days)	Patra Pinda Sweda (sarvanga)	
22/05/2024 to 29/05/2024 (5 days)	Matra Vasti (60ml)	Mahanarayan Tailam
24/05/2024 to 28/05/2024 (3 days)	Kashaya Vasti	Honey 100ml Saindhavam 10g, Murchita tila tailam 100ml, Shatapushpa Kalkam 40g, Dasamoola Erandamoola Kasayam 300ml

OBSERVATION AND RESULTS

Parameter	Before Treatment	After Treatment
Pain Intensity (VAS Score)	7/10 – Moderate to severe pain, especially at night and after prolonged activity	2/10 – Occasional mild discomfort, significantly reduced night-time pain
Stiffness Grade	Grade 3 Stiffness lasting more than 15 minutes during the day	Grade 0 No stiffness reported
Straight Leg Raise (SLR) Test	Positive at 45° on left side (radiating pain)	Negative – No radiation; SLR above 70° possible without discomfort
Bragard's Test	Positive	Negative
Faber's Test	Positive (contralateral)	Negative
Slump Test	Positive (on left side)	Negative
ROM	Restricted lumbar flexion and extension due to pain and tightness	Normal lumbar movement with minimal restriction in end range

DISCUSSION

Bertolotti Syndrome, a manifestation of lumbosacral transitional vertebra (LSTV), represents a structural anomaly that alters normal biomechanics of the lumbosacral junction, leading to chronic back pain and radicular symptoms. The present case highlights the clinical relevance of this condition and demonstrates the potential role of ayurveda in alleviating symptoms and improving functional outcomes. It can be correlated with Katigraha, a condition categorized by pain and stiffness in the lumbar region. The pathophysiology can be understood as the vitiation of Vata dosha, particularly Apana Vata, associated with structural deformity and pseudoarticulation causing obstruction of normal Vata flow (Margavarana) by vitiated Kapha localizing in Katipradesh, causing pain, stiffness and reduced mobility. Structural deformity also causes nerve compression or muscle stiffness can be interpreted as vitiated Vata affecting the Asthi (bones) and Majja Dhatu (nervous tissue). This explains the chronicity of the disease. The therapeutic approach in this case was based on the classical principles of Vatavyadhi chikitsa, incorporating both Shodhana and Shaman therapies.

Rasna Saptakam Kashayam possess analgesic, anti-inflammatory, immunosuppressive and antioxidant properties. Most of the ingredients are Vata-sleshma hara⁸.

Trayodashanga Guggulu consists of Shatavari, Ashwagandha, and Guduchi, which rejuvenate tissue, while Shunthi and Ajmoda help improve Agni⁹.

Vatagajankusha Rasa and Agnitundi Vati help regulate Vata and improve Agni.

Dhanyamla Dhara is a type of Drava Sweda, prepared by the process of Sandhana Kalpana. It is a Ruksha Sweda having anti-inflammatory effects and helps in Ama digestion. It is indicated mostly in Kapha-Vata disorders¹⁰.

Valuka Sweda, i.e., sand fomentation, is a type of Ruksha sweda that pacifies Kapha. Infrared radiation is classified into 3 types,

i.e., near, Middle, and Far-infrared radiation, based on wavelength in the Electromagnetic Radiation spectrum. Sources of Far Infrared Radiation include the Sun, the human body, bio-ceramic materials, etc., which emit heat at normal body temperature, i.e., 30°C to 40°C. Because sand consists of Silica (silicon dioxide, SiO₂), a bio-ceramic compound, it has low Specific Heat capacity and therefore heats up quickly, emits far-infrared radiation, and absorbs and transfers the maximum absorbed heat. This is because Far-Infrared Radiation is absorbed by the thermo-receptors in the skin, penetrates deep into the body tissues, and promotes toxin release at the cellular level. FIR is converted to heat and causes vasodilation in the inflamed area¹¹. This pacifies numbness, rigidity, and Sheeta guna in the body.

Sarvanga Abhyangam with Dhanwantaram Tailam, is a traditional medicated oil indicated in the management of Vata disorders. It is administered both internally and externally, particularly as Abhyangam. The formulation is used in various neurological and musculoskeletal conditions, including paralysis, monoplegia, hemiplegia, diplegia, quadriplegia, and muscle wasting associated with disuse or lower motor neuron lesions. It is believed to enhance the strength and integrity of muscles, ligaments, tendons, and other supporting tissues, providing benefits for painful musculoskeletal disorders such as osteoarthritis, spondylosis, low back pain, synovitis, and joint-related conditions. Sesame oil as the base contributes to its Vata-pacifying action, making it particularly effective in alleviating pain, stiffness, and numbness.

Patra Pinda Sweda (PPS) helps in alleviating Shula, Stambha, and restricted movements in Vata-predominant conditions such as low back pain and associated radicular symptoms. The Ushna and Snigdha qualities of the Sweda pacify aggravated Vata and relieve Srotorodha, thereby restoring the normal functioning of the affected region. The procedure promotes relaxation of the surrounding muscles and soft tissues, improves flexibility, and enhances the therapeutic efficacy of concurrent internal medications.

Yoga Basti¹² was administered for eight days, comprising Anuvasana Basti (Matra Basti) during the initial two days, followed by Dashamoola and Erandamoola Niruha Basti (on the third day and thereafter alternating with Anuvasana Basti as per the classical schedule). As Basti is considered the prime therapy for Vata disorders and Pakwashaya is the principal seat of Vata, Yog Basti acts directly on the root pathology. Dashamooladi Niruha Basti facilitates Dosha Shodhana, Srotoshodhana, and Vatanuloman, thereby helping eliminate vitiated Doshas and restore the normal course of Vata. Administering Anuvasana Basti with Mahanarayana Taila provides Snigdha and Brimhana to the tissues, counteracting the Ruksha and Khara qualities of aggravated Vata. It nourishes Asthi, Sandhi, Mamsa, and Snayu, improves mobility, and alleviates pain and stiffness. Thus, the combined action of Shodhana and Brimhana through Yog Basti contributes to effective Vata Shamana and restoration of musculoskeletal function.

CONCLUSION

Bertolotti Syndrome is an uncommon cause of chronic low back pain that may significantly affect an individual's functional capacity and quality of life. In the present case, Ayurvedic management comprising Yog Basti, Patra Pinda Swedana, Dhanwantaram Taila, and internal medications resulted in considerable improvement in pain, stiffness, mobility, and daily activities. The observed clinical benefits may be attributed to the Vatahamaka, Shothara, and Brimhana actions of the therapeutic interventions.

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