

Borrelia Infection and Pityriasis Rosea

Giuseppe Stinco¹, Maurizio Ruscio², Davide Proscia¹ and Fabio Piccirillo¹

¹Institute of Dermatology, Department of Clinical and Experimental Pathology and Medicine, University of Udine School of Medicine, "San Michele" Hospital, Rodolone Place 1, IT-33013 Gemona del Friuli, Udine, and ²Clinical Laboratory and Microbiology Department, Hospital of San Daniele del Friuli, San Daniele, Italy. E-mail: giuseppe.stinco@uniud.it
Accepted June 11, 2008.

Sir,

Pityriasis rosea (PR) is an acute, self-limiting papulo-squamous skin disease of uncertain aetiology. Clinical and experimental findings suggest the pathogenic role of an infectious agent (1, 2). Viral and bacterial causes have been proposed, but convincing answers have not yet been found (3). A link between *Borrelia burgdorferi* and PR was suggested in the 1990s and a roseolar eruption has been reported as a clinical manifestation of the second stage of Lyme disease (LD) (4, 5).

CASE REPORT

A 20-year-old Caucasian man was referred to our department for the appearance, 2 weeks earlier, of a macula on his right shoulder, close to the axilla, that gradually expanded over a few days, becoming a salmon-pink, oval-shaped, infiltrated patch of approximately 10 cm diameter. Some days later several new, small, salmon-pink, round-to-oval-shaped, fixed macules, papules and plaques of 0.5–2.0 cm diameter developed. He denied a history of fever, chills, upper respiratory tract infection, or genital lesion, but recalled a tick bite on his right shoulder about one week before he first noticed the red macula. He also denied the use of topical or systemic drugs or the application of any substance prior the onset of the eruption. Physical examination revealed a large ovoid, erythematous lesion of 12 × 7 cm diameter, and slightly raised, with a fine collarette scale at the border. Crops of smaller lesions were salmon-coloured, ovoid, raised, and had the same collarette of fine scale. These were bilateral and symmetrical, classically arranged with their long axes parallel to lines of cleavage, resulting in the characteristic "Christmas Tree" distribution (Fig. 1). The patient was otherwise in good health and no lymphadenopathy was present.

Direct microscopic examination of skin scrapings showed no fungal elements. A skin biopsy specimen of the border of the larger patch was performed and revealed the presence of an epidermal hyperplasia with focal spongiosis and focal parakeratosis in mounds and, in the dermis, the presence of a superficial and deep perivascular infiltrate of lymphocytes and histiocytes. Furthermore, a papillary dermal oedema and a variable number of extravasated red cells were observed. Warthin-Starry stain technique did not detect any spirochetotic bodies. Cultural isolation of *Borrelia* in Barbour-Stoenner-Kelly medium (BSKII) plus ciprofloxacin (0.4 µg/ml) and



Fig. 1. An initial macula gradually expanded over a few days to become a large ovoid, erythematous patch, while multiple, oval, macules, papules and plaques developed around the patch.

rifampicin (40 µg/ml) did not provide any evidence of the presence of the LD agent in the tissue; the tubes were examined weekly by dark-field microscopy for motile spirochetes over a period of 45 days. Polymerase chain reaction (PCR) was performed using five different sets of primers: FL6-FL7 (amplifying a fragment of the flagellin gene, present in all the *B. burgdorferi s.l.* stains; LD (amplifying a 16S rRNA genomic fragment common to the tree genospecies); *B. burgdorferi s.s.*, *B. garinii*, *B. afzelii* (each one amplifying a species-specific 16S rRNA genomic fragment). All the primer sets that recognize *B. afzelii* were positive. Specific serum IgM against *B. burgdorferi* (IgM:119 UI, cut-off: <5 UI) with IgG negative was detected with chemiluminescence immunoassay (DiaSorin, Saluggia, Italy), Vlse antigen obtained from P/Bi stain of *B. garinii* is used in IgG assay, whereas recombinant OspC obtained from *B. afzelii* Pko is used in IgM one. The IgM positivity

was confirmed by immunoblot test (RecomBlot *Borrelia* – Mikrogen) using recombinant antigen including the immunodominant epitopes of the tree *B. burgdorferi* s.s., *garinii* and *afzelii*: the serum antigenic pattern was represented by p41, OspC and p18. Routine laboratory tests, including blood cell counts and a panel of serum chemistry, were performed; no alterations were found. Syphilis, HHV-6 and -7 and Epstein-Barr virus serology were negative. The patient started oral doxycycline 100 mg twice a day for 20 days. The larger patch disappeared some days after the beginning of the antibiotic therapy, while a complete resolution of the rash was observed within one month. The patient had never an IgG anti-*Borrelia* seroconversion.

DISCUSSION

Since secondary syphilis and other papulo-squamous disorders have been excluded in this case, the differential diagnosis still includes PR and LD. On the basis of the history, clinical features, histopathological findings and the course of the disease, we consider that the following interpretations are possible in this patient: PR induced by *Borrelia*, PR with an unusual large heralding patch casually associated with LD, or early disseminated LD presenting with multiple erythema migrans (EM) characterized by a roseolar aspect. The peripheral collarette scale does fit better with an unusual large heralding patch than with EM. The lesion was progressively expanding, which is characteristic of EM. Histological examination shows a reactive pattern classified as superficial perivascular dermatitis, which is typical in both EM and PR, but hyperplasia, spongiosis, and parakeratosis are more common in the latter. A positive culture would be strong evidence in this case to establish a diagnosis of EM, but we were unable to demonstrate *Borrelia* in the tissues by cultural isolation and silver staining technique. In any case, an early LD was suspected by the positivity of PCR and the presence of IgM antibodies anti-*Borrelia*. The patient remembered he was bitten by a tick on the right shoulder one week before the appearance of the first skin lesion. EM usually develops about 4–30 days after the tick bite and disappears suddenly after antibiotic therapy (6).

Through haematogenous dissemination up to 5–10% of the patients have multiple EM (7). Roseolar lesions are not typical LD manifestations (4–6): they were described emphasizing that LD resemble syphilis, a disease that shares the same spirochetotic aetiology and clinical polymorphism (4). In this case, roseolar lesions disappeared one month after the large patch without any correlation with antibiotic therapy. Therefore the diagnosis of EM with a concomitant PR was made. We suppose that the association of the two diseases was not casual, but causal. Although no aetiology of PR has been proven, it has been shown that the disease is related to an infectious agent (2, 3). The initial herald patch may occasionally appear at sites of trauma, such as insect bites (1). This may represent a portal of entry for an infectious agent. A double inoculation of the bacteria and the agent of PR during tick-bite, or a single *Borrelia* infection with EM triggering the PR are two possible interpretations in this case. The consequence was an EM with the characteristics of the herald patch followed by the other lesions of PR.

Since the course of LD is influenced by the timeliness of both diagnosis and antibiotic treatment it is important, particularly in endemic areas, to recognize EM also when associated with PR.

REFERENCES

1. González LM, Allen R, Janniger CK, Schwartz RA. Pityriasis rosea: an important papulosquamous disorder. *Int J Dermatol* 2005; 44: 757–764.
2. Chuh A, Chan H, Zawar V. Pityriasis rosea – evidence for and against an infectious aetiology. *Epidemiol Infect* 2004; 132: 381–390.
3. Kempf W, Burg G. Pityriasis rosea – a virus induced skin disease? An update. *Arch Virol* 2000; 145: 1509–1520.
4. Trevisan G, Cinco M, Agolzer A. Roseolar lesions in Lyme disease: isolation of the causative agent. *Int J Dermatol* 1992; 31: 507–508.
5. Aberer E. The dermatologic spectrum of Lyme borreliosis. *Wien Med Wochenschr* 1995; 145: 165–170.
6. Mullegger RR. Dermatological manifestations of Lyme borreliosis. *Eur J Dermatol* 2004; 14: 296–309.
7. Benedix F, Weide B, Broekaert S, Metzler G, Frick JS, Burgdorf WH, et al. Early disseminated borreliosis with multiple erythema migrans and elevated liver enzymes: case report and literature review. *Acta Derm Venereol* 2007; 87: 418–421.