

Discoloration and Bullous Lesions on the Hands

Verónica Olvera-Cortés, MD; Nancy Pulido-Díaz, MD; Álvaro Rhony Orellana-Arauco, MD



A 71-year-old man presented for evaluation of discoloration and blisters of 1 day's duration on both hands that were more severe on the right hand. The lesions were preceded by a sensation of stinging pain. One hour prior to the onset of symptoms, he had peeled approximately 100 walnuts. He had no relevant medical history. Physical examination revealed dark brown to black discoloration involving both hands (top) extending to the fingernails. Blisters filled with clear fluid also were present on the fingers (bottom).



WHAT'S THE DIAGNOSIS?

- Addison disease
- fixed drug eruption
- hemochromatosis
- hyperpigmentation due to antineoplastic agents
- irritant contact dermatitis and hyperpigmentation due to juglone

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From the Dermatology Department, Hospital de Especialidades, Centro Médico Nacional La Raza, Instituto Mexicano del Seguro Social.

The authors report no conflict of interest.

Correspondence: Verónica Olvera-Cortés, MD, Seris St, Azcapozalco, La Raza, 02990 Mexico City (dra.veronica.olvera@gmail.com).

THE DIAGNOSIS:

Irritant Contact Dermatitis and Hyperpigmentation Due to Juglone

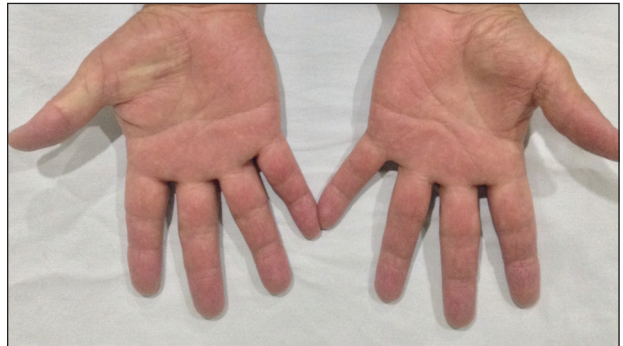
Clinical suspicion, resemblance to similar cases, and questioning the patient about his behavior prior to the onset of symptoms led to the diagnosis of irritant contact dermatitis and hyperpigmentation due to juglone in this case. Walnuts belong to the botanical family of Juglandaceae and are the seed of the trees of the genus *Juglans*, which encompass 24 different species. The nuts from all species included in this genus are edible.¹ The most well-known species of walnut is the common walnut (*Juglans regia*), which is native to the Balkans region in southeast Europe, southwest and central Asia extending to the Himalayas, and southwest China.¹

Walnut fruits are rich in phenolic compounds. Thirteen phenolic compounds have been identified in walnut husks including chlorogenic acid, caffeic acid, ferulic acid, sinapic acid, gallic acid, ellagic acid, protocatechuic acid, syringic acid, vanillic acid, catechin, epicatechin, myricetin, and juglone.² Juglone, also called 5-hydroxy-1,4-naphthoquinone, is a yellow naphthoquinone pigment that occurs naturally in the leaves, roots, husks, and bark of plants in the Juglandaceae family, particularly the black walnut (*Juglans nigra*).^{3,4}

Juglans regia, also known as English or Persian walnut, contains potent chemical constituents and has been used to treat diverse ailments such as diarrhea, hyperglycemia, cancer, infectious diseases, anorexia, asthma, helminthiasis, arthritis, sinusitis, stomachache, and skin disorders (eg, eczema; acne; alopecia; scalp itching, peeling, and dandruff), and as an adjunctive emollient and itch-relieving treatment.^{5,6}

The juice of walnut shells from the *J regia* tree have been used for centuries to color the skin and hair.⁷ Irritation and skin hyperpigmentation have been associated with topical walnut use.⁵ As a naphthoquinone, juglone also is reported to exert some toxic effects on normal tissues including acute irritant contact dermatitis.⁴ As the active ingredient from the green husk of walnuts, it has been considered a strong sensitizer in guinea pigs,¹ but contact sensitivity in humans rarely has been reported.⁷

Juglone is known to react with the keratin proteins present in the skin to form sclerojuglonic compounds, which have UV protection properties and a red-brown color.⁸ The resulting reaction gives rise to chromophore groups with a strong pigmentation action that absorbs visible colors (especially violet) and reflects yellow and red, resulting in the coloration ranging from red to deep brown.⁷ The mechanism of skin pigmentation does not involve the melanocytes. Hyperchromia involving the hands—particularly the palms, fingers, and nails—lasts 1 to 4 weeks depending on the intensity of the



Complete resolution of hyperpigmentation and irritant contact dermatitis was noted at 1-month follow-up.

pigmentation. Housewives and agricultural workers are the at-risk population.⁷ Acute irritant contact dermatitis and hyperpigmentation due to juglone mainly has been observed during the early autumn in agricultural workers and housewives who remove the green husk of walnuts.⁹

Addison disease can present with pigmentary changes in the skin and mucous membranes; it also is accompanied by fatigue, anorexia, weakness, and weight loss, none of which were noted in our patient. A fixed drug eruption tends to have an annular or oval form and is related to the intake of medication (mostly antibiotics) up to 2 weeks prior to the onset of the dermatosis. Our patient did not have any chronic disease or take any medication prior to the dermatosis and lacked the classic clinical morphology of this entity. Hemochromatosis affects not only the skin but also the liver, myocardial fibers, and other internal organs. Our patient did not have any clinical manifestations of liver or heart failure or diabetes mellitus.

Our patient was treated with drainage of the blisters. Due to the extent of the dermatosis, prednisone 25 mg/d also was initiated. The patient was instructed to avoid direct contact with the husk of walnuts. At 1-month follow-up, the hyperpigmentation had resolved with no relapse (Figure).

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