

Carrot Man: A Case of Excessive Beta-Carotene Ingestion

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ABSTRACT

In this case report, the authors describe a 48-year-old male who complained to his primary care physician of abdominal discomfort and yellow/orange skin discoloration. Physical examination was normal except for some mild mid-abdominal discomfort (no observed skin color changes). An abdominal CT scan indicated a colon that was full of stool. Laboratory studies indicated elevated liver enzymes. Upon further questioning, the patient reported ingesting 6–7 pounds of carrots per week

to facilitate his dieting effort. The patient was diagnosed with constipation, hypercarotinemias, and possible vitamin A toxicity. Following the cessation of excessive carrot ingestion, his liver enzymes normalized within 1 month. © 2012 by Wiley Periodicals, Inc.

Keywords: beta-carotene; carrots; dieting; liver enzymes

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Introduction

Overweight, obesity, and dieting behaviors seem to be integral themes in the fabric of American society. For example, according to the US National Health and Nutrition Examination Survey in 2003–2004, 17% of children and adolescents were overweight and 32% of adults were obese.¹ In addition, using a survey format in a randomized sample of over 38,000 college students, investigators found that 50% of respondents were attempting to diet.² Finally, in a cross-sectional population-based telephone survey, 15.2% of adults reported having used a weight-loss supplement—8.7% in the past year.³ In the context of these statistics, obesity remains contributory for a number of medical morbidities (e.g., diabetes, high blood pressure, cardiovascular disease, joint stress, hyperlipidemia), and abdominal obesity has been shown to significantly relate to cardiovascular mortality.⁴ Therefore, attempts to lose weight are oftentimes justified, despite the dif-

iculty in doing so. In the following case report, the authors describe a previously obese adult male who disclosed an unusual approach to dieting—an approach that resulted in several unexpected physical findings.

Case Report

Mr. C. was a 48-year-old white male who presented to his family physician for the evaluation of a swollen abdomen and periodic yellow-orange discoloration of his skin. In support of his concerns, the patient indicated that others had commented about his odd skin color. Symptoms had been present for 3–4 months. He denied nausea, changes in appetite, vomiting, diarrhea, constipation, melena, or hematochezia. Mr. C. reported some mild, intermittent, mid-abdominal discomfort. The patient denied any alcohol or drug use. Mr. C. reported that, during the previous year, he had successfully lost 100 pounds “without much effort.”

At the time of the initial evaluation, Mr. C. was 5'8" and 152 pounds (BMI = 23.1). On physical examination, vital signs were normal. The patient appeared well nourished and developed, and in no acute distress. Overall skin color appeared normal and there was no evidence of jaundice or icterus. The cardiorespiratory and neurological examinations were normal. Examination of the abdomen confirmed some distention but no tenderness.

In the aftermath of the initial examination, the patient's primary care physician ordered a comprehensive metabolic panel as well as a CT scan of the abdomen and pelvis to evaluate for the presence of

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a mass. The CT results indicated normal findings with the exception of, “stool... throughout the entire colon... raising the concern for constipation.” The laboratory studies, including albumin and protein, were normal except for an elevation in two liver enzymes: alanine aminotransferase (ALT; 98 U/L; normal range 24–63 U/L) and lactate dehydrogenase (LDH; 260 U/L; normal range 100–190 U/L).

During a follow-up appointment approximately 2 weeks later, the patient disclosed eating 6–7 pounds of carrots per week for a period of months. Due to his skin discoloration and the elevation in liver enzymes without other contributory etiologies (e.g., hepatic disease), the patient was diagnosed with hypercarotinemias, possible hypervitaminosis A, and constipation. The patient was advised to curtail his excessive ingestion of carrots. One month after the initial evaluation, follow-up liver enzyme studies were normal.

Discussion

The use of carrots to aid in dieting efforts has been previously recognized and documented by clinicians in the field of eating disorders.^{5,6} For example, in an Italian study, the prevalence of carotenoderma (i.e., yellow-orange discoloration of the skin due to beta carotene) was 21% in a consecutive sample of 24 patients with eating disorders.⁷ However, the prevalence rate in the US is far lower and the presented case is somewhat unusual in that the subject was a middle-aged previously obese male who also evidenced an associated rare elevation in liver enzymes.

Beta-carotene is a constituent of carrots as well as other fruits and vegetables (e.g., squash, cantaloupe, pumpkin, sweet potatoes). It is the most common carotenoid in the normal human diet. Beta-carotene is also called “provitamin A” because it consists of two molecules of vitamin A, which become hydrolyzed and released during excursion through the gastrointestinal tract. There is no recommended daily allowance for beta-carotene.

Excessive ingestion of beta-carotene may cause an orange-yellow discoloration of the skin (particularly in the stratum corneum), sweat, and sebum. The discoloration is most noted in areas of potential skin perspiration, such as the nasolabial folds, palms of the hands, and soles of the feet. (This may explain why the patient was not evidencing overt diffuse changes in skin color at the time of the initial evaluation.) The sclerae are

not affected, as in jaundice (an indicator of hepatic disease).

In addition to discoloration of the skin, Mr. C. had an elevation in liver enzymes. On rare occasion, elevated levels of beta-carotene have been associated with changes in the livers of humans.⁸ These types of changes have also been empirically documented in animal studies.^{9,10}

Despite the conversion of beta-carotene to vitamin A, excessive ingestion of beta-carotene is not typically associated with vitamin A toxicity. However, this patient may have also had some mild vitamin A toxicity due to high exposure over a lengthy period of time. A single 7½ inch carrot has 8,666 IU of vitamin A, which is nearly twice the daily value or recommended daily allowance. More than three carrots per day is likely to saturate the body’s ability to store vitamin A. While acute toxicity is unlikely (i.e., a single dose of more than 660,000 IU), mild chronic toxicity (10 times the daily values) may have been present. Signs and symptoms of chronic vitamin A toxicity include dry skin, nausea, headache, fatigue, irritability, hepatomegaly, and alopecia. In some cases, hepatotoxicity may lead to cirrhosis. Symptoms possibly related to vitamin A toxicity in this patient were abdominal discomfort (possibly also due to constipation) and mild liver enzyme elevation.

Conclusion

Dieters remain creative in their attempts to lose weight. In this case, the excessive ingestion of carrots was the elected dieting method. While hypercarotinemias has been referred to as a marker for disordered eating,¹¹ it may also occur in routine dieters. To our awareness, this behavior and symptomatic manifestation has not been reported in a noneating-disordered individual. Clinicians need to be aware of the possible excessive ingestion of carrots, particularly in the presence of localized yellow-orange skin changes in the nasolabial folds, palms of the hands, and soles of the feet.

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