Localized Conjunctival Argyrosis: A Late Sequela of Strabismus Surgery

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Abstract. We describe a case of focal argyrosis of the conjunctiva clinically simulating a melanoma. An 82-year-old woman was referred for an asymptomatic pigmented conjunctival lesion. Her only significant past ocular history was strabismus surgery 76 years earlier. Biopsy of the conjunctiva and lateral rectus muscle revealed the discoloration was pigment granules. Energy-dispersive x-ray microanalysis revealed the pigmentation to be silver deposits. The patient had strabismus surgery probably using a silver clip. Argyrosis should be considered in the differential diagnosis of focal pigmented conjunctival lesions. [Ophthalmic Surg Lasers 2000;31:495-498]

INTRODUCTION

Numerous reports have documented argyrosis since the 17th century when large doses of silver containing medications were used to treat such diverse ill-

Figure 1. Pigmented conjunctival lesion in the temporal aspect of the right eye. Note the extension of the pigmentation along the visible extent of the lateral rectus muscle insertion.

nesses as syphilis, seizures, burns, and almost all forms of incurable diseases. Corneal deposits of silver have been reported from ocular medications, make-up containing silver, and from occupational exposure. Silver may also involve the conjunctiva, though usually in a more diffuse manner. We report an unusual presentation of localized argyrosis of the conjunctiva and lateral rectus muscle simulating a malignant melanoma in a patient who underwent strabismus surgery 76 years earlier. She probably underwent surgery using a silver ring to shorten the lateral rectus muscle.

CASE REPORT

An 82-year-old white female with a history of strabismic amblyopia was evaluated for an asymptomatic pigmented conjunctival lesion in the right eye, noted on a routine examination. She underwent strabismus surgery of the right eye in 1917. The patient denied any additional ocular surgery, trauma, or use of ocular medications.

On examination, a large angle left esotropia was noted. Slit lamp examination revealed a $5.5 \times 10.5$ mm pigmented conjunctival lesion in the temporal aspect of the right eye (Figure 1). The pigmentation
mainly appeared to involve the underlying subconjunctival connective tissue and the insertion of the lateral rectus muscle; no scleral thinning was noted. Except for cataractous changes, the remainder of the anterior segment evaluation and dilated fundus examination were within normal limits bilaterally. Immersion B-scan ultrasonography showed the lesion to be flat without intraocular extension or specific internal reflectivity. X-rays of the skull revealed no evidence of a metallic foreign body in the right orbit.

Because of the suspicion of a conjunctival malignant melanoma or a subepithelial foreign body, the patient underwent biopsy. At the time of surgery, pigmentation was noted to involve the right lateral rectus muscle throughout its visible extent. This muscle also underwent biopsy. Postoperatively, she has done well without evidence of pigment progression.

Histologic evaluation of the affected conjunctiva and muscle disclosed numerous extracellular black granules within the tissue. Many of them were aligned in a linear array along muscle fibers (Figure 2). The pigment readily bleached with potassium permanandate, and did not stain with Perl’s Prussian blue stain. Six 1-micron thick sections of paraplast-embedded conjunctiva and extraocular muscle adjacent to that viewed by light microscopy were subjected to energy-dispersive x-ray microanalysis (EDX). For EDX, the sections were floated on water, mounted on carbon stubs coated with xylene to deparaffinize the tissue sections, and then coated with carbon in a vacuum evaporator. Energy-dispersive x-ray microanalysis disclosed prominent peaks for silver and minor amounts of selenium, silica, and sulfur (Figure 3). Mapping the distribution of silver corresponded to the distribution of the pigment granules readily identified by backscatter imaging (Figure 4). Selenium was distributed throughout the background and was not related to the pigment particles.

Our patient had none of the usual predispositions for ocular argyrosis, with her only significant past history being strabismus surgery to her affected eye in 1917. Although silver sutures and foils do not appear to have been used in ophthalmic surgical procedures, to the best of our knowledge, these materials need to be considered in surgically-induced argyrosis. William Halstead noted that silver wire suture worked well in abdominal surgery, as well as skin wounds, because of its antiseptic properties. He stressed the ability of silver to inhibit the growth of organisms in the surgical field. A foreign body was also in our differential diagnosis because of the location of the pigmentation. A similar clinical picture was reported because of a pencil injury.
Reports of localized soft tissue pigmentation from silver sutures are rare. A single report in the German literature noted blue to black patches in a scar from a previous cesarean section performed 30 years earlier using a silver suture. A clinical picture of cutaneous malignant melanoma prompted biopsy of this localized argyrosis.

In 1908, Briggs reported a method of tendon shortening through the use of a silver wire. A flattened ring of silver wire was clamped over a loop of an extraocular muscle tendon (Figure 5). The strangulated tissue began to atrophy within 24 hours; this tissue, along with the silver ring, was removed in 10 to 14 days. The operation attracted sufficient interest to be listed in a major German ophthalmology textbook. Bartley et al. reported a clinical presentation strikingly similar to ours—a patient with localized argyrosis simulating a conjunctival melanoma. Although initially postulated as arising from silver suture or postoperative application of silver nitrate collyrium, a follow-up report in 1992 gave strong evidence that this pigmentation was caused by Briggs’ silver wire rings.

Indeed, Bartley reported 5 additional potentially similar cases in communications with 2 other ophthalmologists. All patients appeared to have undergone strabismus surgery in the first half of this century. In one case, the silver wire ring was apparently left in place (unlike Briggs’ technique), and was found on the extraocular muscle. Our patient underwent strabismus surgery in Asheville in 1917, in the same area and time-frame of Dr. Briggs’ career.

According to personal communication, Dr. E. Isbey, Jr. (April 1995), the number of individuals who underwent the Briggs procedure is unknown, but these pigmented conjunctival lesions are rare, and have not been observed in the experience of current ophthalmologists in the region where Briggs practiced from 1899 until his death in 1931. Perhaps pigmentation may only follow silver clips that remain in place for years and are not removed. However, our patient had no evidence of a retained ring, intraoperatively or by skull radiographs.

REFERENCES


5. Halstead WS. Ligature and suture material: the employment of fine silk in preference to catgut and the advantages of transfixation of tissues and vessels in control of hemorrhage. Also an account of the introduction of gloves, gutta-percha tissue and silver foil. JAMA. 1913;60:1119-1126.


