Ficus carica L photodermatitis: a report of five cases with histopathologic study and review of the literature.

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Abstract

Phytophotodermatitis is a condition caused by contamination of the skin with phototoxic plant substances, followed by exposure to ultraviolet rays. *Ficus carica* L 1753, belonging to the *Moraceae* family, can be responsible for acute photodermatitis. We present five cases of photodermatitis caused by contact with *Ficus carica* L and subsequent exposure to sunlight. A histopathologic study and review of the literature are included.

Keywords: Ficus carica L, fig, 5-methoxypsoralen, phytophotodermatitis, psoralen

Introduction

Phytophotodermatitis occurs after contamination of skin with phototoxic plant substances, usually furocoumarins, and exposure to ultraviolet light [1-4]. *Ficus carica* L 1753, a plant belonging to the *Moraceae* family, has been responsible for many cases of phytophotodermatitis [5-24].

Case Synopsis

Our caselist consists of five men, aged 32, 9, 46, 38, and 70 years, patients 1-5, respectively, who were admitted to our dermatology unit because of an acute rash that, according to their medical history, appeared two to four hours after contact with trunk, leaves, fruit, and latex of *Ficus carica* L. The rash was characterized by erythematous vesicles, of different morphology and size, located on the upper arms (**Figure 1**). The skin eruption was accompanied by a burning sensation. All patients were subjected to biopsy for histopathologic examination and direct immunofluorescence. All patients were successfully treated with two compresses/day of cool physiological solution and hydrocortisone butyrate cream (2 applications/day for 5 days). After recovery, the patients were subjected to patch tests of the SIDAPA (Società Italiana di Dermatologia Allergologica, Professionale e Ambientale) baseline series, along with leaf juice and shoot sap of *Ficus carica* L. The procedure followed European Society of Contact Dermatitis guidelines.

The histopathologic appearances were similar in all patients. It was characterized by spongiosis, exocytosis, eosinophilic necrotic keratinocytes, and lymphohistiocytic infiltrate in the superficial dermis (**Figure 2**). Direct immunofluorescence were negative. By patch tests, one patient developed a mild erythematous reaction to shoot sap at day 1. Photo-patch tests (300nm, with exposure of 2 minutes) were positive (erythematous vesicular reaction) to leaf juice and shoot sap in all patients.

Case Discussion

Ficus carica L can be responsible for irritant contact dermatitis, caused by the presence in the latex of some enzymes, such as amylase [10], protease [10], and ficin [12,17]. Small hairs (trichomes) located on

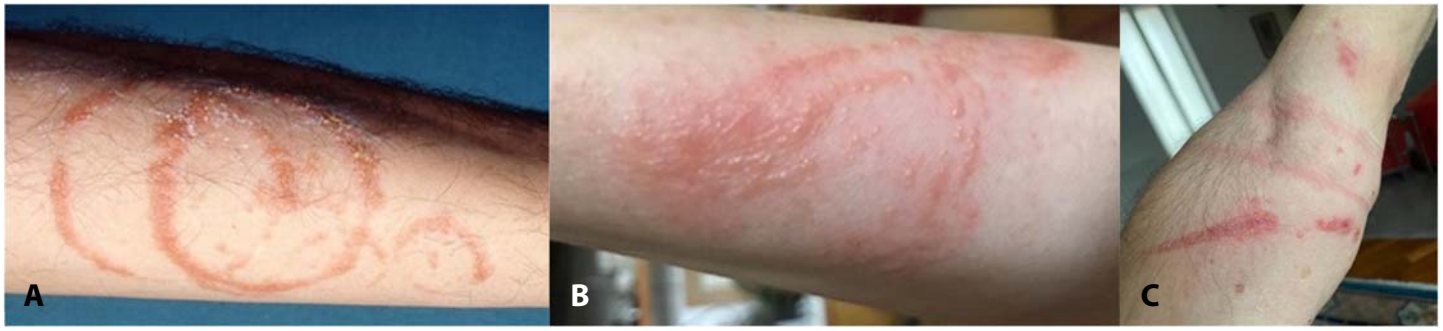

Figure 1. *Patients **A)** 1, **B)** 4, and **C)** 5: erythematous-vesicular lesions on a forearm.*

the undersurface of leaves can also be irritant [12]. Allergic contact dermatitis is uncommon. Phototoxic dermatitis is the most frequent clinical manifestation caused by *Ficus carica* L. The presence and levels of psoralens in *Ficus carica* L were studied: psoralen and 5-methoxypsoralen are present in appreciable quantities in the leaf and shoot sap, but they are not detected in the fruit or its sap [6]. This is the reason that the response follows contact with the leaf and shoot sap but not with the fruit sap [6]. Psoralen and 5-methoxypsoralen are more concentrated in the leaf sap in comparison with the shoot sap [6,17]. Psoralen levels are several times higher than those of 5-methoxypsoralen [6]. Lower concentrations of both compounds are present in autumn compared to spring and summer [6]. The higher content of psoralen and 5-methoxypsoralen in spring and summer can be responsible for the increased incidence of fig dermatitis during these seasons [6]. However, *Ficus carica* L also contains 8-methoxypsoralen. Biopsies have been very rarely performed in patients with *Ficus carica* L photodermatitis [18,20]. However, this is important when the diagnosis is obscure because the presence of eosinophilic necrotic keratinocytes, the so-called sunburn cells, confirms that this is a typical phototoxic reaction. As previously mentioned, these cells were observed in all our patients.

Ficus carica L phototoxic dermatitis is characterized by the acute appearance of erythema, edema, and vesicles on the skin that has contacted *Ficus carica* L followed by voluntary [10,11,13,20] or accidental exposure to ultraviolet rays. Severe phototoxicity secondary to the application of fig leaf extracts used as a tanning agent has been reported [10,11,13]. Erythema and edema are frequently followed by the appearance of vesicular and bullous lesions, of different morphology and size, accompanied by a burning sensation and itching. Some bizarre clinical presentations can sometimes mimic child abuse [9]. The final clinical result is often post-inflammatory hyperpigmentation that can persist for weeks or months. Rare cases of erythroderma [13], hemolytic anemia [11] and retinal hemorrhage [11] have been reported. Contrary to what one might think, *Ficus carica* L photodermatitis is rare in greengrocers: they are aware of the risks of handling figs.

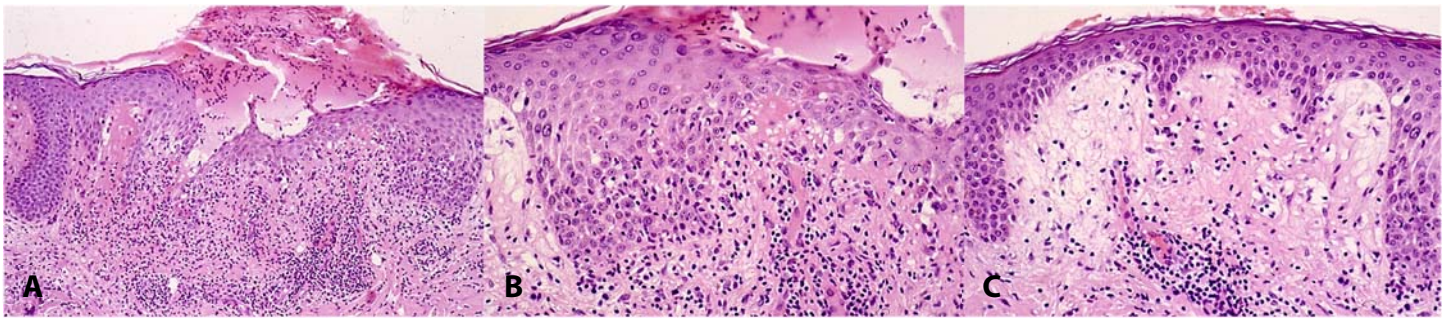

Figure 2. *H&E histopathologies. **A)** Patient 4: parakeratosis, spongiosis and spongiotic vesicles; perivascular lymphohistiocytic infiltrate in the superficial dermis, 40×. **B)** Patient 4: spongiosis and exocytosis in the epidermis, associated with eosinophilic necrotic keratinocytes, 100×. **C)** Patient 5: spongiotic vesicles, 100×.*

Conclusion

In conclusion, we reported five cases of *Ficus carica* L photodermatitis. The results of photo-patch tests (erythematous vesicular reaction to leaf juice and shoot sap in all patients) and histopathology (presence of eosinophilic necrotic keratinocytes in all patients) confirm that this dermatitis is a typical phototoxic reaction.

Potential conflicts of interest

The authors declare no conflicts of interest.

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References

1. Kavli G, Volden G. Phytophotodermatitis. *Photodermatol*. 1984;1:65-75. [PMID: 6397734].
2. Held JL. Phytophotodermatitis. *Am Fam Physician*. 1989;39:143-6. [PMID: 2650498].
3. Bowers AG. Phytophotodermatitis. *Am J Contact Dermatol*. 1999;10:89-93. [PMID: 10357718].
4. Bark KM, Heo EP, Han KD, et al. Evaluation of the phototoxic potential of plants used in oriental medicine. *J Ethnopharmacol*. 2010;127:11-8. [PMID: 19818392].
5. Ippen H. Phototoxische Reaktion auf Feigen. *Hautarzt*. 1982;33:337-9. [PMID: 7107277].
6. Zaynoun ST, Aftimos BG, Abi Ali L, et al. *Ficus carica*; isolation and quantification of the photoactive components. *Contact Dermatitis*. 1984;11:21-5. [PMID: 6744838].
7. Goitre M, Bedello PG, Cane D, Alovisi V. Fitofotodermatite da fico. *Giorn It Derm Vener*. 1984;119: 435-6. [PMID: 6241607].
8. Lembo G, Lo Presti M, Balato N. Phytophotodermatitis due to *Ficus carica*. *Photodermatol*. 1985;2:119-20. [PMID: 4034418].
9. Watemberg N, Urkin Y, Witztum A. Phytophotodermatitis due to figs. *Cutis*. 1991; 48:151-2. [PMID: 1935241].
10. Micali G, Nasca MR, Musumeci ML. Severe phototoxic reaction secondary to the application of a fig leaves' decoction used as a tanning agent. *Contact Dermatitis*. 1995;33:212-3. [PMID: 8565479].
11. Bollero D, Stella M, Rivolin A, et al. Fig leaf tanning lotion and sun-related burns: case reports. *Burns*. 2001;27:777-9. [PMID: 11600261].
12. McGovern TW. The fig – *Ficus carica* L. *Cutis*. 2002;69:339-40. [PMID: 12041811].
13. Bassioukas K, Stergiopoulou C, Hatzis J. Erythrodermic phytophotodermatitis after application of aqueous fig-leaf extract as an artificial suntan promoter and sunbathing. *Contact Dermatitis*. 2004;51:94-5. [PMID: 15373856].
14. Derraik JGB, Rademaker M. Phytophotodermatitis caused by contact with a fig tree (*Ficus carica*). *N Z Med J.* 2007;120:1-5. [PMID: 17867224].
15. Fitchett TEJ. Regarding the 'Phytophotodermatitis caused by contact with a fig tree (*Ficus carica*)' case report. *N Z Med J. 2007*;120(1261):U2719. [PMID: 17853938].
16. Derraik JGB, Rademaker M. Phytophotodermatitis caused by contact with a fig tree (*Ficus carica*). *N Z Med J*. 2007;120:1. [PMID: 17721568].
17. Polat M, Oztas P, Dikilitas MC, Alli N. Phytophotodermatitis due to *Ficus carica*. *Dermatol Online J*. 2008;14:9. [PMID: 19265622].
18. Bonamonte D, Foti C, Lionetti N, Rigano L, Angelini G. Photoallergic contact dermatitis to 8-methoxypsoralen in *Ficus carica*. *Contact Dermatitis*. 2010;62:343-8. [PMID: 20557340].
19. Hussein A, Shugaev I. Phototoxic response to *Ficus carica* leaf and shoot saps. *Isr Med Assoc J*. 2012;14:399-400. [PMID: 22891407].
20. Son JH, Jin H, You HS, et al. Five cases of phytophotodermatitis caused by fig leaves and relevant literature review. *Ann Dermatol*. 2017;29:86-90. [PMID: 28223753].