

CASE REPORT

Resolution of Chronic Low Back Pain in a Young Male Following Vitamin-D Correction: A Clinico-Radiological Case Study

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Abstract

Chronic low back pain in young adults may, at times, be due to neglected metabolic etiology. A 27-year-old IT professional presented with non-radiating lower back pain that had persisted for about eight months. The pain had failed standard treatments, such as analgesics, rest, and simple physiotherapy. Clinical examination and MRI showed only minimal degenerative changes, which were not enough to explain the severity of symptoms. Further testing with blood work revealed a significant vitamin D deficiency (9.6 ng/mL). High-dose cholecalciferol was initiated along with calcium supplementation, and the patient was advised to enhance sun exposure and follow a consistent physiotherapy program. A dramatic clinical improvement was observed over the following weeks: his visual analog scale (VAS) pain score reduced from 7 to 2, his mobility improved, and follow-up MRI results demonstrated significant resolution. This case highlights the relevance of vitamin D deficiency as a potential etiology in chronic low back pain, especially when imaging findings are inconclusive. Prompt diagnosis and appropriate correction can lead to substantial symptom relief and help prevent chronicity.

Keywords: Chronic low back pain, Vitamin D deficiency, Hypovitaminosis D, Musculoskeletal pain, Metabolic myopathy

1. INTRODUCTION

An estimated 84% of people will experience non-specific low back pain (NSLBP) in their lifetime, making it one of the most prevalent and difficult musculoskeletal disorders seen in clinical practice. A

functional handicap that is severe enough to interfere with daily activities and quality of life is experienced by 11-12% of people, and about 23% of people acquire chronic low back pain (CLBP). Mechanical stressors, including heavy lifting, bad posture, and extended standing, have historically been linked to the high frequency or duration of symptoms; however, new research indicates that mechanical factors alone may not be the only explanation [1]. More and more focus is being placed on systemic and metabolic factors, such as vitamin D insufficiency, as important but little-known causes of musculoskeletal pain syndromes. In terms of muscle physiology and bone mineralization, vitamin D is essential. Vitamin D deficiency can cause osteomalacia and hypovitaminosis D myopathy, a type of muscle weakness that primarily affects the proximal and antigravity muscles. It's significant to note that this myopathy may appear before the typical biochemical indicators of bone demineralization do. Research has shown that high-dose vitamin D treatment significantly improves muscle strength and pain scores in people with vitamin D deficiency, especially in the muscles used for postural stability and movement [2]. The paraspinal and quadriceps muscles, which are crucial for spinal stability, have

2. CASE PRESENTATION

2.1 Patient Profile

A 27-year-old man who works in IT visited the orthopaedic clinic with complaints of ongoing lower back pain that had been bothering him for the past eight months. There was no radiation to the lower

seen the most gains. Despite being linked to severe bone disease and rickets in the past, vitamin D deficiency is nevertheless common throughout the world, particularly in younger, energetic people who do not exhibit traditional risk indicators [3]. Undiagnosed hypovitaminosis D may be mistakenly attributed to mechanical or idiopathic causes in people with chronic, unexplained musculoskeletal pain, even those who are neither old or immigrants, according to research. This case also brings attention to the importance of checking vitamin D levels, specifically 25-hydroxyvitamin D, in patients with ongoing back pain, especially when standard lab tests like alkaline phosphatase come back normal. These traditional markers may not always reveal underlying muscle weakness caused by low vitamin D. A young man suffering from long-standing low back pain that didn't improve with standard treatments showed significant relief and better imaging results after his severe vitamin D deficiency was treated.[4]

The study emphasizes how crucial it is to identify the metabolic reasons for musculoskeletal pain and how useful vitamin D testing is in the diagnostic process for persistent low back pain, especially when conventional tests show no structural abnormalities.

limbs, and the pain was described as dull and agonizing in nature. It began subtly and progressed gradually, getting considerably worse with extended sitting (a posture required by the patient's sedentary work profile) and getting somewhat better with rest.

There was no history of systemic illness, bowel or bladder problems, weight loss, fever, or trauma.

2.2 Clinical Examination

When the patient was examined generally, their BMI was within the normal range at 23.4 kg/m². He didn't seem particularly distressed and was properly fed. When the lumbar spine was examined locally, the L4-L5 region was found to be painful. There was no evidence of spinal deformity or paravertebral muscular spasm. Bilateral negative results from the straight leg lifting test ruled out radiculopathy. Deep tendon reflexes and lower limb motor and sensory assessments were also normal. In particular, the results of Schober's test for lumbar spine flexibility and the FABER (Flexion, Abduction, and External Rotation) test for sacroiliac pathology were both disappointing. These results revealed that neither disc herniation-related nerve root compression nor inflammatory spondyloarthropathy was present.

2.3 Radiological Investigations

There was no sign of facet joint arthropathy, listhesis, or vertebral collapse on plain radiographs of the lumbosacral (LS) spine, which revealed modest disc space narrowing at the L4-L5 level. The L4-L5 intervertebral level of the LS spine showed Pfirrmann Grade III disc degeneration, which indicates mild disc desiccation without appreciable annular fissures or disc height loss. There were no signs of nerve compression, disc bulge, or herniation. While the scans showed some early signs of wear and tear, they

didn't fully explain the severity or long-lasting nature of the patient's pain.

2.4 Laboratory Investigations

Blood tests revealed that his vitamin D level was very low, just 9.6 ng/mL, pointing to a severe deficiency (anything below 10 ng/mL is considered severe). Other important lab values, including calcium, phosphorus, and parathyroid hormone (PTH), were all within normal limits. This suggested there were no clear signs of bone softening (osteomalacia) or a reactive increase in PTH levels.

2.5 Justification of Findings

Since there were no obvious neurological complaints or structural abnormalities visible on the imaging, it was doubtful that the patient's symptoms were primarily caused by inflammation or mechanical issues. It was out that the patient's chronic, nonspecific low back discomfort was likely caused by a significant vitamin D deficit. Because of its effects on calcium homeostasis, neuromuscular function, and muscle strength, vitamin D is crucial for maintaining musculoskeletal health. It is recognized that proximal myopathy, which mostly affects postural muscles including the lower back and pelvic girdle, is caused by hypovitaminosis D.

Although Pfirrmann Grade III degeneration may have a minor role in mechanical discomfort, the patient's quick recovery after vitamin D replenishment (as detailed in the follow-up section) and the intensity of pain in relation to the MRI results strongly suggest a

metabolic etiology, specifically hypovitaminosis D myopathy.

2.6 Diagnosis

The diagnosis of severe vitamin D deficiency-related chronic low back pain was made after a clinical evaluation that was bolstered by imaging and laboratory tests. The L4-L5 intervertebral disc showed some minor degenerative alterations, but not enough to account for the patient's ongoing complaints. A significant shortage was revealed by the notably low serum 25-hydroxyvitamin D [25(OH)D] level of 9.6 ng/mL, which suggested a metabolic component to the musculoskeletal pain.

3. OUTCOME

The patient's recovery in his lower back pain was exceptional, with his pain score reducing from 7 out of 10 to 2. a) He had an increased range of motion and was able to participate in more physically active tasks without restriction; b) His vitamin D blood test was repeated and showed a value of 34.2 ng/mL, confirming that the previous deficiency had been

4. DISCUSSION

Beyond controlling calcium levels and ensuring proper bone health, Vitamin D is also important for muscle and the entire musculoskeletal system (Ceglia, 2009) [5]. The deficiency of Vitamin D can result in muscle weakness, pain, and reduced physical performance, which may exacerbate chronic situations such as lower back pain. Population studies have revealed that individuals suffering the most from chronic health issues like heart diseases,

The overall clinical picture suggested muscle-related pain due to vitamin D deficiency, mostly affecting the spine. There were no signs of nerve involvement, and tests meant to trigger symptoms came back normal.

2.7 Treatment

The patient was started on oral vitamin D (cholecalciferol) at a dose of 60,000 IU once a week for eight weeks. Following this initial stage, he was converted to a monthly maintenance dosage with supplemental calcium. Lifestyle changes were also recommended, particularly reinforcing targeted back exercises on a graded approach.

resolved; c) There was an improvement noted in the follow-up MRI scans showing decreased bone marrow edema, clearer definition of the vertebral endplates, and less bone marrow edema. He was symptom-free after 6 months and did not require analgesics.

cancer, and ongoing musculoskeletal pain, and even sharper rates of mortality (Schöttker et al., 2013) [6]. These observations emphasize how significant keeping vitamin D levels within the normal range is. Some reviews and clinical trials have indicated that the use of vitamin D in acute and chronic pain conditions could ease the pain for some individuals, but does not yield the same results in all cases (Wu et al., 2016; Straube et al., 2015) [7,8]. This case

enhances that argument, after rectifying the deficiency, the patient returned to normal vitamin D levels, which subsequently improved muscle strength, reduced painful stimuli from vitamin D-related muscle dysfunction, and subsided muscular pain.

The consequences of chronic pain may also be lessened by vitamin D supplementation by lowering body inflammation. The immune system is modified, and the body's defense system decreases inflammatory substances known as cytokines that are produced, which means vitamin D can also help with chronic pain (Zhang et al., 2012) [9]. The reduction of such inflammatory factors may explain some pain relief and functional improvement seen after replenishing vitamin D.

6. REFERENCES

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5. **CONCLUSION**
- This instance demonstrates how a vitamin D deficiency may be the root cause of persistent low back pain that can be treated. Significant clinical improvement was achieved with prompt diagnosis and supplementation, underscoring the significance of taking vitamin D levels into account in patients with modest radiological abnormalities and ongoing musculoskeletal problems.
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