Scanning electron microscopy of lichen sclerosus*

Microscopia eletrônica de varredura do líquen escleroso

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Abstract: Lichen sclerosus is an acquired inflammatory condition characterized by whitish fibrotic plaques, with a predilection for the genital skin. We performed scanning electron microscopy of the dermis from a lesion of lichen sclerosus. Normal collagen fibers could be easily found in deeper layers of the specimen, as well as the transition to pathologic area, which seems homogenized. With higher magnifications in this transitional area collagen fibers are adherent to each other, and with very high magnifications a pearl chain aspect became evident along the collagen fibers. In the superficial dermis this homogenization is even more evident, collagen fibers are packed together and round structures are also observed. Rupture of collagen fibers and inflammatory cells were not found. These autoimmune changes of the extracellular matrix lead to the aggregation of immune complexes and/or changed matrix proteins along the collagen fibers, the reason why they seem hyalinized when examined by light microscopy.
Keywords: Collagen; Collagen diseases; Lichen sclerosus et atrophicus; Microscopy, electron, scanning; Skin diseases

Resumo: O líquen escleroso é uma afecção inflamatória caracterizada por placas esbranquiçadas fibróticas ocorrendo preferentemente na pele genital. Realizamos exame com microscópio eletrônico de varredura da derme de uma lesão de líquen escleroso. Ao exame as fibras colágenas normais puderam ser facilmente identificadas, bem como a transição para a área alterada, a qual aparece homogeneizada. Nessa área as fibras parecem aderidas umas às outras e com aspecto em colar de pérolas. Na derme superficial essa homogeneização é ainda mais evidente, com as fibras bem aderidas e ainda com as estruturas arredondadas. Ruptura das fibras e células inflamatórias não foram observadas. Os fenômenos autoimunes que ocorrem na matriz extracelular nessa enfermidade devem levar à agregação de imunocomplexos e/ou proteínas alteradas nas fibras colágenas, por essa razão elas aparecem hialinizadas na microscopia óptica.
Palavras-chave: Colágeno; Dermatopatias; Doenças do colágeno; Líquen escleroso e atrófico; Microscopia eletrônica de varredura

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INTRODUCTION

Lichen sclerosus (LScl) is an acquired inflammatory condition characterized by whitish fibrotic plaques, with a predilection for the genital skin. [1]

Autoimmunity against the extracellular matrix protein 1 (ECM1) was demonstrated and may be involved in the immunopathogenesis of LScl, which is confirmed by the effective treatment with topical corticosteroids and calcineurin antagonists. [2,3]

Light microscopy is very characteristic, showing superficial dermal changes which have been described as edema of the upper dermis, sclerotic collagen or hyalinized collagen.[1,4-6] In this area collagen bundles are no longer observed, the dermal tissue looks homogeneous and less eosinophilic. Moreover epidermal atrophy, hydropic degeneration of the basal layer and dermal lymphocytic infiltrate are also seen.

We performed scanning electron microscopy (SEM) of the dermis from a lesion of a disseminated case of LScl (Figure 1). A punch biopsy was obtained for diagnosis confirmation, the skin fragment was cut into two pieces, and one of them routinely processed for SEM. Light microscopy showed dermal hyalinization that established the Lscl diagnosis.

RESULTS

Normal collagen fibers could be easily found in deeper layers of the fragment, as well as the transition to the pathologic area, which seems homogenized (Figure 2). With higher magnifications in this transitional area collagen fibers are adherent to each other, and with very high magnifications (x 20,000) a pearl chain aspect became evident along the collagen fibers (Figure 3). In the superficial dermis this homogeniza-

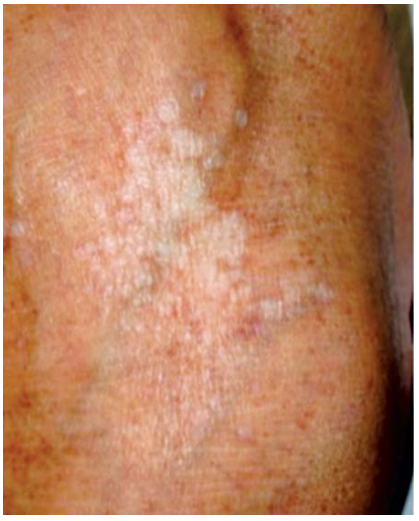

Figure 1: Whitish lesions on the dorsum of the foot.

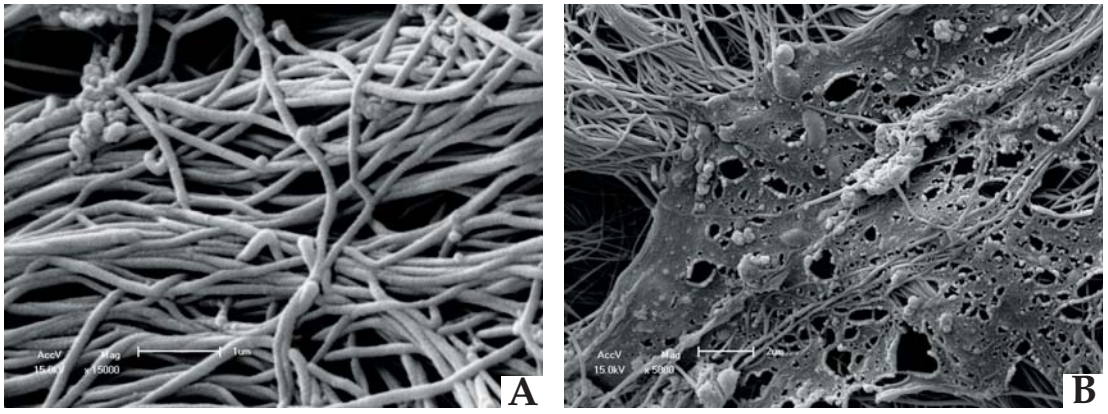

Figure 2: Scanning electron microscopy - (a). normal collagen fibers (x 15,000) (b). transition to a homogenized area (x 5,000)

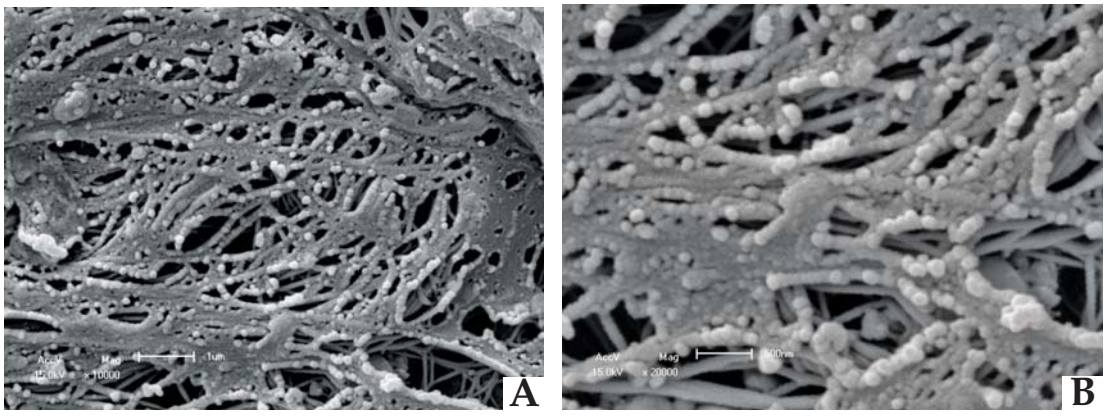

Figure 3: Scanning electron microscopy - (a). homogenized area (x 10,000) (b). detail showing the pearl chain aspect of the collagen fibers (x 20,000)

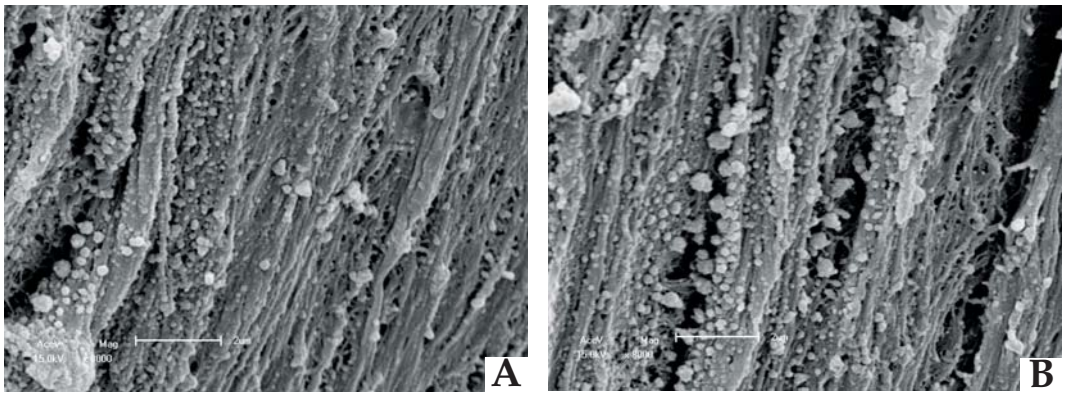

Figure 4: Scanning electron microscopy - (a). and (b). superficial area with strong collagen homogenization (x 8,000)

tion is even more evident; collagen fibers are packed together and round structures are also observed (Figure 4). Rupture of collagen fibers and inflammatory cells were not found.

DISCUSSION

We could not find any report on the use of SEM in Lscl; this technique is not normally used to document dermal changes.

Our findings show the aggregation of round structures to collagen fibers, giving them a pearl chain aspect. In the superficial dermis, where the changes are more conspicuous when examined by light microscopy, this aggregation was even stronger.

It is possible to assume that the autoimmune changes of the extracellular matrix lead to the aggregation of immune complexes and/or changed matrix proteins along the collagen fibers, the reason why they seem hyalinized when examined by light microscopy.

A previous report with transmission electron microscopy in LScl observed amorphous, dispersed, electron-dense substances in the homogeneous zones without primary collagen changes, in accordance with our results.[7]

Although SEM is mainly used to examine surfaces, as in hair diseases, it can bring some additional information on conditions with dermal involvement. ❑

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