Myxoma of the cornea

Hind AlKatan,^a Khalid Al-Arfaj^b

From the ^aPathology and Laboratory Medicine Department, King Khaled Eye Specialist Hospital, Riyadh and the ^bDepartment of Ophthalmology, King Fahad University, Al-Khobar, Saudi Arabia

Correspondence and reprints: Hind AlKatan, MD · Pathology and Laboratory Medicine Department, King Khaled Eye Specialist Hospital · PO Box 7191, Riyadh 11462 Saudi Arabia · T: +966-1-482-1234 F: +966-1-482-1908 · hkatan@kkesk.med.sa · Approved for publication October 2007

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Myxomas are lesions composed of modified fibroblasts with a round or elongated shape that are sparsely distributed in a myxoid stroma with abundant glycosaminoglycans "rich in hyaluronic acid" and fine collagen.¹ Solitary and multicentric lesions are known. They have been identified in the orbit, eyelids, conjunctiva and more recently in the cornea. We report the ninth case of solitary corneal myxoma, in the absence of a cardiac lesion.

CASE

A 58-year-old Saudi male with diabetes for 2 years and recent onset of hypertension presented to King Khaled Eye Specialist Hospital with a 1-year history of a whitish lesion over his left cornea, which caused irritation and affected his vision. He gave a history of cataract extraction surgery 2 years previously and unilateral pterygium excision 4 years previously in the same eye. Upon examination of his eye, an elevated whitish corneal lesion measuring 5×3 mm was seen on the nasal side with vascularization extending from the limbus (Figure 1). Slit lamp examination showed satisfactory pseudo-phakia. The decision was made to excise the lesion for histopathologic diagnosis. During surgery, the lesion was found to be deep and a scleral patch graft in addition to amniotic membrane transplantation was needed. The histopathology showed a lesion elevating the corneal epithelium with an absent Bowman's layer. A widely separated spindle and stellate mesenchymal cells were observed within a myxoid background (Figure 2). The lesion was unencapsulated and showed areas of positive staining with Alcian blue (Figure 3), and negative staining to S-100 stain. The adjacent conjunctiva showed minimal fibrosis and neovascularization was noted deeper in the lesion (Figure 4). The patient had a satisfactory post-operative result (Figure 5) and was followed up for 7 months with no evidence of recurrence of the lesion.

DISCUSSION

Myxomas are lesions that can be identified in muscles, heart, breast, skin, sinuses and the orbit. The precise origin of myxomas is not known. They are usually non-encapsulated and consist of widely separated stellate and spindle-shaped mesenchymal cells within a basophilic myxoid background rich in hyaluronic acid.¹ The importance of these lesions is attributed to their association with an unusual disease complex which was first described by Carney and associates in 1985.² The cardiac lesions in these cases result in significant morbidity in nearly half of the patients.

Myxomas in the ocular area are generally rare. They can occur as isolated or solitary lesions that tend to be self-limited and have a benign clinical course.³ However, ocular-cutaneous lesions may occur as part of the multicentric disease in up to 70% of cases and often precede the most serious associated cardiac lesions in Carney's complex.¹ The history of ocular myxoma goes back to 1914 when it was first reported in the orbit by Fuchs, and in the same year Maucione described a pure myxoma of the conjunctiva. Then in 1962, Ffooks reviewed the history of ocular myxomas and briefly commented on the first case presented by Magalif in 1913.⁴ He also suggested that the conjunctival myxoma on the

Figure 1. Clinical picture of the left corneal mass.

Figure 2. Histopathology showing spindle and stellate cells (hematoxylin-eosin, ×200).

Figure 3. Histopathology of the lesion showing Alcian blue positive myxoid background (Alcian-blue, ×200).

Figure 4. Deep vascularization of the lesion (hematoxylin-eosin, ×200).

first reported case by Maucione as being probably derived from granulation tissue because of a large number of blood vessels in the specimen. He reported a typical conjunctival myxoma arising in a glaucomatous patient 6 years following a glaucoma filtering procedure. He clarified that the lesion was isolated from the bleb and described it as being *de novo*. Two more cases of epibulbar myxomas were then published by Daughman in 1970⁵ and Stafford in 1971.⁶ They both stated that true epibulbar myxoma are rare and should be differentiated from lesions representing a myxomatous degeneration of mixed tumors such as capillary hemangioma. Mottow-Lippa et al⁷ added the ultrastructural features of such lesions demonstrating plump and spindle cells, some of which possess fine intracytoplasmic filaments dispersed within a matrix with collagen bundles. Their electron microscope findings were consistent with the diagnosis of conjunctival myxoma. Péér and Hidayat studied the clinicopathologic features of 14 cases with a median age of 50 years.⁸ The primary clinical location of their cases was the temporal bulbar conjunctiva with the clinical diagnosis of a cystic lesion in many cases. One case had a bilateral lesion, but did not show any evidence of multicentric disease. They concluded that these lesions are slow growing and do not tend to recur following simple local excision. They favored a neoplastic process rather than a degenerative one in the evolution of such lesions. Furthermore, Horie and co-authors reported a case of conjunctival myxoma with an extensive review of all the previously reported cases.⁹ They examined the immunohistochemical nature of the tumor cells and demonstrated positive staining for vimentin and alpha-smooth muscle actin. The cells were negative for S-100 protein, desmin, myoglobin, lysozyme, cytokeratin and epithelial membrane antigen. They concluded that the tumor cells exhibit a fibroblastic or myofibroblastic cell phenotype.

Myxomas of the cornea, on the other hand are extremely rare. To our knowledge, only 8 cases have been reported. Robinson et al¹⁰ recently summarized the previously reported cases and pointed out the history of a preceding inflammation, disease (a case of keratoconus) or trauma in addition to a total of 6 cases, including his case, which was related to a forceps birth injury treated by phototherapeutic keratectomy. The lesion in his case was subepithelial with a fragmented Bowman's layer and showed spindle and stellate multinucleated cells with positive staining for vimentin and smooth muscle actin. He demonstrated the electron microscopic findings, which supported his diagnosis. He also pointed out that some of the myxoma cells in his case were multi-nucleated, which is a feature found in cardiac and eyelid myxomas associated with Carney's complex.

Lo and associates¹¹ presented a typical case of primary corneal myxoma with supporting clinical, histochemical and ultrastructural studies in a patient who had no underlying corneal disease. Hansen¹² reported the other case of primary spontaneous myxoma of the cornea. Leger¹³ presented his case as a primary myxoma of the cornea in a 26-year old woman with keratoconus and Down syndrome. She was diagnosed initially as acute hydrops, but the lesion proved by histopathology to represent a myxoma. The immunohistochemical staining showed positivity of the cells to vimentin only. The cornea showed z-shaped interruptions in Bowman's layer and a few inflammatory cells. The significance of this association and the effect of the interrupted Bowman's layer on the development of the lesion were uncertain.

We believe that pure myxoma of the cornea is rare and difficult to explain. On the other hand myxomas arising following inflammation, trauma or surgery might be explained on the basis of the relation of the healing process to the development of such lesions. Perez-Grossman³ reported a case of subepithelial corneal myxoma in a patient four years following successful treatment of an infectious corneal ulcer, and concluded that the lesion seemed to be originating from corneal stromal fibroblasts that reacted to the inflammatory process and produced excessive hyaluronic acid instead of collagen. In their opinion, myxoma formation is strongly related to the presence of an interrupted Bowman's layer and the proximity of the lesion to the epithelium, thus no middle or deep stromal myxomas have been reported in corneas with an intact Bowman's layer. Wollensak et al¹⁴ further supported the hypothesis of a cellular origin from subepithelial modified stromal keratocytes. These spindle myofibroblast cells might also be derived from the basal epithelial cell layer where the cells possibly acquire contractile properties. This explains the frequent observation of fragmented or absent

Figure 5. Postoperative appearance of the left eye.

Bowman's layer in affected areas. The relation of the lesion in our case to the history of pterygium excision led us to realize the importance of an initiating reason for the formation of a corneal myxoma. Of the nine corneal myxomas mentioned, a preceeding history of trauma or disease was found in 78% of the cases (7 of 9 including our case). One of the remaining 2 cases without such a history, showed an absent Bowman's layer by histopathology, which was not clinically explained.¹¹ Therefore, we believe that disruption of Bowman's layer is an important factor for the development of corneal myxomas, since this will affect the integrity of both the epithelium and the superficial corneal stroma. We also support the hypothesis of an epithelial basal cell layer origin, which would also explain the previous observation regarding the location of such lesions within the subepithelial area or anterior corneal stroma. Further studies are needed to prove this theory. The identification of these lesions by ophthalmologists and other involved health professionals is essential to classify the simple isolated cases from other patients who might have a multicentric serious disease.

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