

## Carpal tunnel syndrome and vitamin B6

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### ABSTRACT

**QUESTION** A 42-year-old woman with carpal tunnel syndrome tells you she has started taking a vitamin B6 supplement to relieve her symptoms. Her work in an automotive parts department involves both lifting moderately heavy packages and typing at a computer terminal. What does the research indicate about vitamin B6 as a treatment option, and what health issues should you discuss with this patient?

**ANSWER** Although its effectiveness is controversial, vitamin B6 is often used as a conservative and adjunct therapy in treatment of carpal tunnel syndrome. Many patients attempt to treat their symptoms with vitamin B6 on their own. Vitamin B6 at less than 200 mg daily is not likely to cause any adverse effects, but patients should be monitored for changes in symptoms, particularly when high doses are taken over long periods.

### RÉSUMÉ

**QUESTION** Une femme de 42 ans souffrant du syndrome du canal carpien vous dit qu'elle a commencé à prendre un supplément de vitamine B6 pour soulager ses symptômes. Elle travaille dans un service de pièces automobiles où elle lève des articles modérément lourds et utilise un clavier d'ordinateur. Que nous dit la recherche à propos de la vitamine B6 comme option thérapeutique et de quelles questions en matière de santé devrions-nous discuter avec cette patiente?

**RÉPONSE** Quoique son efficacité fasse l'objet de controverse, la vitamine B6 est souvent utilisée comme thérapie conservatrice et auxiliaire pour le syndrome du canal carpien. De nombreux patients essaient de traiter leurs symptômes avec la vitamine B6 sans avis médical. La vitamine B6 en doses de moins de 200 mg par jour ne devrait pas causer d'effets indésirables, mais il faut surveiller chez les patients tout changement dans les symptômes, surtout si des doses élevées sont prises pendant de longues périodes.

Conservative treatments for carpal tunnel syndrome (CTS) usually involve a combination of drugs (including corticosteroids), splinting, and activity modification. Before moving to surgery to treat CTS,<sup>1</sup> some patients try alternative treatments, such as vitamin B6 supplementation. Up to 9% of adult women develop CTS.<sup>2</sup> Although CTS has been linked to repetitive strain injury, other health conditions, such as rheumatoid arthritis and type 2 diabetes, could be important causes of CTS.<sup>3</sup> Examining the role of micronutrients, such as vitamin B6, is warranted because these conditions might be related to, and even affect, nutritional status, providing a rationale for such study.

### Potential role of vitamin B6 in CTS

Vitamin B6 is involved in several metabolic pathways of neural function, including neurotransmitter synthesis, amino acid metabolism, and sphingolipid synthesis and breakdown. During the 1970s and 1980s, studies were undertaken to examine the potential benefit of treating CTS with vitamin B6. Overall, results were equivocal, and most studies, including 1 case study, had only a small number of subjects. The main conclusions to be drawn from these studies are that, in some cases,

vitamin B6 could improve symptoms of CTS because of an underlying nerve condition not previously diagnosed that might be related to vitamin B6 status or to the fact that vitamin B6 acts as an analgesic by raising pain thresholds.<sup>2</sup>

Aufiero et al<sup>2</sup> reviewed 14 supplementation trials and noted that the results of 8 studies supported vitamin B6 supplementation and the results of 6 studies were unclear or non-supportive. None of the 14 studies provided level I evidence, and many of the supportive studies involved only a small number of subjects. Some of the findings and recommendations in these studies are described below.

Bernstein and Dinesen<sup>4</sup> suggested that vitamin B6 supplementation substantially improved pain scores even though electrophysiologic data showed only mild improvement, supporting the theory that vitamin B6 raises pain thresholds. Ellis et al<sup>5</sup> found that, in at least 7 patients, a primary deficiency (dietary inadequacy) of vitamin B6 was linked to CTS. In a case study, Folkers and colleagues<sup>6</sup> determined that 2 mg/d of vitamin B6 improved patients' clinical condition, but that 100 mg of vitamin B6 daily for a longer period allowed patients to avoid hand surgery. Spooner et al<sup>7</sup> observed that the

most discouraging symptoms, pain, numbness, and tingling at night, were not alleviated in patients given 200 mg of pyridoxine for 12 weeks.

In a retrospective review of 994 CTS patient charts, Kasdan and Janes<sup>8</sup> found that, in the 494 patients whose treatment included vitamin B6 (100 mg twice daily), the rate of symptom alleviation was much higher (68%) than among patients who did not receive vitamin B6 (14.3%). Retrospective studies have their limitations though, such as whether vitamin B6 status was measured and how, so despite the number of charts reviewed, no firm conclusions can be drawn.

Despite the uncertainty about the effectiveness of various conservative treatments, including vitamin B6, they are still recommended as complementary treatments to postpone hand surgery. Holm and Moody<sup>9</sup> suggest that CTS treatment should include nonsteroidal anti-inflammatory drugs, nighttime splinting, ergonomic workstation review, and 200 mg of vitamin B6 daily.

### Recommendations on vitamin B6 supplementation

The recommended daily intake of vitamin B6 is 2 mg or less for all age, sex, and lifestage groups, and the upper limit (UL) has been set at 100 mg/d. Pyridoxine's main toxicity symptom is sensory neuropathy, but any symptom disappears rapidly at doses below 1 g/d. Most studies indicate that no neuropathy is brought on by doses between 40 and 500 mg/d, so the lowest observed adverse effect level (LOAEL) has been established at 500 mg/d. Because several reports, albeit with methodologic flaws, reported adverse effects at lower doses, the no observed adverse effect level (NOAEL) has been set at 200 mg/d. An uncertainty factor of 2 was applied to the NOAEL of 200 mg/d to derive the UL of 100 mg/d.<sup>10</sup>

Given that vitamin B6 is still recommended by some practitioners, at least as an adjunct therapy and that some patients in an attempt to avoid surgery choose to take vitamin B6 supplements in quantities that exceed the UL, family physicians might find it helpful to understand how the UL was calculated and what aspects of patients' health should be monitored when they take vitamin B6 supplements.

What this means, then, is that patients taking up to 200 mg/d of vitamin B6 are unlikely to suffer adverse health effects from supplementation. For patients who notice an improvement in their CTS symptoms, physicians can recommend a gradual reduction in dose after about 3 months' therapy at the higher dose. Patients taking

vitamin B6 in amounts greater than 200 mg/d, especially if their intake approaches the LOAEL of 500 mg/d, should be monitored closely for signs of sensory neuropathy. Patients must be advised to use caution with respect to dose, however, because symptoms of sensory neuropathy could be confused with worsening symptoms of CTS. Patients taking high doses of vitamin B6 who present with nerve problems accompanied by depression, fatigue, impaired memory, irritability, headaches, difficulty walking, or bloating should be evaluated for vitamin B6 toxicity as all these symptoms suggest it.<sup>11</sup>

Family physicians should be able to help patients choose supplementation regimens wisely because many patients will opt for conservative treatments rather than more radical treatments, such as surgery, for CTS. ❁



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