

Synthetic Fiber “Teddy Bear” Conjunctival Granuloma; a Case Report

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Abstract

Purpose: To report the clinicopathologic features of a case of conjunctival synthetic fiber granuloma.

Case Report: A 6-year-old girl presented with a slow-growing red nodule in the right inferior conjunctival sac with no history of surgery or trauma. Histopathological examination revealed foreign body type granulomatous inflammation around birefringent fibers of variable colors consistent with synthetic fiber granuloma.

Conclusion: This is the first case report of synthetic fiber (teddy bear) conjunctival granuloma from Iran. Despite its scarcity, ophthalmologists should consider this type of granuloma in the differential diagnoses of childhood conjunctival lesions especially when the lesion is unilateral and inferior.

Keywords: Conjunctival Granuloma; Foreign-body; Synthetic Fiber Granuloma

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INTRODUCTION

Conjunctival foreign body granuloma is induced by the inoculation of a large variety of synthetic and non-synthetic exogenous materials commonly found throughout nature^[1] including insect parts (named conjunctival nodosa in case of caterpillar hair),^[2] organic materials, non-organic debris and synthetic fibers.^[3] Foreign body granulomas have also been described as a common problem after strabismus surgery using catgut sutures.^[4] Close exposure of the eye to stuffed

toy animals, blankets and pullover sweaters made of synthetic materials may cause penetration of the synthetic fibers to the conjunctiva or cornea.^[5] Protective mechanisms such as blinking and tearing often remove foreign bodies from the ocular surface; however, they may be retained, become encapsulated and produce a focal granulomatous inflammation which in case of retained synthetic fibers, the lesion is called a “teddy bear granuloma,”^[5] first described by Weinberg et al in 1984.^[6] These lesions are relatively rare, but have a classic presentation.^[4] They are unilateral, situated in the inferior conjunctival fornix and strikingly develop in pediatric subjects.^[7] Few cases of conjunctival “teddy bear granuloma” and one case of synthetic fiber keratitis have been reported up to now,^[5,6] and the present study is the first report of conjunctival “teddy bear granuloma” from Iran.

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CASE REPORT

A 6-year-old girl presented with redness, itching and a slowly growing red-colored mass in the inferior conjunctival fornix of her right eye noticed by her mother since one month before.

Slit lamp examination of the right eye revealed a well-defined, firm and mobile red subconjunctival nodule measuring $5 \times 5 \text{ mm}^2$ in the inferior fornix with intact overlying conjunctiva and mild papillary reaction. Other ophthalmic examinations were normal. She had no history of ocular trauma or surgery. Her past medical history was also unremarkable. She was scheduled for surgical excision of the mass with clinical suspicious of conjunctival pyogenic granuloma.

Histopathological examination with hematoxylin and eosin (H & E) and periodic acid-Schiff (PAS) stains disclosed goblet cells containing non-keratinized stratified squamous epithelium overlying an aggregation of lymphocytes, plasma cells and histiocytes along with numerous eosinophils and scattered multinucleated giant cells of foreign body type. Clusters of round to cylindrical multicolored fibers of relatively uniform size (28-36 μm) were present which were birefringent under polarized light and some contained fine dark granules [Figure 1a-d]. Scattered lymphoid follicles were also identified. The fibers were non-reactive with PAS staining.

DISCUSSION

“Teddy bear granulomas” are rare inflammatory reactions to synthetic fibers in the conjunctiva.^[4] They are

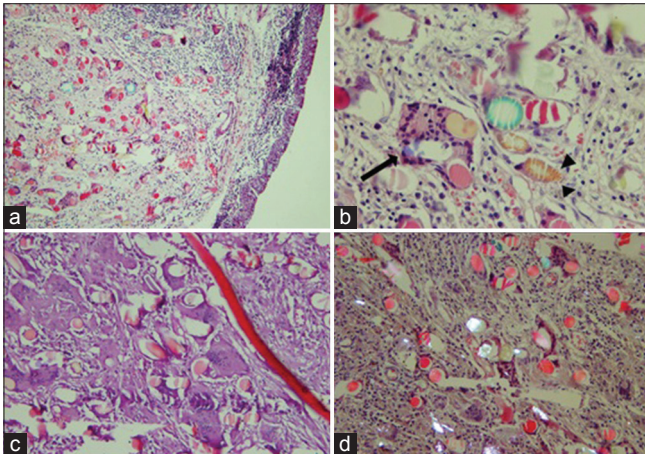


Figure 1. (a) Image depicts intact conjunctival epithelium overlying granulomatous inflammatory infiltrates, multinucleated giant cells and multiple foreign bodies in different colors scattered in the stroma (H & E, $\times 100$); (b) note multinucleated giant cells engulfing the synthetic fibers (arrow). The arrowheads show multiple black dots inside the fibers (H & E, $\times 400$); (c) periodic acid-Schiff (PAS) staining was negative for the synthetic fibers (PAS, $\times 200$); (d) the fibers are birefringent under polarized light (H & E with cross polarizer, $\times 200$).

more common in children and adolescents due to closer exposure to synthetic fibers during daily activities.^[1-4]

Redness, tearing and irritation are the signs associated with foreign bodies in the eye, but corneal involvement with clouding leading to decreased vision has also been reported.^[5] Since children most often neglect the symptoms, they are referred weeks or months after formation of the granulomas.^[1,5]

Definite diagnosis is made by microscopic evaluation documenting the presence of a conjunctival granuloma composed of lymphocytes, plasma cells, eosinophils and foreign body giant cells adjacent to birefringent synthetic fibers, varying from blue-black to green or pink in color, depending on the type of the synthetic fiber.^[1,5] The Splendore-Hoeppli phenomenon (an antigen-antibody reaction) may occasionally be one of the presentations in which an intensely eosinophilic material is formed around microorganisms such as fungi, bacteria or parasites or around biologically inert substances;^[1,8] however, this phenomenon was not observed in our case. Characteristic microscopic features of synthetic fibers have been described by Weinberg et al^[6] and Resnick et al.^[2] Synthetic fibers are recognized by their relatively uniform size, tri-lobed structures and black granular spots which are remnants of titanium, barium or zinc components used in their manufacturing. Fiber diameter ranges from 17 to 29 μm .^[1,5,6] Natural non-synthetic fibers such as eyelashes, caterpillar hair or cotton fibers^[1] have a hollow central core and are PAS positive with weaker birefringence under polarized light as compared to synthetic fibers.^[1,2,6] Scanning and transmission electron microscopy evaluation reveals parallel scratches on the cut ends of fibers which are sectioning artifacts, and variable longitudinal grooves on the axis of many synthetic fibers.^[1]

Our patient presented with characteristic clinical and histopathological features of synthetic fiber granuloma comparable to previous reports, except for fiber diameter of 28 to 36 μm , which is slightly larger than earlier published cases.^[1,2,5,6] Surgical excision has been reported as the treatment of choice^[2,4,5] and our patient developed no recurrence after 12 months of follow up.

Although only few cases of “teddy bear granulomas” have been reported in the literature, it is believed that they occur more commonly than detected. Ferry et al^[7] believe that most ophthalmologists and pathologists are not familiar with these lesions and they should include synthetic fiber granuloma in the differential diagnoses of conjunctival granulomas, especially when there is unilateral involvement of the inferior fornix in a child. However, to our knowledge, the exact reason for the unilateral nature of the condition is unclear. Schmack et al^[1] stated that synthetic fiber granulomas should be differentiated clinically and histopathologically from other causes of conjunctival granulomas such as ophthalmia nodosa, chalazia,

pyogenic granuloma, papillary hyperplasia in vernal conjunctivitis, sarcoidosis, atypical dermoid or dermolipoma and neoplasms such as vascular tumors and rhabdomyosarcoma. Surgical excision can be performed simply at the slit lamp using topical or local anesthesia in a cooperative child.^[1]

In summary, the diagnosis of synthetic fiber granuloma is a challenge to ophthalmologists encountering a conjunctival mass in a child. It characteristically presents as a unilateral conjunctival nodule in a child without previous surgery or trauma. A definite diagnosis can be made by histopathological evaluation. Surgical excision of the lesion is the best treatment.

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Conflicts of Interest

There are no conflicts of interest.

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