Pink bodies with halo

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Abstract

The presence of eosinophilic Toto bodies in oral lesions could be found in a variety of situations and sometime may present a challenge to the pathologist. We present three case reports where the oral biopsy was taken from the gingival region of a 30-year-old female, a 32-year-old male patient and another from the buccal mucosa of a 67-year-old male patient. Histopathologically, the three cases were finally diagnosed as pyogenic granuloma and moderately differentiated squamous cell carcinoma with the presence of clusters of Toto bodies in the upper spinous layer of stratified squamous epithelium.

Keywords: Eosinophilic bodies, pyogenic granuloma, Toto bodies

INTRODUCTION

Toto bodies are the eosinophilic bodies located in the superficial spinous cell layer of stratified squamous epithelium.¹ These are homogenous eosinophilic bodies, are round-to-oval shaped with a peripheral halo appearance and generally vary in size.¹ These are mostly seen in reactive or inflammatory lesions.² These are also known as mucopolysaccharide keratin dystrophy.¹

Till now, these bodies were commonly seen in inflammatory gingival and other oral mucosal lesions such as irritational fibroma, pyogenic granuloma, peripheral giant cell granuloma and gingivitis.² The present reported cases are of pyogenic granuloma and moderately differentiated squamous cell carcinoma showing the presence of Toto bodies in clusters in the upper spinous cell layer.

CASE REPORT

Oral biopsies were taken, one from the gingival region with respect to 33–35 having smooth surface and reddish pink in color and nontender from a 30-year-old female patient [Figure 1a], and another biopsy was taken from a 32-year-old male patient, where the lesion was soft to firm in consistency, was light pink in color and surrounding the attrited right incisor tooth region [Figure 1b]. The third biopsy was taken from a 62-year-old male patient [Figure 1c] with respect to the left buccal mucosa in relation to the maxillary and mandibular molar tooth region having both white and erythematous ulcerative areas, which was tender on palpation.

On incisional biopsy, the first soft-tissue specimen was measuring about 1 cm × 1.2 cm, was soft to firm in consistency, was creamish in color, had an irregular surface and margin and was roughly oval in shape [Figure 2a]. The second gross specimen was measuring about 1 cm × 1 cm,
was soft to firm in consistency and was cream to brown in color with an irregular surface [Figure 2b]. The third soft-tissue specimen was measuring about 1.2 cm × 1 cm, was cream to dark brown in color with an irregular surface and had rolled-out margin [Figure 2c].

Histopathologically, the first [Figure 3a] and second cases [Figure 3b] revealed the presence of parakeratinized stratified squamous epithelium overlying the connective tissue components and clusters of eosinophilic Toto bodies in the upper spinous cell layer. The underlying connective tissue of both the cases [Figure 4a and b] showed the presence of haphazardly arranged collagen fiber bundles, numerous large endothelial lined blood capillaries with red blood cells and mild-to-moderate chronic inflammatory cell infiltrates. The third case [Figure 5] showed the presence of nonkeratinized stratified squamous epithelium showing areas of eosinophilic Toto bodies. The epithelium was hyperplastic in nature and had superficially confined Toto bodies with few focal areas showing a break in the continuity of the basement membrane (shown with black arrow). The subepithelial connective tissue was composed of severe inflammatory cell response mainly composed of lymphocytes and plasma cells [Figure 6]. Deeper connective tissue was composed of moderately differentiated epithelial cell population arranged in the form of sheets and cords. Dysplastic epithelial cells within the connective tissue showed features of dysplasia such as nuclear and cellular pleomorphism (black arrow) and nuclear hyperchromatism (arrowhead) [Figure 7].

On analyzing the histopathology, which correlated with the clinical diagnosis, the first two cases were diagnosed as lobular capillary hemangioma and the last case was diagnosed as moderately differentiated squamous cell carcinoma.

**DISCUSSION**

Toto bodies are located extracellularly in the dilated intercellular spaces of degenerative epithelial cells.[1] The incidence and severity of the presence of Toto bodies are related to the intensity of the inflammatory reaction in the underlying tissue.[2] The inflammatory reaction was observed in our diagnosed present cases with the presence of round eosinophilic Toto bodies in the superficial spinous cell layer. The highest percent of cases with Toto bodies are seen in pyogenic granuloma, followed by other inflammatory hyperplastic gingivitis.[2] In our present cases also, we found two cases of pyogenic granuloma showing Toto bodies, followed by moderately differentiated squamous cell carcinoma. Various histochemical and ultrastructural studies have been done to answer toto bodies possibility of origin, but its actual etiology has still not been clearly mentioned. Various diverse possibilities of its origin have been explained by different authors as follows:

**Figure 1:** Intraoral clinical images a and b, showing pyogenic granuloma of gingiva involving the lower right mandibular region. Image c showing squamous cell carcinoma of the left buccal mucosa

**Figure 2:** Incisional biopsy photographs a and b, gross specimen of pyogenic granuloma measuring about 1x1.2 cm, 1x1 cm. (c) gross specimen of squamous cell carcinoma measuring about 1.2x1 cm with soft to firm consistency along with irregular surface and margin
According to Toto, these bodies show positive staining for periodic acid–Schiff (PAS), Alcian blue and other metachromatic stains, which stain mucopolysaccharides and are homogeneous dystrophic complexes of acid and neutral mucopolysaccharides with keratin. Hence, he labeled them as mucopolysaccharide keratin dystrophy.\[1\]

Buchner et al. suggested two possibilities of its origin. One is blood plasma infiltrate, i.e., as the intensity of inflammatory reaction increases, which might represent a filtrate from the blood vessels similar to the inflammatory exudates. Another possibility is that histochemically, these bodies show the presence of –SH and –SS groups similar to keratin. Therefore, they suggested the term keratin-like material for these Toto bodies.\[2\]

Chen suggested that ultrastructurally, these bodies are located extracellularly in superficial cells of inflamed oral mucosa, which are weakened by the degenerative changes and become compressible. The plasma membrane of superficial cells is thickened and becomes less permeable to macromolecules. Thus, there would be no outpouring of keratin-like material, i.e., tonofilaments or keratohyalin granules into the extracellular spaces. Therefore, he suggested that these bodies are formed by the combination of glycoprotein and mucopolysaccharides of normal intercellular substance and exudates of the plasma fluid, which are accumulated in the dilated intercellular spaces of superficial degenerating cells.\[3\]

Padala et al. evaluated the staining characteristics of Toto bodies to establish their origin and to identify their significance in lesions. They investigated Toto bodies in the epithelium of pyogenic granuloma, fibroma and leukoplakia after hematoxylin and eosin staining. Sections were stained with Alcian blue, PAS and Ayoub–Shklar stains to evaluate staining intensity and distribution. More of the Toto bodies were found in pyogenic granuloma than...
in fibroma and leukoplakia, similar to our present cases. PAS and Alcian blue staining exhibited mild intensity and did not establish the origin of Toto bodies. High staining intensity and diffuse distribution of stain were observed with Ayoub–Shklar staining, which indicated that Toto bodies originate from keratin. [4]

CONCLUSION

The uniqueness of these three cases is that we observed the presence of homogenous eosinophilic Toto bodies, which were round to oval shaped with a peripheral halo appearance and varying in size in the superficial spinous cell layer of the stratified squamous epithelium as discussed in the introduction. Till now, no case report has been published regarding Toto bodies, which are seen rarely histopathologically in inflammatory lesions. As such, there is less documentation about Toto bodies. However, we came across these beautiful Toto bodies while reporting histopathology slides and thought to put some light on them. Rarely, the presence of Toto bodies could be of diagnostic importance in reactive or inflammatory process.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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“Guidance in the proper direction is necessity for any form of success in life.”

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Conflict of interest

There are no conflicts of interest.

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