

Image Diagnosis: Yellow Palms and Soles: Look Beyond the Eyes and Think Beyond Hyperbilirubinemia

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CASE PRESENTATION

A 57-year-old man with diabetes presented to our clinic with 3 months of yellowish discoloration of his palms and soles. For the previous 5 years he had been on treatment for type 2 diabetes with metformin 500 mg twice daily. He denied history of jaundice, pruritus, loss of appetite, nausea, or any other symptom. He had not recently consumed carotene-rich foods such as carrots, spinach, lettuce, broccoli, or winter squash. On examination there was no icterus. Both of his palms (Figure 1) and soles (Figure 2) showed yellowish discoloration. Laboratory tests revealed a total bilirubin of 1.5 mg/dL, aspartate transaminase 36 IU/mL, alanine transaminase 40 IU/mL, thyroid stimulating hormone 2.01 IU/mL, and serum creatinine 1.4 mg/dL. Beta carotene levels were 64 mcg/dL (9-52 mcg/dL). The patient's fasting blood sugar was 183 mg/dL, and his hemoglobin A_{1c} (glycosylated hemoglobin) was 8.5%. We referred him to an endocrinologist for diabetes control. The endocrinologist changed the patient's medications to a combination of metformin, sitagliptin, glimepiride, and pioglitazone. After 16 weeks of treatment, our patient's hemoglobin A_{1c} was 6.7%, and the yellowish discoloration had almost disappeared from his soles and had been reduced by 75% in his palms.

DISCUSSION

Our patient's yellow palms and soles were attributed to diabetes mellitus. Other causes of yellow palms and soles, like carotenemia¹ caused by ingestion of nutritional supplements, hypothyroidism,² and renal² and hepatic failure, were ruled out. Yellow



Figure 1. Yellowish discoloration of both palms.



Figure 2. Yellowish discoloration of both soles.

palms and soles in diabetes are caused by impaired metabolism of carotene in the liver. The exact frequency of this phenomenon is unknown, but approximately 10% of patients with diabetes and elevated carotene levels have yellowish discoloration of the skin.² Excessive blood glucose levels impair the liver's ability to convert carotene

to vitamin A.^{3,4} Another postulation is that proteins that have high turnover time, like dermal collagen, undergo glycosylation and give a yellowish hue to the skin.⁵ Yellowish discoloration is visualized most clearly at the palms and soles because the abundance of sweat glands, minimal interference by melanocyte pigment, and the presence of a thick, horny layer of skin causes maximal accumulation of carotene at these sites.⁶ ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

How to Cite this Article

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References

1. Takita Y, Ichimiya M, Hamamoto Y, Muto M. A case of carotenemia associated with ingestion of nutrition supplements. *J Dermatol* 2006 Feb;33(2):132-4. DOI: <https://doi.org/10.1111/j.1346-8138.2006.00028.x>.
2. Julka S, Jamdagni N, Verma S, Goyal R. Yellow palms and soles: A rare skin manifestation in diabetes mellitus. *Indian J Endocrinol Metabol* 2013 Oct;17(Suppl 1):S299-300. DOI: <https://doi.org/10.4103/2230-8210.119625>.
3. Monk BE. Metabolic carotenemia. *Br J Dermatol* 1982 Apr;106(4):485-7. DOI: <https://doi.org/10.1111/j.1365-2133.1982.tb04546.x>.
4. Mikkelsen CS, Mikkelsen DB, Lindegaard HM. [Carotinaemia in patient with excessive beta-carotene food-intake and dysregulated diabetes mellitus]. [Article in Danish]. *Ugeskr Laeger* 2009 Jan 26;171(5):315-6.
5. Lin JN. Images in clinical medicine. Yellow palms and soles in diabetes mellitus. *N Engl J Med* 2006 Oct 5;355(14):1486. DOI: <https://doi.org/10.1056/NEJMicm050780>.
6. Cohen HL. Observations on carotenemia. *Ann Intern Med* 1958 Feb;48(2):219-27. DOI: <https://doi.org/10.7326/0003-4819-48-2-219>.