IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 2 Ser.8 (February. 2020), PP 43-45
www.iosrjournals.org

Cornoid Lamellae Revisited

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Abstract: *Cornoid lamellae a vertical angulated column of parakeratosis associated with diminished granular layer and dyskeratosis. It is classical histopathological feature of porokeratosis, but can be seen in other dermatosis. Brief description about its clinical presentation, morphogenesis and its detection is being presented here.*

Keywords: *Cornoid lamellae.*

Key message: *Cornoid lamellae an important pathologic finding of porokeratosis can be seen in other coditions also, so other histopathologic findings along with clinical picture can help in diagnosis.*

Date of Submission: 30-01-2020 Date of Acceptance: 15-02-2020

I. Introduction

The Cornoid lamella, a sine quo non of porokeratosis, was first described by Mibelli in 1893[1]. Clinically it corresponds to raised, thread-like border of porokeratosis. Cornoid lamellae represents an abnormal form of keratinization, which is seen in all types of porokeratosis. It was a fallacy by Mibelli that cornoid lamellae arise from pores of eccrine sweat ducts, and hence he used the the term porokeratosis.

II. Definition

A cornoid lamella is characterized by the following histopathologic features[2]:
(1) A thin, tilted, vertical column of parakeratosis that extends through the surrounding orthokeratotic stratum corneum, and to some extent, above and below it.
(2) Loss or marked diminution of the granular layer underneath the column of parakeratosis.
(3) Dyskeratosis and/or vacuolization of the underlying cells of the stratum spinosum
Underneath a coronoid lamella there are dilated capillaries along with mild to moderate dense lymphohistiocytic infiltrate in the papillary dermis. An important differentiating point is the presence of dyskeratosis or vacuolization of cells in the underlying spinous layer, just beyond the lower end of the parakeratotic column which helps in distinguishing the cornoid lamella from other ordinary columns of parakeratosis.

III. Clinical Presentation And Detection

Cornoid lamellation is classically described porokeratosis as a thin, thread like raised border with central atrophic plaque of porokeratosis. As the plaque expands, the deepest part of the cornoid lamella moves outward causing its tip to slant inwards. It can vary in its elevation and distribution in individual lesion. Normally elevated border is clinically visible, but a superficial and subtle cornoid lamella can be missed like in disseminated superficial actinic porokeratosis, leading to misdiagnosis of flat seborrheic keratosis, stucco keratosis, or atrophic annular lichen planus.[3,4] Painting the periphery of such lesions with Gentian violet (crystal violet, tolulene blue can be used) and then cleaning it with alcohol swab, the characteristic raised border will retain the color.[4] when viewed under microscope, a “peppered pattern” of staining with periodic acid–Schiff is seen and thus helps in differentiating cornoid lamellae in difficult cases.[5]

The ideal specimen to visualize a cornoid lamella is an incisional biopsy and it is to be taken perpendicular to the border as the cornoid lamellation is limited to the border of lesion. Punch biopsy can also be performed in which cornoid lamellae can be seen on the either end of the section, but can be lost during “rough trimming” of the paraffin block or if the center of the lesion is punched, the epidermal features will be entirely nonspecific ranging from atrophic mild interface to psoriasiform hyperplasia.[3]

Dermoscopy is the latest adition to the list of diagnostic modalities. Dermoscopically[6,7] diagnostic finding is the white peripheral border, often double-marginated, representing coronoid lamella. It has been metaphorically called “white track” or “lines of volcanic crater,” and “diamond necklace” on ultraviolet light dermoscopy.

When examined ultrastructurally[8], keratohyaline granules and lamellar bodies underneath the cornoid lamella are decreased and dyskeratotic cells have vacuolated cytoplasm (due to vacuolated mitochondria). The cells of parakeratotic column were flattened, compact with electron dense cytoplasm. The homogenous stacking up of ultrastructurally compact horny cells gives it homogenous eosinophilic appearence.

IV. Theories Of Morphogenesis

Previously theories various theories have been suggested that porokeratosis is a disorder of the eccrine sweat glands and the invagination of the epidermis may result from an abnormal clone of epidermal cells which leads to the formation of cornoid lamella.[9]

Another hypothesis suggests that the invagination is a dilated acrosyringeal and dermal duct which is keratin-plugged.[9]

Recently conducted studies bring to light that an abnormal mutant clone of keratinocytes expands peripherally, leading to the formation of cornoid lamella at the boundary between the clonal population and the normal epidermal cells.[10] Gene located on 12q23.2-q24.1 might play a key role in the abnormal nature of these cells.[11]

The permeability barrier of stratum corneum is mantained by lipid substances which is secreted by lamellar bodies. Lamellar bodies also also have acid hydrolase which play a role in desquamation of horny cells.[12,13] Verticle stacking of parakeratotic cells may be a result of decreased of lamellar bodies and keratohyaline granules, resulting in defective desquamation.[14] Increased expression of p53 mainly localized in the basal layer under the cornoid lamella has been reported. These results probably reflect abnormal cell clones with alterations on cycle control.[15]

By N-(7-dimethylamino-4-methyl-3-coumarinyl) maleimide staining carried by Ito et al, found an abnormal distribution pattern of -SH groups and SS linkages in cornoid lamella. The -SH groups were seen to be irregularly distributed and abruptly disappeared at the bottom of cornoid lamella.[8] Involucrin, a marker of terminal differentiation of epidermal keratinocytes was over expressed beneath the cornoid lamella and it had irregular appearance and disappearance.[16] There is also a tendency to rapid or incomplete keratinization of keratinocytes forming the cornoid lamella.

Wade and Ackerman summed up cornoid lamellation to be an epidermal reaction pattern and cornoid lamellae is analogous to other cutaneous histologic pattern of epithelium like focal acantholytic dyskeratosis, epidermolytic hyperkeratosis and follicular mucinosis.[2]

V. Other Disorders With Cornoid Lamellae

Porokeratosis is the prototype disorder in which cornoid lamellae has been described. Other conditions where cornoid lamellae has been seen are scars, seborrheic keratoses, verruca vulgaris, scar, milia, solar keratosis, squamous cell carcinoma in situ and basal cell carcinoma.[2] Inflammatory conditions in which cornoid lamellation has been described psoriasis, lichen planus like keratosis, dermatomyositis, keratosis lichenoides chronica, Grover's disease and Fox Fordyce disease.[2] Hamartomas and inherited disorders of keratinization disorders with cornoid lamellation are porokeratotic eccrine ostial and dermal duct nevus,ichthiosis hysterix and pachyonychia congenital.[3]

Multiple cornoid lamellae have been described in PEODDN and porokeratotic eccrine, hair follicle nevus (where cornoid lamellae are seen to involve eccrine or follicular structures).[17] Whereas multiple and giant cornoid lamellae are seen in linear porokeratosis.[3]

VI. Conclusion

Cornoid lamellae an important pathologic finding of porokeratosis can be seen in other coditions also, so other histopathologic findings along with clinical picture can help in diagnosis.

Source of Financial Support and Sponsorship
Nil.
Conflict Of Interest
Nil
Acknowledgement
Nil.

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Rohit Garg, etal. "Cornoid Lamellae Revisited." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(2), 2020, pp. 43-45.