

## MINIREVIEWS

### Melanodacryorrhea, or Black-Colored Tears: A Review of the Literature

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#### ABSTRACT

Melanodacryorrhea, or black-colored tears, is an extremely rare condition. A review of the literature yields very few articles on its pathophysiology. The authors discuss three identified causes of melanodacryorrhea: uveal melanoma, ocular mycosis, and bilateral conjunctival argyrosis. *Biomed. Int.* 2013; 4: 100-102. ©2013 Biomedicine International, Inc.

*Key words:* Argyrosis, black tears, melanodacryorrhea, melanoma, ocular mycosis, silver

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#### INTRODUCTION

A thin, three-layered, clear tear-film protects the ocular surface. Several systemic or local diseases can cause changes in the color of tears. These include epistaxis, irritation due to contact lenses, severe anemia, coagulopathies (e.g., hemophilia), conjunctival vascular tumors, Osler-Weber-Rendu disease, nasolacrimal sac tumors, and conjunctival melanoma.<sup>1,2</sup> Additionally, some drugs and diagnostic dyes can change the color of tears, such as rifampicin and fluorescein.<sup>3</sup> In the extant literature, several conditions are noted to cause melanodacryorrhea, or black-colored tears.

#### *Etiologies*

Uveal melanoma with orbital extension has been associated with melanodacryorrhea.<sup>3</sup> A patient may complain of painless blurred vision in the affected eye, foreign body sensation, and black tears. The intraocular pressure of the affected eye may be elevated. Ultrasonography can detect the presence of an echo-dense mass with vascular pulsations. However, per the Collaborative Ocular Melanoma Study, massive orbital extension of melanoma is uncommon, with extraocular extension in 3% of eyes affected by medium choroidal melanomas and in 8% of eyes affected by large choroidal melanomas.<sup>3</sup> Structural defects in the sclera, such as those secondary to trauma, can result in massive extraocular extension. In addition, large necrotic melanomas can result in scleritis, which weakens the structural integrity of the sclera and thereby makes the sclera more susceptible to penetration by an extending uveal melanoma.<sup>4</sup> Tumors with extraocular extension can invade the conjunctival epithelium. Such invasion enables the pigment from the tumor to disperse into tears, resulting in melanodacryorrhea.<sup>3</sup> Thus, a patient with melanodacryorrhea should be evaluated for invasive melanoma with extraocular extension.

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Submitted October 1, 2013; accepted November 23, 2013.  
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Ocular mycosis is a rare condition that primarily occurs in immunocompromised individuals. It can be seen in immunocompetent individuals with a history of ocular trauma, corticosteroid injections, or preexisting ocular disease.<sup>5</sup> *Exophiala* species are black-pigmented yeasts commonly found in soil, plants, water, and decaying wood<sup>5</sup>, and have been described as causing fungal keratitis following keratoplasty<sup>6</sup> and laser in situ keratomileusis.<sup>7</sup> In immunocompetent individuals, this fungal infection is typically superficial and localized. A subconjunctival mycetoma secondary to infection by an *Exophiala* species can result in recalcitrant ocular inflammation and black-colored deposits in tears.<sup>5</sup> Treatment can include aggressive topical and systemic antifungal therapy with surgical intervention<sup>8</sup> or surgical debridement alone.<sup>9</sup> Thus, melanodacryorrhea can suggest immunodeficiency. Patients who present with black-colored tears should be evaluated for causes of a compromised immune system, such as HIV.

Melanodacryorrhea can be due to argyrosis, which results from prolonged exposure to silver. A direct relationship is evident in the amount of discoloration and total exposure time to silver.<sup>10</sup> In the majority of cases of argyrosis, several other parts of the body are also discolored, such as the skin, nails, teeth, and mucosal surfaces.<sup>11</sup> Black tears and black pigmentation of both eyes with normal visual acuity and intraocular pressure can occur in the setting of bilateral conjunctival argyrosis.<sup>11</sup> A Scheimpflug camera image can display hyperreflectivity corresponding to corneal pigment accumulation in the superficial layers of the cornea, and the diagnosis of argyrosis can be confirmed via a conjunctival biopsy that shows subepithelial extracellular silver particles in the lamina propria.<sup>11</sup> The exact mechanism of melanodacryorrhea in the setting of argyrosis is not known, but a proposed theory is that mechanical inoculation of the eye with silver particles results in black-colored tears.<sup>10</sup> In addition to argyrosis, silver exposure can damage the liver, kidneys, respiratory tract, and intestinal tract, and elicit changes in blood cell lines.<sup>11</sup> Consequently, a patient should be evaluated for these systemic problems if his or her melanodacryorrhea is secondary to argyrosis.

## CONCLUSION

Only three case reports in the extant literature discuss melanodacryorrhea. These case reports indicate that melanodacryorrhea can suggest the presence of cancer, immunodeficiency, or silver toxicity. In conclusion, primary care physicians and ophthalmologists should place these three pathologies on the differential when evaluating a patient who presents with black-colored tears.

## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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