

Flagellate dermatoses

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INTRODUCTION

Flagellate dermatoses are uncommon figurate dermatoses characterized by parallel linear or curvilinear arrangement simulating the marks of whiplashes. The term flagellate dermatitis was originally introduced for bleomycin-induced dermatitis. However, with time other causes for this pattern have been recognized [Table 1].

True flagellation/mechanical

Flagellation has been used in various religions for penance or punishment.^[1] Whipping has also been used to “discipline” children, but in the modern context flagellate marks on children should arouse a suspicion of child abuse.^[2] In adults, these could be suggestive of partner/spouse abuse or torture. Sadomasochistic behavior involves voluntary whipping of oneself or the partner for sexual gratification.^[3] Artefactual whiplash marks may be produced for tangible or intangible gains in malingering and other psychiatric illnesses.

Chemotherapy induced flagellate dermatitis and pigmentation

Bleomycin is a polypeptide chemotherapeutic agent with predominant adverse reactions in the cutaneous and respiratory systems presumably due to the lack

of inactivating enzyme, hydrolase in these tissues.^[4] The common mucocutaneous lesions described are pigmentation (~50%), alopecia (~50%)^[5] and flagellate dermatitis (8-66%).^[4] This starts as diffuse, pruritic, flagellate, erythematous plaques over the trunk and extremities (scratch dermatitis) a few hours to 6 months after administration of the drug [Figure 1]. The rash heals with persistent flagellate hyperpigmentation [Figure 2]. Pigmentation has also been described without pruritus or rash. Although it usually appears after a cumulative dose >100 U; it has also been reported after doses as small as 14 U used for intralesional injections of verrucae.^[6] The pathogenesis of bleomycin dermatitis remains speculative and various theories such as micro-trauma, inflammatory oncotoxicity, increased melanogenesis, heat-recall and reduced epidermal turnover allowing prolonged melanocyte-keratinocyte contact have been proposed.^[4,7,8] There is no specific treatment, but avoidance of bleomycin leads to eventual clearance over months to years. However, re-exposure may produce an aggravated reaction. Peplomycin is a bleomycin derivative with reduced pulmonary toxicity that is used for lymphomas and prostatic carcinoma. It has also been implicated in flagellate erythema by mechanisms similar to bleomycin.^[7]

Docetaxel is a taxane with a high rate of cutaneous reactions including flagellate dermatitis. The reaction is apparently suppressed by corticosteroids, but withdrawal of steroids leads to reappearance of lesions.^[9] Mahmoud and Eide reported a case of flagellate dermatitis from bendamustine, an alkylating agent approved in 2008 for the treatment of chronic lymphocytic leukemia and non-Hodgkin lymphoma.^[10]

Rheumatological diseases

Dermatomyositis is known to produce linear lesions variously described as centripetal flagellate erythema,^[11] zebra-like striped erythema,^[12] and linear streaks^[13]. In contrast to bleomycin-induced flagellate dermatitis, erythema is more pronounced

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| Access this article online | |
|---|----------------------------------|
| Quick Response Code: | Website: www.ijdvl.com |
|  | DOI: 10.4103/0378-6323.129397 |
| | |

How to cite this article: Bhushan P, Manjul P, Baliyan V. Flagellate dermatoses. Indian J Dermatol Venereol Leprol 2014;80:149-52.

Received: May, 2013. **Accepted:** August, 2013. **Source of Support:** Nil. **Conflict of Interest:** None declared.



Figure 1: Bleomycin induced flagellate dermatitis



Figure 2: Bleomycin induced flagellate pigmentation at same sites as in Figure 1

than pigmentation. The trauma of scratching appears to play an important role, as in the bleomycin induced rash.^[7] The histopathology is usually non-specific, but perinuclear vacuolization of the arrector pili muscle has been described.^[14] The significance of this rash in relation to the prognosis or underlying neoplasm remains unclear. The rash generally disappears with corticosteroid therapy.^[14]

Adult-onset Still's disease is an autoimmune disease occasionally associated with flagellate erythema. Histopathology of flagellate lesions shows mild perivascular infiltration of mononuclear cells and neutrophils, along with some dyskeratotic cells in the epidermis.^[15,16]

Toxin-induced

Shiitake mushrooms (*Lentinus edodes*) are commonly used in Asian cuisines and are known to produce flagellate dermatitis (toxicoderma).^[17] The rash is very pruritic, predominantly truncal and does not generally heal with pigmentation.^[7] Toxicoderma is probably caused by a lentinan-like polysaccharide, which is denatured by cooking and thus occurs only on eating raw or under-cooked mushrooms.^[17] The prick and patch tests are negative. The intermittent intake of shiitake mushrooms can delay the diagnosis by years.^[18]

Cnidarians (Portuguese man-of-war and jellyfish)^[19-22] contain nematocysts in their tentacles which discharge by an osmotic process when injected in the prey. Most human envenomations are caused by *Anthozoa* (anemones and corals), *Hydrozoa* (Portuguese man-of-war and hydroids), *Scyphozoa* (the true

| Table 1: Causes of flagellate dermatoses |
|---|
| True flagellation/mechanical |
| Religious punishment |
| Torture |
| Sexual pleasure (somasochism) |
| Child/partner abuse |
| Dermatitis artefacta |
| Chemotherapy induced flagellate dermatitis and pigmentation |
| Bleomycin |
| Peplomycin |
| Docetaxel |
| Bendamustine |
| Rhematological disorders |
| Dermatomyositis |
| Adult-onset still's disease |
| Toxin-induced |
| Shiitake mushroom ingestion (raw or undercooked) |
| <i>Cnidarian</i> (Portuguese man-of-war and jellyfish) stings |
| <i>Paederus</i> and other insects |
| Other pruritic dermatoses |
| Dermatographism |
| Excoriations by pruritic conditions |
| Phytophotodermatitis |
| Poison ivy dermatitis |
| Hypereosinophilic syndrome |
| Chikungunya fever induced flagellate pigmentation |
| Idiopathic flagellate pigmentation |

jellyfish) or *Cubozoa* (the box jellyfish). Initially, the victim experiences a severe burning pain in skin that comes in contact with the tentacles followed within minutes by a zigzag, whip-like pattern of raised red wheals 2-3 mm wide. Though about 80% of cases are limited to skin manifestations, some have systemic effects including malaise, vomiting, dyspnea and tachycardia.



Figure 3: Neurotic excoriations mimicking a flagellate pattern

Rove beetles of family *Staphylinidae* and genus *Paederus* contain a vesicant, pederin and produce lesions only when they are crushed on the skin. A wheal forms at the sites followed by a blister within 12-24 h, which may be a linear “whiplash dermatitis.”^[23]

Other pruritic dermatoses

Many other itchy dermatoses may present with linear marks simulating flagellate dermatitis [Figure 3]. Dermatographism may produce a flagellate pattern [Figure 4].^[21] Phytophotodermatitis and poison ivy dermatitis may cause flagellate lesions where the leaves have brushed the cutaneous surface.^[24]

Hyper eosinophilic syndrome

May *et al.*, have described two men with HIV infection who had unusual cutaneous manifestations of hyper eosinophilic syndrome, exfoliative erythroderma and linear flagellate plaques.^[24]

Chikungunya fever induced flagellate pigmentation

Chikungunya fever commonly causes hyperpigmentation such as accentuation of melasma, pigmentation of nose, periorbital melanosis and irregular and flagellate patterns on the trunk and extremities. It is primarily considered a post-inflammatory response with the chikungunya virus probably triggering intraepidermal melanin dispersion or retention.^[25,26]

I idiopathic flagellate pigmentation

Pise *et al.*, have reported a case with flagellate pigmentation without any systemic illness, pruritus or drug intake.^[27] The flagellate marks did not follow the lines of Blaschko. It appears that rarely, flagellate



Figure 4: Dermatographism in a flagellate pattern

pigmentation may be idiopathic; though the diagnosis should be one of exclusion.

CONCLUSION

Flagellate dermatoses are morphologically intriguing diseases produced by different etiological factors. Knowing the various causes of this pattern of skin eruption can help in the diagnosis and management of patients alarmed by this strange-looking eruption.

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