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Superficial Lymphangitis after Arthropod Bite: A Distinctive but Underrecognized Entity?

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Key Words
Superficial lymphangitis · Insect bite · Arthropod

Abstract
Background: Acute bacterial lymphangitis is a common occurrence after skin damage. This diagnosis is often made in case of red linear streaks after arthropod bites, leading to the prescription of oral antibiotics. In this setting, noninfectious superficial lymphangitis after arthropod bites, an eruption rarely mentioned in the medical literature, appears as a diagnostic challenge. ***Objective:*** Our purpose was to study the clinical and histopathological features of this underrecognized condition. ***Methods:*** We collected the observations of six consecutive patients seen between the years 2003 and 2006, who developed an acute linear erythematous eruption along lymphatic vessels, mimicking common bacterial lymphangitis. Standard histological examinations were completed by immunopathological staining using the monoclonal antibody D2-40, a highly selective marker of lymphatic endothelium. Extensive review of the literature about acute noninfectious superficial lymphangitis was performed. ***Results:*** The clinical presentation and histological findings excluded an infectious etiology and suggested superficial lymphangitis after an arthropod bite in all the observations. ***Conclusions:*** This article analyzes the clinical and histological features of noninfectious superficial lymphangitis after arthropod bite, a benign underrecognized condition mimicking common bacterial lymphangitis. Physicians should be aware of this benign reaction to avoid the useless prescription of antibiotics.

Introduction

Acute lymphangitis is mainly caused by streptococcal infection after skin damage [1, 2]. Other bacterial, parasitic or viral organisms have been identified but noninfectious causes are poorly documented. Since 2003, we have seen 6 patients with linear eruptions of the trunk or upper limbs mimicking superficial acute bacterial lymphangitis, but with no apparent initial cutaneous infection. We hypothesized that these eruptions are an underrecognized form of specific lymphangitis after arthropod bites.

Methods

Cases of superficial lymphangitis were identified in a prospective study between the years 2003 and 2006. Cases thought to be streptococcal lymphangitis (e.g. presence of fever, enlarged lymph node) were excluded. Evaluation included both complete physical examination and standard blood tests (except for patient 4).

Skin biopsies were taken from the linear eruption in 5 patients (cases 1, 2, 3, 5 and 6) and from the initial macule in 2 patients (cases 1 and 6).

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Fig. 1. Patient 1: multiple red linear streaks on the right breast, sometimes with comma-like or tadpole appearance.
Fig. 2. Patient 2: unique erythematous linear streak of the torso.

Immunostaining studies were performed with the monoclonal antibody D2-40, a highly selective marker of lymphatic endothelium [3], as described by Niakosari et al. [4], in order to localize more precisely the perivascular inflammatory infiltrate. Lymph node sections were used as a positive control.

Results

Clinical Findings

No fever or enlargement of the lymph nodes was present in any of the 6 patients. The eruption is detailed for each patient.

Case 1

A 60-year-old woman consulted for a linear, red and slightly burning eruption on the chest that lasted for 48 h. The patient had first noticed multiple red papules, extending in a red streak toward the axillary area, 12 h earlier. She acknowledged a similar episode on her back 6 months earlier. She denied any drug use and confirmed that no wound, spindle injury, contact with plants or tick bite had preceded the lesions. Physical examination revealed about 10 round erythematous macules, measuring 1–3 cm in diameter and all with well-defined borders and a central hemorrhagic punctum. The eruption was strictly localized to the right breast with no systematized pattern. Each macule was prolonged in a linear fashion toward the right axillary fold by an erythematous discontinuous band, 2–5 mm wide, up to 10 cm long, and sometimes with a comma-like appearance (fig. 1).

Case 2

A 20-year-old man was referred for a single linear erythematous dermatitis. The eruption had started as a pruritic red papule on the abdomen and extended in a linear fashion toward the axillary area within 12 h. The patient could not recall having been bitten. His medical history was unremarkable. Physical examination revealed a 5-cm plaque with a purpuric center, extending as an erythematous linear and discontinuous nonindurated band measuring 2 cm in width and 30 cm in length (fig. 2).

Case 3

A 35-year-old man presented with an erythematous linear dermatitis on the trunk and the right arm that lasted for 8 days. He denied any insect bite, drug intake or local trauma. Physical examination revealed 20 erythematous macules centered by a hemorrhagic punctum. Each lesion was prolonged by a red discontinuous streak varying in length (1–30 cm) and width (0.5–1 cm): streaks arising on the arms and on the torso above the umbilicum converged toward the axillary areas whereas infraumbilical lesions extended toward the nearby groin (fig. 3).

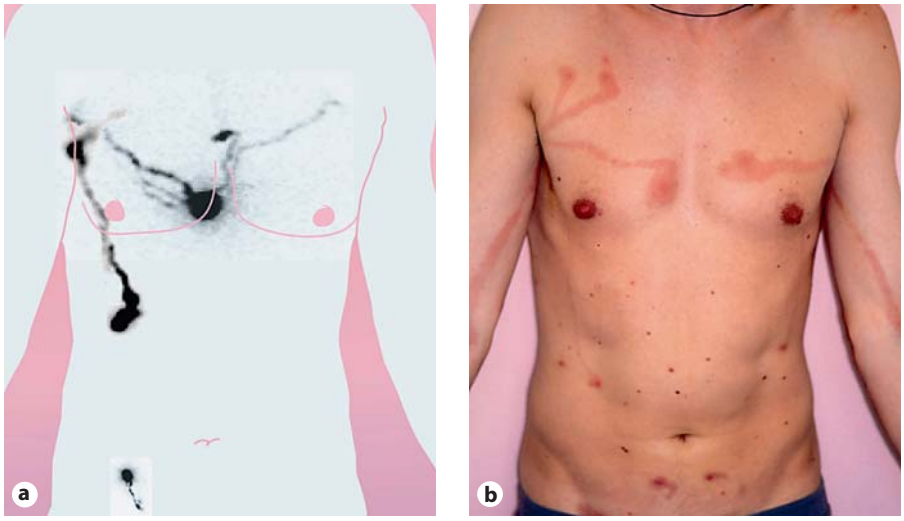

Fig. 3. Lymphatic drainage from the initial site of injury on the anterior thorax and abdomen to the draining sentinel lymph node in the regional node fields. **a** Representative scintigraphic images of patients with melanoma. Intradermal injection of 20 MBq ^{99m}Tc antimony sulfide colloid at 3 sites on the anterior trunk (the right costal margin, the right lower abdomen and the epigastric area) was followed by dynamic imaging at 1 frame/min for 10 min. The summed 10-min dynamic image is displayed to highlight the lymphatic collectors passing to the axilla bilaterally and to the right groin. Sentinel lymph nodes are seen in each node field (reprint with permission, Roger F. Uren, Sydney, N.S.W., Australia). **b** Patient 3: multiple red streaks extending from an initial inflammatory macule toward the ipsilateral superficial draining lymph node; axillary folds for initial sites of the upper limbs and torso, groin folds for those of the hypogastric area.

Case 4

A 61-year-old woman consulted for an erythematous and tender eruption on the chest that lasted for a few days. She denied any insect bite, drug intake or local trauma. Examination disclosed an infiltrated, targetoid, erythema-multiforme-like, erythematous papule on the left breast, with a violaceous center prolonged by a linear and erythematous band extending toward the left axillary area.

Case 5

A 16-year-old girl was referred for an infectious bacterial lymphangitis on the right arm. She had witnessed the spider biting her arm and had noted the development of a red pruritic macule within 36 h. The lesion extended in a linear fashion within 3 days. Oral antibiotics and corticosteroids had been prescribed despite lack of fever or nearby lymph node enlargement. Examination revealed an erythematous plaque, centered by a hemorrhagic punctum and prolonged by a red streak extending toward the axillary fold (fig. 4).

Case 6

A 20-year-old woman consulted for a linear eruption on the left arm. She had first noticed a round and pruritic macule on the left forearm 2 days earlier. She denied any wound or insect biting. Within 24 h, the lesion began to spread into a large erythematous plaque that was pruritic. It then extended in a linear band toward the elbow over the following 2 days. Examination revealed an erythematous plaque, 10 cm in diameter, prolonged by a linear red discontinuous eruption, 2 cm in width, toward the cubital fold (fig. 5).

Outcome

The eruptions resolved spontaneously within a few days except for patient 1 (4 weeks). Patient 2 was lost to follow-up.

Laboratory Findings

The laboratory findings – full blood, erythrocyte sedimentation rates and C-reactive protein values – were normal.

Histopathological and Immunopathological Findings

Biopsies of the erythematous macules (cases 1 and 6) revealed a superficial and deep mixed inflammatory infiltrate, with numerous eosinophils and scattered mastocytes predominant around dermal vessels, hair follicles

and sebaceous glands (fig. 6a, b). The epidermis disclosed a moderate inflammatory infiltrate with slight spongiosis. No polarizable insect mouth part was visible in the sections after examination over multiple levels. Biopsies taken from the linear eruptions (cases 1, 2, 3, 5 and 6) revealed a similar perivascular infiltrate limited to the papillary dermis.

Immunostaining with the D2-40 monoclonal antibody was used to differentiate the capillaries from the lymphatics. The lymphatics of the entire dermis were lined with a single layer of strongly immunoreactive endothelial cells, whereas the walls of the adjacent capillaries were negative. The inflammatory infiltrate was seen around vessels and sebaceous glands and was predominant around blood vessels close to lymphatic channels (fig. 6c, d). Focal positive immunostaining of the basal layer of the epidermis was noted, as previously reported by Niakosari et al. [4].

Discussion

The pattern of these linear lesions was highly suggestive of superficial skin lymphangitis. Each red streak extended from an initial inflammatory macule toward the draining lymph node (fig. 3). Moreover, our cases shared similar clinical features with classic poststreptococcal lymphangitic streaks, including variable width ranging from a few millimeters to several centimeters, tenderness and irregular discontinuous shape. Larva migrans was excluded in the absence of creeping progression of the lesions or tortuous pattern. Lymphatic filariasis and phytophotodermatitis [5] were also easily ruled out because of the clinical history. Mondor's disease or superficial migratory thrombophlebitis was discarded because it usually presents indurated and painful papule-shaped cords or nodules with prethoracic localization and histological findings of vein thrombosis.

Acute lymphangitis is mainly caused by group A *Streptococcus* infection. It presents a single streak triggered by skin damage and is characterized by prominent clinical signs including fever, chills and enlarged lymph nodes, contrasting with the restricted area involved. Increased biological inflammatory parameters are classically noted. In our cases, good general condition, absence of lymph node enlargement, inefficacy of antibiotics (1 case) or rapid spontaneous regression and normal biological inflammatory parameters did not suggest a bacterial etiology of the lymphangitis [1].

Fig. 4. Patient 5: wide erythematous linear streak of the right arm extending from an initial red macule.

Fig. 5. Patient 6: wide linear pink streak extending from a large initial macule toward the cubital fold on the left forearm.

Although most of our patients could not recall having been bitten by an arthropod, several indications of post-arthropod-bite eruption were present: pruritus (4 cases), nonsystematized lesions, tender macules centered by hemorrhagic points, and histological findings of mixed inflammatory infiltrate with eosinophils and mastocytes localized around vessels or sebaceous glands. Noninfectious superficial lymphangitis after arthropod bites is cited in dermatology textbooks as a 'rare' occurrence [6] 'in the apparent absence of secondary infection' [7] without other clinical or histological detail. Smith and Honig [8] reported an observation of lymphangitis after an arthropod bite, with no fever or lymph node enlargement. The lesion resolved after oral intake of antibiotics and was consequently attributed to bacterial infection. Uhara et

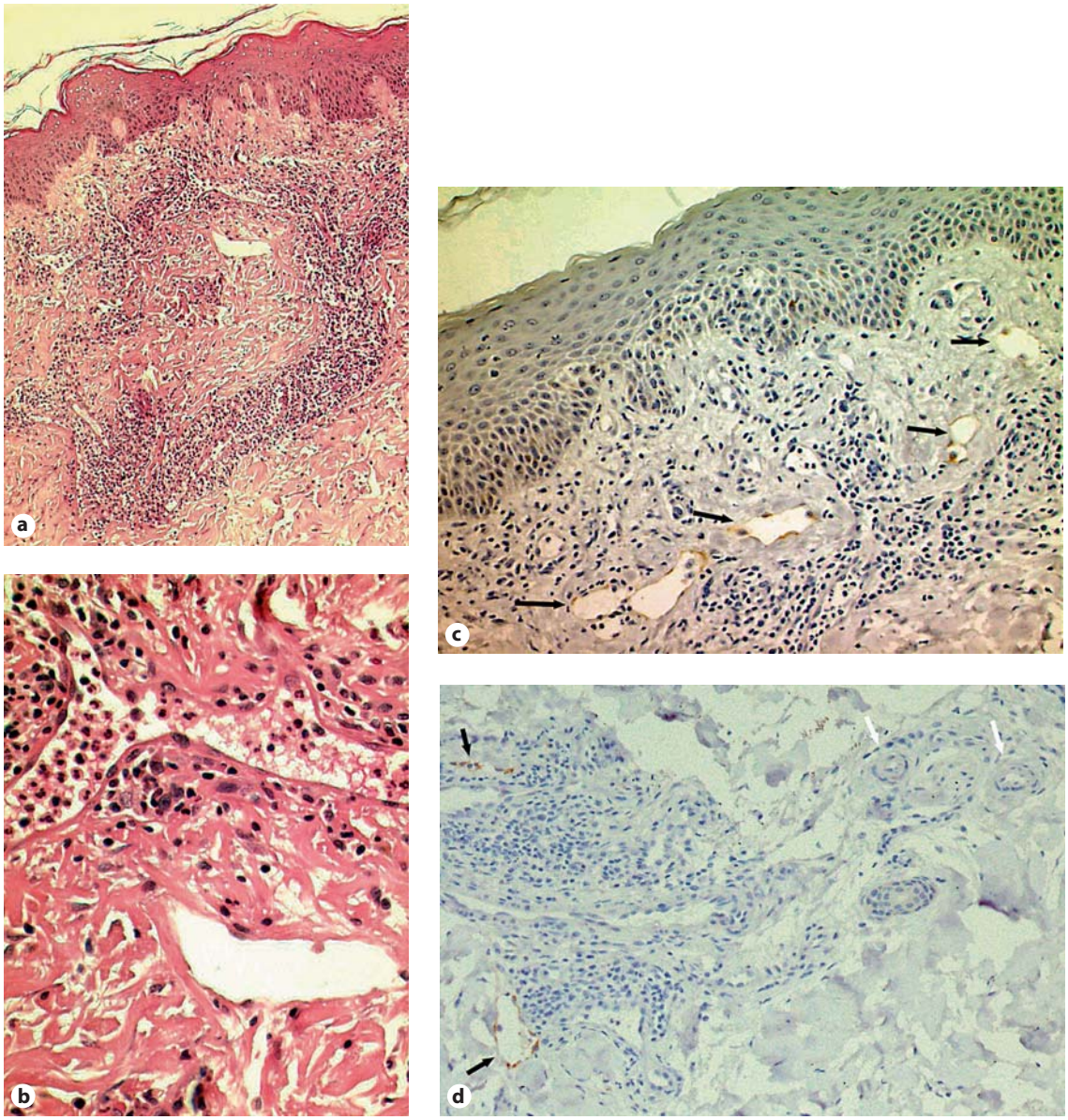

Fig. 6. a, **b** Histopathological specimens from the initial erythematous macule: a dense superficial and deep mixed inflammatory infiltrate with numerous eosinophils and scattered mastocytes was seen around dermal vessels, hair follicles and sebaceous glands, whereas the epidermis was normal. Standard HE staining. **a** Original magnification ×100. **b** Original magnification ×200 (closer view). **c**, **d** Immunostaining using the D2-40 monoclonal antibody on histopathological specimens from the macule: positive immunostaining of the endothelial walls of the dermal lymphatics (black arrows) and absence of immunostaining of the adjacent blood capillary wall (white arrows); inflammatory infiltrate around blood vessels close to lymphatics. **c** Original magnification ×200. **d** Original magnification ×400.

al. [9] noted 2 cases of lymphangitis of the lower limb after insect bites of the foot but gave no detail regarding the exact etiology or infectious status. Abraham et al. [10] recently described the occurrence of acute multiple erythematous streaks in a 62-year-old man, also living in the South of France, and concluded secondary lymphangitis after an insect bite or sting. The authors postulated the implication of an infectious agent such as *Staphylococcus aureus*, despite the absence of bacteriological evidence, as well as a toxic or an allergic process in the pathogenesis of the lymphangitis. Kano et al. [11] described 3 observations of linear eruption following lymphatic courses with

lymph node enlargement secondary to minor injury. Both topics and bacterial agents were suspected in the pathogenesis because of positive bacterial culture from the wound *(S. aureus)* and histological findings of spongiotic dermatitis with interface dermatitis.

Noninfectious dermatitis following a lymphatic course has been described after lymphatic opacification by Evans blue [12] or a radiopaque iodized substance [13], use of topical cantharidin [14, 15] or intralesional bleomycin [16] in the treatment of verruca vulgaris, accidental administration of polysaccharide [17] and local corticosteroid injection [18]. In our observations, a toxic or allergic process induced by an arthropod bite can be hypothesized, with local injection of a toxin contained in the secretion. The linear spread of the inflammation might be due to migration of inflammatory cells induced by contiguous diffusion of the toxin and/or mediators from the lymphatics adjacent to the superficial dermis. The protracted and truncated course could be explained by either the progressive dilution of the toxin or the extinction of the allergic reaction. The incubation period between the initial lesion and the subsequent linear eruption (24–48 h) was consistent with both mechanisms. The presence of eosinophils and mastocytes in the inflammatory infiltrate is nevertheless more indicative of an immunoallergic process than direct toxicity. Further evidence was provided by immunochemical investigations with D2-40, which demonstrated an inflammatory infiltrate predominant around blood vessels close to lymphatics. This suggested the dissemination of the allergen from sites of primary contact via lymphatic and blood circulation, as described in contact dermatitis [19]. According to Kano et al. [11], *S. aureus* could play a role, after skin damage, in triggering an inflammatory response induced by allergens. Unlike these authors, we did not experience an apparent infection at the initial site of injury.

In conclusion, we analyzed 6 cases of secondary superficial lymphangitis after arthropod bite, a benign underrecognized condition mimicking common bacterial lymphangitis, with no evidence for an infectious process. Physicians should be aware of this benign reaction to avoid the useless prescription of antibiotics.

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