A case of tinea incognita and differential diagnosis of figurate erythema

Julia-Tatjana Maul1, Philipp W. Maier1, Florian Anzengruber, Carla Murer, Philipp P. Bosshard, Katrin Kerl, Lars E. French, Alexander A. Navarini*  

Department of Dermatology, University of Zurich, Gloriastrasse 31, CH-8091 Zurich, Switzerland

ARTICLE INFO

Keywords:  
Figueate erythema  
Tinea  
Misdiagnosis

ABSTRACT

A patient with tinea incognita is presented together with a review of the literature of figurate erythema. Figurate lesions are emblematic for dermatology and perhaps the most picturesque efflorescences. The differential diagnosis can be broad and sometimes challenging. Many clinical entities with resembling primary and secondary efflorescences have to be considered as differentials and can be due to anti-infectious, paraneoplastic, allergic, autoimmune or other immune reactions.

1. Introduction

Few physicians can successfully master the clinical challenge of figurate erythema (FE). FE are non-scaling or scaling, usually non-pruritic, annular or arciform, erythematous eruptions that have a tendency to spread centrifugally within hours to days. Their colour can range from slight pink to deeply violaceous, and they are usually characterized histologically by a dense lymphohistiocytic infiltration surrounding superficial and deep dermal vessels. Usually, the papillary and reticular dermis are affected.

The etiology of FE is unknown but thought to be immune-related, most likely due to a hypersensitive immune reaction to antigens of infectious, drug-related, neoplastic or environmental origin. The FE group sensu stricto includes erythema anulare centrifugum, erythema marginatum, erythema migrans and erythema gyratum repens. The differential diagnosis (Fig. 1) can be broad and sometimes challenging, and include more than 30 conditions [1].

2. Case

A 40-year-old saleswoman with known atopic eczema of mild intensity presented with an itching, livid-erythematous patch in the left gluteal region, infiltrated at the edge with serum crusts that had slowly enlarged centrifugally during 7 months until it reached 10 × 7 cm in size (Fig. 1A) at the day of presentation (day 0). Furthermore, on the medial side of the right knee, the patient had noticed a round, 3 × 4 cm erythematous patch with small, grouped pustules at the edge since 6 months.

The patient reported very strong pruritus that had persisted for the whole period of 7 months when the lesion in the left gluteal region had first appeared. The patient had tried topical fusidic acid (day−48 until −39 and −15 until −5) as well as topical (clobetasol propionate) (day −38 until day −20) and systemic steroids (prednisone) (day −20 until day −15), which led to temporary improvement. However, a relapse occurred and lesions slowly enlarged centrifugally, even though the patient continued topical steroids. The patient did not take any other medication, but further medical history revealed a type I hypersensitivity to pollen and crustaceans.

An external histology (day −48) revealed perivascular lymphocytic-histiocytic and eosinophilic infiltrates in all dermal layers and in the superficial parts of the subcutis. In addition, the epidermis was somewhat hyperkeratotic, and some neutrophil granulocytes and small intracorneal serum deposits were detectable. PAS staining showed no fungal hyphae, and mycosis was thus not diagnosed. However, a bacterial swab of the lesion revealed Staphylococcus aureus.

Upon consultation at our clinic, we performed a review of the differential diagnosis of figurate erythema, looking for signs of infection, malignancy or other systemic diseases. A differential blood count revealed erythrocyte macrocytosis that was however considered unlikely to contribute to the skin condition. Signs of autoimmunity and systemic infection including ANA, anti-SS-A, anti-SS-B, anti-transglutaminase, anti-endomysia, anti-gliadin-IgA as well as HIV serology and fecal parasitology were inconspicuous. A chest x-ray and a sonography of the abdomen and lymph nodes only showed an enlarged right submandibular lymph node, but no signs of malignancy.

Topical steroids (clobetasol propionate) were paused and a biopsy with direct immunofluorescence was performed (day +2). Directly afterwards, the symptoms exacerbated, with the appearance of multiple
25 °C) a dermatophyte was isolated which was identified as a species of 
serous papules and blisters. In scales from the gluteal lesion, fungal 

Fig. 1. Differentials and patients' lesion. A: Hyperergic mycosis at the left gluteal region in herein presented immunocompetent patient. B: Erythema annulare centrifugum (EAC). C: Erythema annulare. D: Erythema gyratum. E: Erythema nodosum. F: Rowell's Syndrome. G: Erythema chronicum migrans. H: Erythema necroticans migrans (courtesy of Oliver Wilde, Gilching, Germany). I: Erythema exsudativum multiforme. J: Annular Urticaria.

histology. Lymphocytic infiltrates of Jessner (LLI) and lupus er- 
ythematous tumor (LET) can both present with arciform urticarial plaques and block-like lymphocytic inflammatory infiltrates with (LET) or without (LLI) mucin deposition. Rowell's syndrome, the association of LE and EEM, is characterized by annular, succulent or bullous lesions on the trunc, face and neck [4].

If the epidermis is not involved, but the border of the figurate er- 
ythematous lesion appears dense upon palpation, a granulomatous le- 
sion should be considered. Granuloma annulare is the most common of 
these and its border is composed of multiple small papules. It occurs on 


do hands, feet and extensor surfaces. A biopsy shows palisaded granulomas 
with central necrobiosis and increased mucin deposition. A variant is 

the elastolytic giant cell granuloma of Hanke that produces large an- 
nular plaques on sun-exposed skin with central atrophy and hypo-
pigmentation. Histology demonstrates absence of elastic fibers in the 
center of the lesion and elastophagocytic giant cells in the periphery. 
Sarcoidosis can also produce annular plaques of brownish colour that 
are most often found on the face and are composed histologically of 
sarcoidal granulomas. Leprosy looks quite similar clinically and is 
usually characterized by hypoesthesia in the center of the lesion. Drug 
reactions can also produce annular granulomatous lesions, e.g. the in-
terstitial granulomatous reaction that is most often due to anti-
hypertensives or lipid-lowering agents but can also be associated with 
certain forms of autoimmune diseases. It is characterized by palisading 
granulomas surrounding small collagenous deposits [1].

Papulosquamous figurate erythematous lesions reveal additional 
epidermal involvement histologically. Tinea corporis is defined by an-
nular plaques with a sharply defined, scaly border, facultative pustules 
at the edge of the lesion [5], and dermatoophytes in the stratum cor-


dine Central clearing and peripheral enhancement causes annular or 
arcuate lesions, furthermore the fusion of the lesions can result in gy-
rating patterns [6]. The most frequent pathogen of dermatomycoses 
worldwide is Trichophyton rubrum [7]. Tinea corporis is by far the most 
common dermatosis within the list of differentials of FE, perhaps apart 
from psoriasis, and should be sought and excluded first. Erythema an-
nulare centrifugum (EAC) lesions are sterile but can be triggered by 
fungal infections such as tinea pedis. EAC is not a specific clin-
icopathological entity; it rather represents a clinical reaction pattern of 
unidentified etiology. It is assumed that the EAC is a general term for 
many different clinical-histological reaction patterns. It initially pre-
sents with an erythematous patch or urticarial papules, which spread 
centrifugally. It often shows a trailing scale that corresponds to focal 
parakeratosis and spongiosis in histology. Due to centrifugal migration, 
confluence of single lesions and central clearing, EAC can have an an-
nular and arciform appearance. This effect makes EAC the emblematic 
representative of figurate erythema [8]. Erythema gyratum repens is a 


rare paraneoplasia that looks like EAC painted on the skin with broad 
strokes in a wood-grain pattern. It also has a moving edge that wanders 
about one cm per day [9]. Resolving pityriasis rubra pilaris resembles 
erythema gyratum repens and its histology typically shows checker-
board-like ortho- and parakeratosis. Erythrokeratoderma variabilis and 
some bullous conditions are important differentials as well. Because 
pityriasis rosea can also produce annular scaly plaques and is relatively 
common, it should be considered as well. It is commonly located on the 

posterior trunk, partly in a Christmas-tree distribution and starts with a 
comparatively large herald plaque. Lichen planus produces a central 

brownish hyperpigmentation and can have mucosal involvement. The 
main histological finding is a band-like lymphocytic infiltrate at 
dermal-epidermal junction and hypergranulosis. Annular lupus er-
ythematous (LE), characterized by photosensitivity also shows inter-
face dermatitis. Discoid LE favours the face, the subacute-cutaneous LE 
the upper extremities and the upper trunk. Seborrheic dermatitis stays 
within the seborrheic areas and is less well demarcated than psoriasis, 
which shows annular scaly plaques with slow expansion and sharp 
edges. In the histology of psoriasis, neutrophil infiltrates in epidermis 
and parakeratosis are typically observed. Ichthyosis linearis
circumflexa in Netherton syndrome is associated with atopic diathesis, highly elevated serum IgE and its erythematous plaques are bordered by double-edged scales [1].

If the lesions are covered by scales of variable severity, the figurate erythematous lesion could be annular lichenoid dermatitis of youth, whose clinical features include red-brownish annular plaques with central hypopigmentation, and, histologically, a lichenoid infiltrate. Secondary syphilis looks clinically alike and is accompanied by flu-like symptoms. Mycosis fungoides in the patch and plaque stage can also have annular erythematous plaques. The histology is quite characteristic in typical cases with chain-like infiltrates of atypical lymphocytes ("indian file"), plasma cells and eosiophilin in the dermis as well as epidermotropism of lymphocytes.

Pustular lesions can be differentiated based on clinical features and histology. Pustular psoriasis can have an annular pattern and is characterized by fast-growing erythematous borders with pustules. The histology reveals neutrophilic infiltrates and pustules. IgA pemphigus shows pustules in a circinate pattern. The histology is comparable to pustular psoriasis with additional intercellular epidermal IgA deposition. Ofuji’s disease, the eosinophilic pustular folliculitis is described pustular psoriasis with additional intercellular epidermal IgA deposits. The histology is comparable to typical cases with chain-like inclusions in the epidermis. The histology is quite characteristic in typical cases with chain-like inclusions in the epidermis.

Annular erythematous plaques. The histology is quite characteristic in typical cases with chain-like inclusions in the epidermis. The histology is quite characteristic in typical cases with chain-like inclusions in the epidermis.

As a result of disease progression, the plaques enlarge and become more annular or circinate. In some cases, the plaques may coalesce to form larger annular lesions. The histology reveals neutrophilic infiltrates and pustules. IgA pemphigus shows pustules in a circinate pattern. The histology is comparable to pustular psoriasis with additional intercellular epidermal IgA deposition. Ofuji’s disease, the eosinophilic pustular folliculitis is described pustular psoriasis with additional intercellular epidermal IgA deposits. The histology is comparable to typical cases with chain-like inclusions in the epidermis. The histology is quite characteristic in typical cases with chain-like inclusions in the epidermis.

Another differential diagnosis of figurate erythema are erosive and vesiculo-bullous lesions such as erythema multiforme (EM) or more severe forms such as Stevens-Johnson syndrome. Nectric keratinocytes and inflammation are demonstrated in histology. Less common is the necrotic migratory erythema, which is associated with liver or gastrointestinal disorders and clinically shows erosions and crusting mirrored by histologic findings of erosions and edema. Bullous pemphigoid has tense blisters and pruritic annular urticarial plaques with typical IgG and C3 deposits in the basement membrane zone (BMZ). Linear IgA bullous dermatosis is clinically comparable but shows linear deposits of IgA in the BMZ instead. Epidermolysis bullosa simplex, Dowling-Meara subtype has a mutation in the genes encoding keratin 5 or 14 and produces epidermotropism of lymphocytes.

Purpuran annularis telegangiectoides Majocchi pursues petechiae and telangiectasias in annular shape and is located mainly on the legs. In histology, perivascular infiltrations of lymphocytes and extravasated erythrocytes are present. A leukocytoclastic vasculitis with annular, erythematous to purpuric, oedematous plaques is known as acute haemorrhagic edema of infancy. Lastly, perforating dermatoses can also look like figurate erythema, namely elastosis perforans serpiginosa with transdermal elimination of elastic fibers.

3.2. Differential diagnosis in our patient with figurate erythema

Applying the presented strategy for the differential diagnosis of figurate erythema to the presented case, we had observed long-standing (> 24 h), slowly enlarging, roundish plaques with epidermal involvement and sharply defined, scalloped border, as well as dried pustules. A tumor screen was negative. The lesions were in region with little sun-exposure. No blisters or purpura were present. Taken together, the likely diagnosis was the number of patients with fungal infections is substantial and growing; at least 5–10% of dermatological consultations worldwide involve this disease [7]. However, the majority of those infections are local, most notably affecting the nails. Persistent or chronically recurrent tinea corporis due to Trichophyton rubrum in immunocompetent patients on the contrary is rare and often missed. The reason of misdiagnosis include but are not limited to the few subtle differences in the clinical presentations of tinea corporis and FE (for example erythema annulare). While tinea corporis classically presents itself as an annular erythematous plaque with a raised edge, erythema annulare is typically characterized by one or several indurated, erythematous or violaceous annular plaques on the extremities. The subtlety of the differences in clinical presentation represent a challenge for clinicians who rarely see such cutaneous disorders.

As a result, misdiagnosis can occur in any primary outpatient setting, which is why it is important to re-evaluate patients with chronic annular skin lesions on a regular basis and, if in doubt, refer them to a specialized center (university clinic). A biopsy and a mycological examination of skin scrapings including a direct microscopic examination, e.g. a potassium hydroxide (KOH) mount, and a fungal culture can help in most cases to distinguish between FE (for example erythema annulare) and tinea corporis. However, both the microscopic examination and the fungal culture can be false-negative, due to i) sampling errors, i.e. the specimen does not contain the fungus or insufficient amount of specimen, ii) non-adequate handling, transport and storage of specimen, iii) prior anti-fungal therapy, iv) unexperienced staff or v) limited sensitivity of the method itself. Based on several studies, the sensitivity of a KOH mount and culture has been estimated to be in the range of 60–85% and 40–60%, respectively [12–14]. It is therefore recommended to repeat mycological examinations when results initially are negative and a fungal infection cannot be ruled out.

If misdiagnosed and treated with steroids (which unfortunately happened to our patient, too), tinea corporis may change its clinical presentation and become a tinea incognita because topical steroids often suppress local immune responses. We consider our patient immunocompetent, based on her detailed medical history, our investigation of the infiltrating cells, as well as the differential blood count that did not reveal any anomalies. However, the changes in the local immune response in patients with tinea corporis undergoing topical steroid therapy certainly deserve further investigation.

In conclusion, a thorough review of the presented case led to the diagnosis of tinea corporis, which had been missed initially. This case illustrates that a thorough review of the differential diagnoses of FE, critical evaluation of the prior diagnosis, and repeated investigations (analysis of scales for tinea and skin biopsy) is valuable in establishing the correct diagnosis of FE.

Conflict of interest

There are no conflicts of interests.

Acknowledgement

We want to thank Oliver Wilde, Gilching, Germany for his support.

References

[1] J.J. Rios-Martin, L. Fernandez-Pulido, D. Moreno-Ramirez, Approaches to the dermatopathologic diagnosis of figurate lesions, Actas Dermosifiliogr. 102 (2011) 316–324.
[2] S. de Rospinis, M. Tonolla, S. Pranghofer, L. Petrini, O. Petrini, P.P. Bosshard, Identification of dermatophytes by matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry, Med. Mycol. 51 (2013) 514–521.
[3] A. Hofhuis, S. Bennema, M. Harm, A.J. van Vliet, W. Takken, C.C. van den Wijngaard, W. van Peil, Decrease in tick bite consultations and stabilization of early Lyme borreliosis in the Netherlands in 2014 after 15 years of continuous increase, BMC Public Health 16 (2016) 425.
[4] B. Kreft, W.C. Marsch, Lupus erythematous gyratus repens, Eur. J. Dermatol. 17 (2007) 79–82.
[5] P. Nonhoff, C. Kruger, J. Schaller, G. Ginter-Hanselmayer, R. Schulte-Beerbuhl, H.J. Tietz, Mycology - an update part 2: dermatomycoses: clinical picture and diagnostics, J. Dtsch Dermatol. Ges. 12 (2014) 749–777.
[6] Fitzpatrick, Fitzpatrick’s Color Atlas and Synopsis of Clinical Dermatology, McGraw Hill Education, 2013, pp. 618–619.
[7] H. Havlickova, V.A. Czaika, M. Friedrich, Epidemiological trends in skin mycoses worldwide, Mycoses 51 (Suppl 4) (2008) 2–15.
[8] M. Zimmer, K. Eisendle, R. Zelger, Erythema annulare centrifugum. A clinical reaction pattern, Der Hautarzt; Zeitschrift fur Dermatologie, Venerologie, und verwandte Gebiete 61 (2010) 967–972.
[9] W. Weyers, C. Diaz-Cascojo, I. Weyers, Erythema annulare centrifugum: results of a clinicopathologic study of 73 patients, Am. J. Dermatopathol. 25 (2003) 451–462.
[10] S. Jahnbska, M. Blaszczzy, A. Kozlowska, Erythema gyratium repens-like psoriasis, Int. J. Dermatol. 39 (2000) 695–697.
[11] E. Gilmour, M. Bhushan, C.E. Griffiths, Figurate erythema with bullous pemphigoid:
a true paraneoplastic phenomenon? Clin. Exp. Dermatol. 24 (1999) 446–448.

[12] M.M. Shenoy, S. Teerthanath, V.K. Karmaker, B.S. Girisha, M.S. Krishna Prasad, J. Pinto, Comparison of potassium hydroxide mount and mycological culture with histopathologic examination using periodic acid-Schiff staining of the nail clippings in the diagnosis of onychomycosis, Indian J. Dermatol. Venereol. Leprol. 74 (2008) 226–229.

[13] J.O. Levitt, B.H. Levitt, A. Akhavan, H. Yanofsky, The sensitivity and specificity of potassium hydroxide smear and fungal culture relative to clinical assessment in the evaluation of tinea pedis: a pooled analysis, Dermatol. Res. Pract. 2010 (2010) 764843.

[14] J.M. Weinberg, E.K. Koostenblatt, W.D. Tutrone, H.R. Tishler, L. Najarian, Comparison of diagnostic methods in the evaluation of onychomycosis, J. Am. Acad. Dermatol. 49 (2003) 193–197.