

Scanning electron microscopy of molluscum contagiosum *

Microscopia eletrônica de varredura do molusco contagioso

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Abstract: Molluscum contagiosum is a disease caused by a poxvirus. It is more prevalent in children up to 5 years of age. There is a second peak of incidence in young adults. In order to examine its ultrastructure, three lesions were curetted without disruption, cut transversely with a scalpel, and routinely processed for scanning electron microscopy (SEM). The oval structure of molluscum contagiosum could be easily identified. In its core, there was a central umbilication and just below this depression, there was a keratinized tunnel. Under higher magnification, a proliferation similar to the epidermis was seen. Moreover, there were areas of cells disposed like a mosaic. Under higher magnification, rounded structures measuring 0.4 micron could be observed at the end of the keratinized tunnel and on the surface of the lesion.

Keywords: Microscopy, electron, scanning; Molluscum contagiosum; Molluscum contagiosum virus

Resumo: Molusco contagioso é uma dermatovirose causada por um poxvírus, sendo mais prevalente em crianças com até 5 anos de idade. Um segundo pico de incidência é encontrado em adultos jovens. Com o objetivo de demonstrar sua ultraestrutura três lesões foram curetadas sem rompê-las, cortadas transversalmente e processadas de rotina para microscopia eletrônica de varredura. A estrutura oval do Molusco contagioso pôde ser facilmente observada, no seu centro há uma umbilicação central e logo abaixo observa-se um túnel queratinizado. Com aumentos progressivos observam-se proliferações semelhantes à epiderme e áreas de células dispostas em mosaico. Com grandes aumentos estruturas arredondadas medindo 0,4 micron são vistas no final do túnel queratinizado e na superfície da lesão.

Palavras-chave: Microscopia eletrônica de varredura; Molusco contagioso; Vírus do molusco contagioso

INTRODUCTION

Molluscum contagiosum (MC) is a disease caused by a poxvirus of the Molluscipox virus genus and is characterized by umbilicated translucent papules of 1 to 3 mm in size. The disease is more prevalent in children up to 5 years of age.¹ There is a second peak of incidence in young adults, mainly as a sexually transmitted disease.² There have been a few reports of traumatic inoculation, such as that caused by tattoos.³

This study aimed to perform cross-sectional scanning electron microscopy (SEM) of MC.

Three MC lesions were curetted without disruption of their structure, cut transversely with a scalpel, and routinely processed for SEM.

RESULTS

Under lower magnification, the oval structure

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of MC could be easily identified. In its core, there was a central umbilication and just below this depression, there was a keratinized tunnel (Figure 1). Under higher magnification, it was possible to observe the epidermis and the stratum corneum; underneath the epidermis, there was a proliferation similar to the epidermis (Figure 2). Moreover, there were areas of cells disposed like a mosaic (Figure 3).

Examination of the keratinized tunnel revealed a similar aspect to that of normal skin surface, with scales arranged in a "roof-like" pattern (Figure 4). Under higher magnification, rounded viral structures measuring 0.4 micron could be observed at the end of

the keratinized tunnel and on the surface of the lesion (Figures 5A and 5B).

DISCUSSION

These findings obtained through SEM revealed relevant information about the structure of MC. In the medical literature, there are two reports on the use of SEM and several others on transmission electron microscopy (TEM).^{4,9}

Our ultrastructural findings are comparable to the ones obtained through optical microscopy, which show an epidermis-like layer encircling the proliferation caused by the virus (Figure 2 inset).

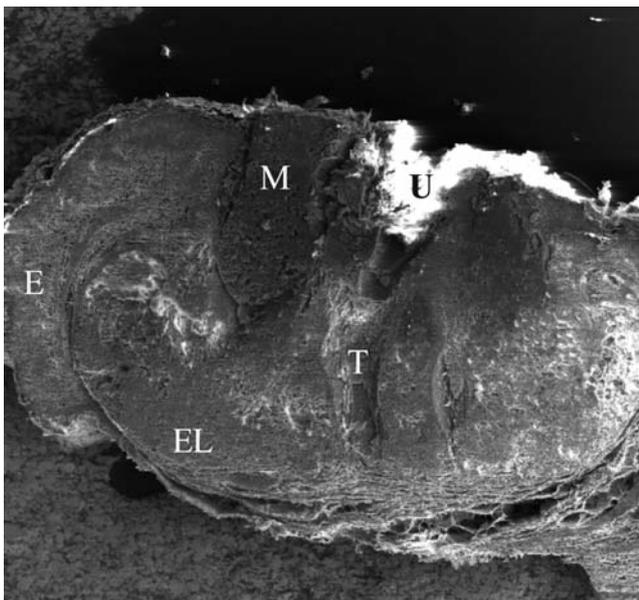


FIGURE 1: SEM under lower magnification (x56) showing the entire structure of MC. E- epidermis; EL epidermis-like area; U- central umbilication; T – keratinized tunnel; M- mosaic area

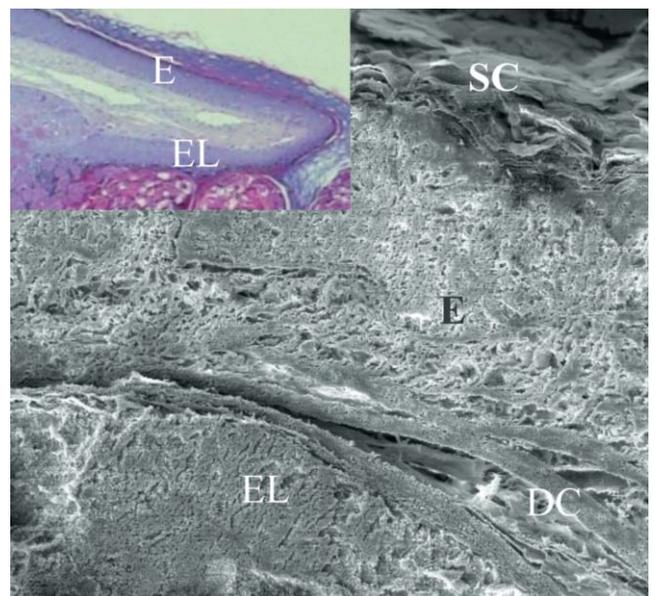


FIGURE 2: SEM (x 290) – SC - stratum corneum; E- epidermis ; ES - epidermis-like; DC – dermal collagen. Note the comparison with light microscopy (inset), showing an epidermal-like layer underneath the epidermis

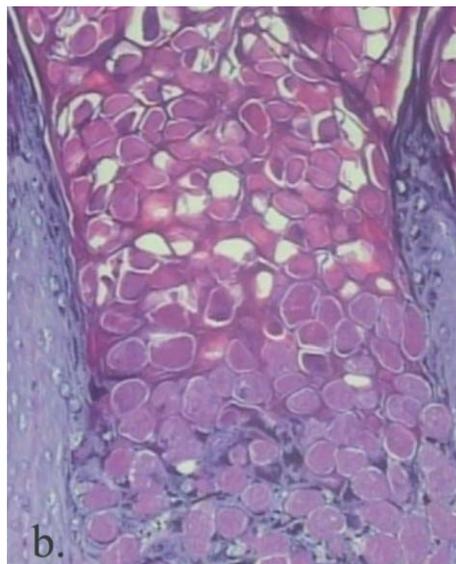
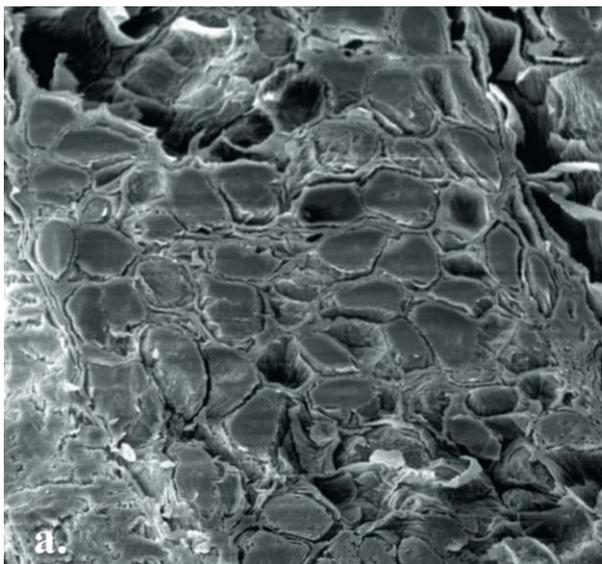


FIGURE 3: SEM (x 350) detail of the mosaic area (a) light microscopy with typical eosinophilic molluscum bodies (b)

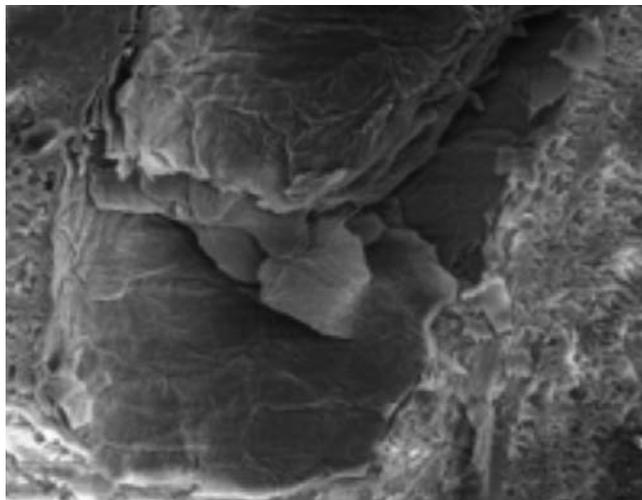


FIGURE 4: SEM (x 350) detail of the keratinized tunnel

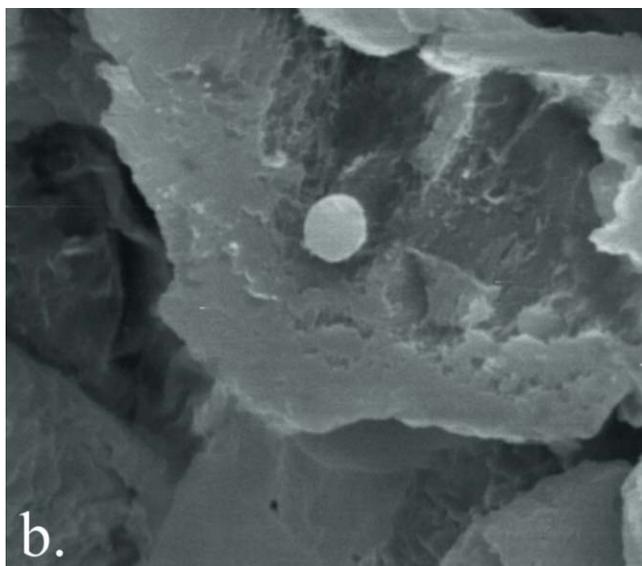
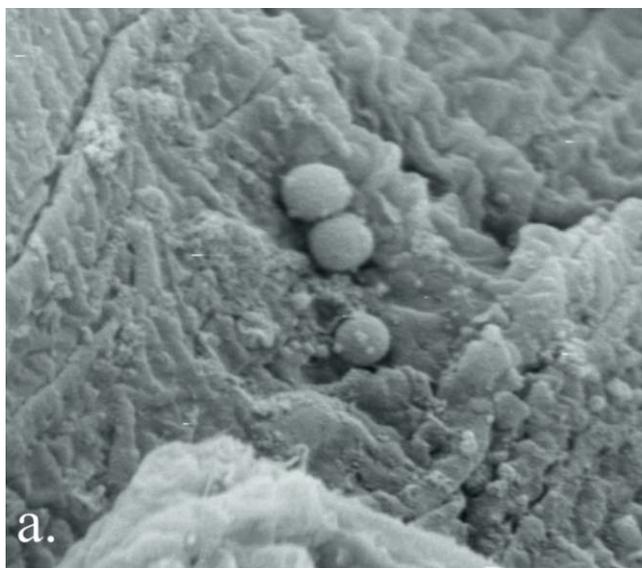


FIGURE 5: SEM (x 10.000) viral structures in the keratinized tunnel (a) and on the surface of the lesion (b)

The mosaic structure found in the cross-section corresponds to the so-called molluscum bodies seen on light microscopy, which consist of large cells with an eosinophilic granular cytoplasm and a small peripheral nucleus, considered pathognomonic of MC (Figure 3B).⁶ This structure is surrounded by the epidermis-like proliferation.

In a previous report about the use of SEM, these infected keratinocytes were described as a "viral colony sac".⁵ Reports on TEM showed large amounts of viral particles in the cytoplasm of these keratinocytes with lateral displacement of the cell nucleus.⁶ Other authors found nucleus lobulation secondary to compression caused by intracytoplasmatic viral proliferation.⁸

The viral morphology described previously through the use of SEM and TEM was spherical, ellipsoidal or brick-shaped. We only observed spherical structures in our findings. The reported size of the virus was also similar to the one we found.⁴

Interestingly, we found a keratinized tunnel just below the central umbilication and viral particles at the end of the tunnel and on the surface of the lesion, revealing its disseminated form. This tunnel could be reminiscent of hair follicle, suggesting that MC proliferation could start at the outer root sheath keratinocytes. These findings could also explain its dermal localization, in contrast to HPV infections, which are epidermal. □

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