

Solitary Fibrous Tumor of the Conjunctiva with Heretofore Undescribed Pathologic Findings

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A 37-year-old female presented with a conjunctival mass discovered 3 years prior. An excisional biopsy revealed a patternless proliferation of round and spindle-shaped cells with an eosinophilic fibrillary cytoplasm and vesicular nuclei with occasional inclusions. Psammoma bodies were arranged around the dilated irregularly-shaped vessels. Differential diagnoses included conjunctival solitary fibrous tumor (SFT), nevus, glomangioma, ectopic meningioma, and mesectodermal leiomyoma. The tumor cells were immunoreactive for CD34, CD99, bcl-2 and vimentin, and were negative for smooth muscle actin, desmin, glial fibrillary acidic protein, S-100 protein, epithelial membrane antigen, and human melanoma black-45. Ultrastructurally, the tumor cells had rough endoplasmic reticulum, free ribosomes, and scattered mitochondria without basal lamina or cellular junctions, which are features of fibroblasts. A diagnosis of SFT was rendered based on the light microscopic, immunohistochemical, and electron microscopic findings. We report here on the second case of a SFT arising in the conjunctiva, which clinically and histologically mimics conjunctival nevus, glomangioma, ectopic meningioma, and a hybrid neurogenic-myogenic tumor such as mesectodermal leiomyoma.

Key Words: Solitary fibrous tumors; Conjunctiva; Antigens, CD34; CD99; Bcl-2

Conjunctiva has two components; a clear mucous membrane and subepithelial stroma consisting of fibrovascular connective tissue that thickens in the fornix and thins at the limbus. Neoplasms can arise in the conjunctiva from both epithelial and subepithelial connective tissue. Nevi are the most common, and, fibrous tumors of any type are rare in the conjunctiva. A solitary fibrous tumor (SFT) is a rare mesenchymal tumor characterized by spindle cells, fibrotic cells, and branching vasculature. SFT occurs mainly in the serosal cavities, but it is also found in the nasal cavity and thyroid gland. To date, about 60 cases of SFT of the eye have been reported with most of them in the orbit,¹ and only one in the conjunctiva.²

We report here on the second reported case of a SFT arising in the conjunctiva, which clinically and histologically resembles conjunctival nevus, glomangioma, ectopic meningioma, and a hybrid neurogenic-myogenic tumor such as mesectodermal leiomyoma.

CASE REPORT

A 37-year-old female presented with a conjunctival mass in her right eye, which was discovered 3 years ago. The mass was characterized as slightly elevated, firm, elliptical, pinkish-red mass, approximately 0.8 cm in diameter, and found on the medial side of the bulbar conjunctiva. The woman's vision was 1.0 in the right eye and 1.0 in the left eye, and intraocular pressure, as measured by applanation tonometry, was 13 mm Hg in each eye. The patient's past medical history was unremarkable. Complete excision of the tumor was performed under local anesthesia using lidocaine.

Pathological findings

The specimen consisted of fragmented, dark-red, soft hemorrhagic tissue, measuring 0.8×0.4×0.3 cm. The specimen was fixed in 10% formalin. Microscopically, the tumor was well demarcated from the overlying squamous epithelium, with no

capsule (Fig. 1A) and characterized by oval to short spindle-shaped cells around the small dilated vessels, with occasional psammoma bodies (Fig. 1B). Many dilated vessels without a classic staghorn-like appearance were observed. The tumor cells had round to oval, bland looking nuclei with inconspicuous nucleoli, and many eosinophilic intranuclear inclusions (Fig. 1C). No cellular whorls, multinucleated giant cells, mitotic activity, nuclear pleomorphism or necrosis were identified. Immunohistochemically, the round to short spindle-shaped cells were immunoreactive for CD99 (prediluted, 12E7, Dako, Glostrup, Denmark), CD34 (prediluted, QBEnd10, Dako), bcl-2 (1:100, 124,

Dako), and vimentin (prediluted, V9, Dako), while they were negative for desmin (1:100, D33, Dako), smooth muscle actin (1:100, 1A4, Dako), S-100 protein (1:1,200, polyclonal, Zymed, San Francisco, CA, USA), human melanoma black-45 (1:100, Dako), glial fibrillary acidic protein (1:350, Dako), and epithelial membrane antigen (EMA; 1:200, Dako).

The paraffin block was deparaffinized for ultrastructural examination and the deparaffinized tissue was fixed in 2.5% glutaraldehyde, followed by 1% osmium with propylene dioxide, and finally embedded in Epon 812 (Oken Shoji Ltd., Tokyo, Japan). Thin sections were post-stained with uranyl acetate and

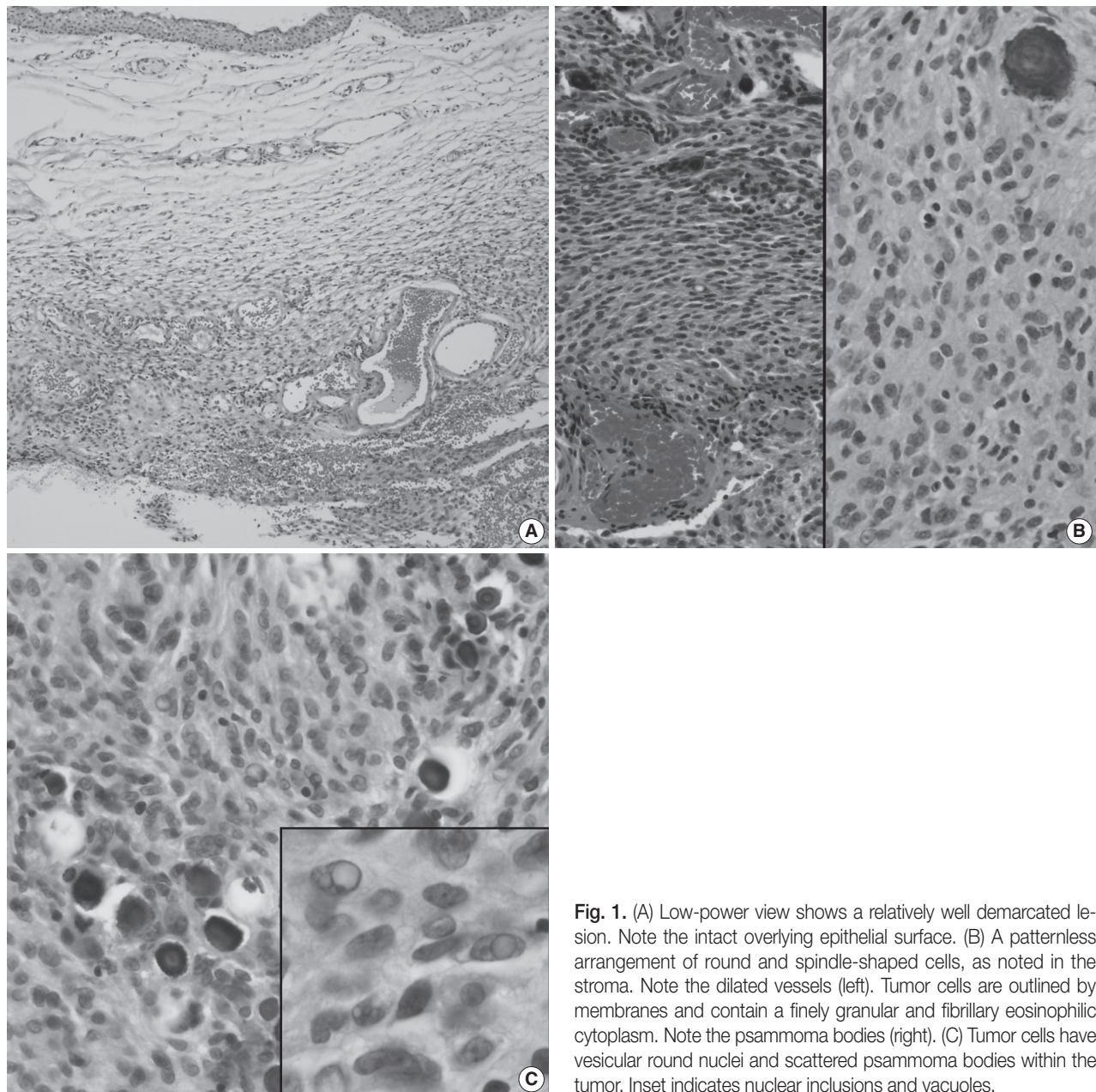


Fig. 1. (A) Low-power view shows a relatively well demarcated lesion. Note the intact overlying epithelial surface. (B) A patternless arrangement of round and spindle-shaped cells, as noted in the stroma. Note the dilated vessels (left). Tumor cells are outlined by membranes and contain a finely granular and fibrillary eosinophilic cytoplasm. Note the psammoma bodies (right). (C) Tumor cells have vesicular round nuclei and scattered psammoma bodies within the tumor. Inset indicates nuclear inclusions and vacuoles.

lead citrate and examined with a transmission scanning electron microscope (H-7100, Hitachi High-Technologies, Tokyo, Japan) at an accelerating voltage of 75 kV. Ultrastructurally, the round to spindle shaped tumor cells showed well-developed rough endoplasmic reticulum, free ribosomes, and scattered mitochondria. Neither basal lamina nor cellular junctions were observed.

Based on the results, the diagnosis of SFT arising from the conjunctiva was made.

DISCUSSION

The greatest challenge in this case was the correct pathologic diagnosis of the conjunctival tumor. On light microscopy, the tumor was composed of bland-looking round to spindle-shaped tumor cells showing a fine fibrillary cytoplasm in the background of dilated blood vessels with no branching appearance and psammoma bodies. Moreover, the tumor had a relatively nondescript morphology, which made the diagnosis even more difficult. Fibrous tumor, nevus, glomangioma, ectopic meningioma, and a hybrid neurogenic-myogenic tumor (i.e., mesectodermal leiomyoma) were initially included in the differential diagnoses. Meningiomas are characterized by round or spindle-shaped cells with vesicular nuclei and intranuclear pseudoinclusions, forming syncytial growth or whorls, with EMA-immunoreactivity and intervening cellular processes of the tumor cells under electron microscopy. Ectopic orbital meningioma has rarely been described in the eyelid, caruncle, and conjunctiva.³ Conjunctival nevi are common, and nevus cells form nests and have intracytoplasmic brown pigment and intranuclear cytoplasmic pseudoinclusions.⁴ Glomangioma commonly occurs in the eyelid area and may develop in the conjunctiva.⁵ Further, glomangioma is characterized by large vascular channels and a scarcity of blood in the lumina, as well as lining with cuboidal cells having the eosinophilic cytoplasm, which are immunoreactive for smooth muscle actin and negative for epithelial markers. Mesectodermal leiomyoma that rarely occurs in the ciliary body is believed to originate from mesodermal tissue derived embryologically from the neural crest (i.e., mesectoderm).⁶ Under light microscopy, mesectodermal leiomyoma frequently show a fibrillary background and clear vacuolated nuclei, which microscopically more closely resembles a neurogenic or meningioma than a myogenic tumor. However, the tumor shows positive immunoreactivity for muscle markers only, and negative staining for melanoma-specific antigen and neural markers. Ultra-

structurally, the tumor shows both neurogenic features such as microtubules, as well as myogenic features including abundant myofilaments with fusiform densities, pinocytic vesicles, and small caveolae of plasmalemma. Fibrous tumors of the conjunctiva include benign fibrous histiocytoma, giant cell angiofibroma, SFT, and fibroblastic type of myofibroblastoma as differential diagnoses.⁷ Benign fibrous histiocytoma is characterized by the storiform growth pattern with fibroblastic and histiocytic cells, and occasional multinucleated giant cells, whereas giant cell angiofibroma shows a patternless proliferation of spindle cells and multinucleated giant cells with the occasional floret shape, and rich in vasculature. Spindle cells of giant cell angiofibroma are immunopositive for both CD34 and vimentin in the SFT, while those of benign fibrous histiocytoma are mainly CD34-immunonegative. In addition to co-expression for CD34 and vimentin, immunonegativity for desmin in the SFT allows it to be distinguished from blastic type myofibroblastoma. Although CD34-positive spindle cells and the vessel-rich fibrous tissue are sharing features with giant cell angiofibroma, multinucleated giant cells are not found in the SFT. Strong CD34 reactivity is currently regarded as characteristic and an indispensable finding in the diagnosis of SFT. Spindle cells showing immunoreactivity for CD34, CD99, bcl-2, and vimentin are dispersed in the collagen bands, while they are negative for desmin, smooth muscle actin, epithelial markers, vascular markers or neural markers. Although no individual marker is absolutely specific for SFT, the combined expression of CD34, bcl-2, CD99 and vimentin definitely points towards a diagnosis of SFT.¹

SFT is usually rich in a fibrocollagenous matrix, and composed of alternating hypercellular loci and hypocellular sclerotic loci; namely, spindle cells with a fascicular or storiform arrangement, and bundles of collagen fibrils with spindle cells. Intracytoplasmic pseudoinclusions and psammomatous calcification like the present case are not common features of SFT.¹ Conjunctival SFT in the present case shows unique morphological findings because it shares features under light microscopy and clinical background with conjunctival meningioma, nevus, glomangioma or mesectodermal leiomyoma. Thus, the diagnostic problem remains such that the present tumor is an unusual variant of SFT or CD34-positive benign fibroblastic tumor, not otherwise specified, because of the unusual morphological findings for diagnosing SFT. The other possibility is that these unusual findings may be ascribed to their particular location of occurrence.

In addition to its unique pathologic appearances, most of the deeply-situated orbital SFTs appear to be space-occupying le-

sions presenting with proptosis, while their conjunctival counterparts have no apparent clinical symptoms in the present case and the previous one.²

The present case is the second reported case of SFT arising in the conjunctiva. Albeit rare, SFT should be included in the differential diagnosis of conjunctival mass lesions.

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