

Acrodermatitis Chronica Atrophicans of the Face: A Case Report and a Brief Review of the Literature

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SUMMARY Acrodermatitis chronica atrophicans is a rare late manifestation of tick-borne *Borrelia burgdorferi* infection, manifesting as inflammatory and atrophic lesions on acral skin.

We describe the case of a 73-year-old woman with skin changes progressed to marked atrophy on her left hand and an edematous inflammatory involvement of the face. The diagnosis of acrodermatitis chronica atrophicans was made on the basis of clinical appearance, serological and histopathological findings, and the lesional detection of *B. burgdorferi*-specific gene segments by polymerase chain reaction.

This unusual case illustrates that acrodermatitis chronica atrophicans affects not only the extremities but also the face. The clinical and histological finding of the lesions occurring on acral skin showed a prominent atrophic appearance, while the ones occurring on the face showed a prominent inflammatory appearance.

KEY WORDS: Lyme borreliosis, *Borrelia burgdorferi* DNA amplification, *Borrelia afzelii*

INTRODUCTION

Acrodermatitis chronica atrophicans (ACA) is the characteristic skin manifestation of the late stage of Lyme borreliosis (LB) which develops insidiously, from a few months up to years after a tick bite (1). ACA is a long-standing disease which occurs more frequently in elderly women (2). It is most often unilateral, although bilateral cases have also been reported. It may affect only a part of an extremity, but additional lesions may appear later and also extend to other parts of the body (3). The lesions are usually located on the extensor surfaces of the limbs, including the back of hands and feet, starting as an edema

and dark erythema that slowly change into atrophy of the skin and the adnexa. Sometimes atrophy becomes so deep that the dermis, subcutis, and muscles are affected (1-3). The sites most commonly affected are the feet, legs, back of the hands, and the olecranon areas. More rarely, lesions can be localized on the trunk and proximal arms; other sites have been occasionally reported (4).

We present a case of ACA in a woman who had diffuse lesions on the limbs and a marked atrophic bilateral lesion of the face.

CASE REPORT

A 73-year-old woman developed a slow progressive change of color of the dorsum of her left hand during the last two years. On examination, the affected skin had a violaceous discoloration, telangiectasias, and a thin, wrinkled, cigarette paper-like, translucent appearance. Because of the loss of subcutaneous fat, the skin vessels were prominent (Figure 1). We also noticed an erythematous livid discoloration on both feet with a prominent corona flebectatica paraplantaris medialis and a red edema of the malar sides. A few months earlier, the patient had reported the onset of bilateral redness of her face that was pain-

less, not sharply demarcated, and with prominent dermal vessels (Figure 2). The adnexa at this site were preserved and the oral mucous membrane and the tongue were unaffected.

The patient was otherwise in good health, and no lymphadenopathy was present; there was no pain, functional impairment, or fever and no history of a tick bite despite the fact that the patient lived and worked outdoors in an endemic area for LB in Northern Italy. On the basis of the clinical presentation and the epidemiological data, we tentatively advanced the diagnosis of a late skin borreliosis. Our diagnosis was supported by detection of slightly elevated

Table 1. The published cases on acrodermatitis chronica atrophicans of the face

| Authors | Country | Cases | Facial skin lesions | Other sites of skin lesions | Treatment | Specific serum antibodies | PCR detection/serotype |
|--|-------------|----------------------|--|-----------------------------|--|---|--|
| Detmar <i>et al.</i> 1989 (5) | Germany | 67-year-old woman | Swelling and discoloration of the eyelids | Lower limbs, abdomen | IV ceftriaxone 4 g daily for 14 days | IIF IgG 1:2048 IIF IgM 1:16 | Not performed |
| | | 67-year-old woman | Facial erythema and swelling and discoloration of the eyelids | Legs | IV ceftriaxone 4 g daily for 14 days | IIF IgG 1:512 IIF IgM 1:32 | Not performed |
| Schmidli <i>et al.</i> 1989 (6) | Switzerland | 81-year-old woman | Facial red oedema | Forearms and thighs | Oral aminopenicillin 2250 mg daily for 28 days | IIF IgG 1:2048 IIF IgM 1:64 | Not performed |
| Muller <i>et al.</i> 1994 (7) | Switzerland | 73-year-old woman | Violaceous discoloration | Dorsum of the hands, feet | IV ceftriaxone 2 g daily for 14 days | IgG high IgM not detectable | Positive PCR (<i>B. burgdorferi</i> s.l.) |
| Brehmer-Andersson <i>et al.</i> 1998 (8) | Sweden | Sex/age not reported | Facial lupus-like lesions | Not reported | Not reported | Not reported | Not performed |
| Danz <i>et al.</i> 2007 (9) | Germany | 72-year-old woman | Swelling of the lower eyelids, cheeks, the nose and the upper lip | Left hand | Oral doxycycline 200 mg daily for 30 days | EIA IgG high EIA IgM 3 U/ml Positive immunoblot | Negative PCR |
| de Heller-Milev <i>et al.</i> 2008 (10) | Switzerland | 51-year-old woman | Infiltrated erythema of the middle of the face extending to the neck | Chin erythema | Oral doxycycline 200 mg daily for 21 days | ELFA IgG+IgM 4.71 (0.75-1.0) EIA IgM 18 (< 1.0) Positive immunoblot | Positive PCR (<i>B. afzelii</i>) |
| Stinco <i>et al.</i> | Italy | 67-year old woman | Red oedema of the malar sides | Left hand, feet | IV ceftriaxone 2 g daily for 21 days | EIA IgM 18,71 U/mL EIA IgG > 200 U/mL Positive immunoblot | Positive PCR (<i>B. afzelii</i>) |

IIF – Indirect immunofluorescence; EIA – Enzyme-linked immunosorbent assay (ELISA); ELFA – Enzyme linked fluorescent assay;

immunoglobulin G (IgG) titers of *Borrelia*-specific serum antibodies by the enzyme-linked immunosorbent assay (ELISA) test: immunoglobulin M (IgM) 18.71 U/mL (normal range <18 to 22 U/mL) and IgG > 200 U/mL (normal range: <10 to 15 U/mL). Western blot confirmed the presence of several antibodies targeting the VlsE protein as well as p83, p58, p39, p31, and p21 proteins. Two skin biopsies were performed from the atrophic area of the left hand and from the edematous preauricular site. The histopathology of the hand lesion showed thinning of the epidermis with loss of rete ridges, decreased breadth of the dermis, and reduction of pilosebaceous units. The facial sample showed a superficial and deep inflammatory cellular infiltrate of the dermis. This moderately dense infiltrate was composed of lymphocytes, some histiocytes, and plasma cells. Prominent vascular channels were also present. Culture samples for *Borrelia* from both biopsies were negative. *B. burgdorferi*-specific DNA was amplified from the both biopsy materials by nested-polymerase chain reaction (PCR) reactions using rRNA primer sequences specific for *B. burgdorferi sensu stricto*, *B. garinii*, and *B. afzelii*, with positive results for *B. afzelii*.

A diagnosis of ACA was made, and the patient was administered a treatment with oral doxycycline 100 mg twice daily for 28 days. After 6 months, since there was no improvement, we introduced therapy with ceftriaxone 2 g intravenously for 21 days, which resulted in a rapid clinical response, in particular on the facial lesions. After 3 months, titers of *Borrelia*-specific IgM antibodies returned to normal, whereas titers of IgG antibodies decreased to 30% of the initial value.



Figure 1. Patient's left hand with atrophy of the skin, violaceous discoloration and prominent dermal vessels.

DISCUSSION

Few cases of ACA with facial involvement have been reported in the literature (Table 1). In most cases, the face was involved at an early stage, presenting with a skin-colored facial edema. In 1989, Detmar *et al.* described two cases with dominant involvement of the facial skin and eye lid edema. In both cases, serological antibody tests proved that they were caused by *B. burgdorferi sensu lato* (5). In the same year, Schmidli *et al.* reported on an 81-year-old woman suffering from extensive ACA with facial involvement most likely related to an immunodeficiency state in the course of multiple malignancies (6). In 1994, Muller *et al.* reported a case of an edematous facial lesion where the persistence of the borrelial genome on the skin sample was demonstrated by DNA amplification (7). In 1998, in a collection of 111 cases of ACA reported by Brehmer-Andersson *et al.*, a single case included an onset of ACA with facial erythema with cyanotic lupus-like lesions on the face (8). In 2007, Danz *et al.* reported on a case of a chronic persistent facial edema and roughness of the facial outline. Antibodies for *B. burgdorferi* were detected, but polymerase chain reaction for *B. burgdorferi* DNA from the skin biopsy was negative (9). In 2008, de Heller-Milev *et al.* reported on a 51-year-old woman that presented with infiltrated erythema of the middle of the face extending to the neck and chin. The diagnosis of *B. afzelii* infection was confirmed by serology and PCR from the skin biopsy (10).

The clinical features of our patient were similar to previous cases. ACA was present on the distal extremities with clinical and histological features of



Figure 2. Red edema of the face, not sharply demarcated and with prominent dermal vessels.

long lasting disease and an atrophic outcome, while being edematous and clearly inflammatory in the facial involvement.

Commonly, in ACA patients, distinct clinical features can be recognized. The early inflammatory phase, is marked by a bluish reddish macular or edematous appearance, while the atrophic phase predominantly presents with teleangectasias (ACA teleangectatica) or fibrous nodules above the bone prominences (ACA fibromatosa), or, finally, atrophy of the skin (ACA atrophicans sensu stricto) (11,12).

The disease course is characterized by an initially edematous inflammatory stage in which the epidermis remains intact while the dermis becomes swollen and inflamed. The skin is blue-red and the borders usually merge (13). As a result of chronic inflammation, collagen degeneration occurs with loss of elastic fibers and thus ultimately a "cigarette paper-like" atrophy of the skin. In the atrophic phase, generalized thinning of the dermis and epidermis gives the skin a transparent appearance, often with clearly visible veins (14). The clinical evolution from the early inflammatory edematous stage to the atrophic stage of ACA reflects on histological findings. In our patient, we observed a prominent atrophic appearance from the biopsy on her left hand and a prominent inflammatory appearance on her face. We emphasize that all cases so far observed on the face had an inflammatory appearance (5-10). It is currently not possible to determine whether lesions of the face have a tendency to progress to the atrophic phase. The inflammatory appearance of the face lesions may be due to an early diagnosis (i.e. patients refer immediately to the doctor when their face is involved) or to a site-related persistent inflammatory process. ACA appears to be associated with the long-term persistence of *Borrelia* organisms in the skin, and several nonspecific reactions together with a specific immune response may contribute to its manifestations (1,3). It is possible that acral regions are the favorite sites of atrophic skin changes because of reduced skin temperatures or reduced oxygen pressure.

In conclusion, further cases are needed to clarify many aspects of ACA in this rare location.

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