BRIEF REPORT

Improvement of Chronic Back Pain or Failed Back Surgery with Vitamin D Repletion: A Case Series

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This article reviews 6 selected cases of improvement/resolution of chronic back pain or failed back surgery after vitamin D repletion in a Canadian family practice setting. Pub Med was searched for articles on chronic back pain, failed back surgery, and vitamin D deficiency. Chronic low back pain and failed back surgery may improve with repletion of vitamin D from a state of deficiency/insufficiency to sufficiency. Vitamin D insufficiency is common; repletion of vitamin D to normal levels in patients who have chronic low back pain or have had failed back surgery may improve quality of life or, in some cases, result in complete resolution of symptoms. (J Am Board Fam Med 2009;22:69–74.)

Back pain is the most common neurological complaint in North America, second only to headache. Chronic back pain is often progressive and the cause may be difficult to determine. In America, more than $50 billion are spent each year on treatment.[1] Low back pain (LBP) and proximal myopathy are also common symptoms of vitamin D deficiency and osteomalacia.[2,3] There are many risk factors for vitamin D insufficiency or deficiency, including lack of sun exposure, inadequate dietary intake, darker skin color, age, obesity, and the use of various medications. The prevalence of vitamin D insufficiency/deficiency is high in Canada (where the patients in this report are located), especially during the winter.

The case reports described in Table 1 were from one solo practice. There were 4 patients who had chronic back pain for more than a year and 2 patients who suffered for more than 3 years from failed back surgery. Repletion of inadequate vitamin D levels (<80 nmol/L) demonstrated significant improvement or complete resolution of chronic LBP symptoms in these patients, and has been reported in literature before.[3,4]

Discussion

PubMed was searched for articles, using the search terms "low back pain," "disk surgery," "musculoskeletal pain," and "vitamin D deficiency." As stated before, LBP is a common condition; it is estimated at approximately 5% of patients presenting in primary care have LBP, many of which become chronic.

Vitamin D is required for the differentiation, proliferation, and maturation of cartilage cells and for the production of proteoglycan synthesis in articular chondrocytes. Restoring vitamin D levels to normal in patients with osteomalcia has resulted in complete resolution of pain within 4 weeks.[5] Improvement in back pain and weakness in patients with osteomalcia has also been noted. Patients who have chronic, nonspecific LBP or have had failed back surgery may have an underlying vitamin D insufficiency/deficiency.[6]

Risk factors for persistence or recurrence of LBP after surgery include infection and smoking. A less common reason is low vitamin D levels. Repletion with 1000 IU/day improves vitamin D status by approximately 20 to 25 nmol/L, and 2000/day IU will improve levels by 40 to 50, except in darker-skinned people, who may require significantly more. Patients with back pain who also have other risk factors for low vitamin D levels may benefit from a screening 25(OH)D level and repletion therapy. Muscle pain has been commonly seen in

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Table 1. Summary of Patient Data: Demographics, Brief Description of Patients, Vitamin D Levels Before and After, and Result of Repletion Therapy

Patient #	Age (years)	Gender	25(OH)D Levels Before Treatment (nmol/l)*	Patient Description§	Symptoms	Vitamin D_3 Dose Used to Treat (IU/d)	25(OH)D Level After Repletion (nmol/l)‖	Symptom Improvement/Comments
1	75	Female	N/A (estimated at 66)†	Pain began after a slip and fall and had persisted for several years. An X-ray showed osteoarthritis of the lumbar spine. Vitamin D was increased to 2000 IU daily and the husband noticed a significant improvement in mood.	Chronic low back pain	1000	91	Some improvement and less use of pain medications.
2	47	Male	N/A (estimated at 70)†‡	This patient had a long history of back pain. He required disc surgery and initially had improvement, but symptoms returned within 6 months. His pain became progressively worse: he had to curtail his usual activities and was no longer able to do yard work or play golf. He used medication for pain control. He was advised that occasionally pain like this can be from insufficiency of vitamin D. A 25(OH)D level was not obtained before treatment. Patient was able to return to his usual activities and had no further back pain. He no longer required any pain medications.	Severe back pain	2000	120	Complete resolution of pain in 4 weeks, no further need for pain medication. Patient stopped the vitamin D for several months and his pain returned only to disappear again after restarting vitamin D.

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Table 1. Continued

3	44	Female	49	This patient had significant back pain for years She was not able to do housework, such as washing the floor or vacuuming, and had other members of the family do this work. She found it difficult to work because of back spasms when she sat for too long and had to do stretching exercises almost every hour. She was not able to participate in some sports activities that she previously enjoyed. Her symptoms of back pain and spasms completely resolved within 3 weeks and she is able to do her housework, sit for longer periods of time without stretches, and participate in sports. Her mood markedly improved and she considers Vitamin D her happy pill, as does her husband.	Chronic severe back pain Muscular pain	5000	171	Complete resolution of pain within 3 weeks; no further need for pain medications.
4	30	Female	18	This patient had significant back pain, which had become worse after pregnancy (a known risk factor for vitamin D deficiency). She was not able to work for a number of years. Each morning she had difficulty getting out of bed because of severe back pain. Her pain was only partially controlled with medication. She was found to have a severe deficiency of vitamin D and her back pain improved within 3 to 4 weeks with 2000 IU of vitamin D; it completely resolved within 6 weeks. She was able to return to work and has been gainfully employed. Her mood improved significantly.	Disabling chronic back pain	2000	72 (did not achieve normal levels even with 2000 IU daily)	Complete resolution of pain; no further need for pain medication

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5	63	Male	20	This patient had a history of four back operations for disc protrusion. The last one was in 1993. His diagnosis was failed back surgery and he was on long-term disability and had to attend a pain management clinic. He was found to be severely deficient in vitamin D. His symptoms completely resolved after six weeks on 4000IU of vitamin D after years of having pain. He was able to reduce his medication but was not able to come off it completely, because of withdrawal headaches and a long history of migraines. He is slowly tapering his pain medications.	Failed back surgery	4000	87	Complete resolution of pain in 6 weeks

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Table 1. Continued

6	52	Male	29	This patient had 2 surgeries for lumbar discs. He developed chronic low back pain after the operations, which never resolved despite using all modalities listed above. He was found to be vitamin D deficient and initially was supplemented with 2000 IU of vitamin D, with no improvement of his symptoms. His vitamin D level was still suboptimal despite taking this dose. The dose was increased to 4000 IU and there was some improvement in pain but it did not completely resolve; he continues to be on pain medication.	Failed back surgery	2000	77 (did not achieve normal levels even with 2000 IU daily)	Some improvement but continued need for pain medication.

*Normal value is >80 nmol/l; insufficient value is <80 nmol/l; deficiency is <25 nmol/l.
†Barger-Lux, MJ, et al. Vitamin D and its major metabolites: serum levels after graded oral dosing in healthy men. Osteoporos Int 1998;8:222–30.
‡A rough estimate of this patient's level before treatment was 65 to 70 nmol/l (400 IU of vitamin D/day will raise levels from 7 to 11 nmol/l), or about 2.5 nmol per 100 IU of vitamin D.
§All patients had tried various pain treatments, including physiotherapy, visiting a chiropractor, acupuncture, or visit to a pain management clinic, all without much benefit.
‖Levels were taken 6 to 12 months after treatment.

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patients with vitamin D deficiency,[5] as well as myopathy, which usually resolves more quickly than bone pain (which may take up to 1 year to resolve).[2]

Physicians should have a high index of suspicion for low vitamin D levels in patients with LBP, and determining the vitamin D status in these patients may be important. In those cases with vitamin D insufficiency/deficiency, repletion of vitamin D may offer dramatic results. Determining vitamin D levels and vitamin D repletion before and after back surgery may be prudent. The patients in this study who responded best used between 4000 and 5000 IU of vitamin D_3/day.

Conclusion

This case series supports information that has recently become apparent in the literature about vitamin D deficiency and its influence on back pain, muscle pain, and failed back surgery. Doses in the range of 4000 to 5000 IU of vitamin D_3/day may be needed for an adequate response.

Placebo-controlled studies looking at outcomes in patients requiring back surgery with supplementation of vitamin D are urgently needed. Likewise, randomized placebo-controlled studies assessing vitamin D status, vitamin D receptor genotyping, and outcomes (using standardized measures of the severity of LBP, function, and quality of life) on repletion of vitamin D in patients with chronic LBP are needed.

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