Retinal Metastasis Presenting as a Retinal Hemorrhage in a Patient With Adenocarcinoma of the Cecum

In contrast to choroidal metastases, which are the most common malignant intraocular neoplasms in adults, metastases confined to the retina are extremely rare.\(^1\) The colon is an infrequent source of metastatic carcinoma to the retina. To our knowledge, there are 2 other reported cases of metastatic adenocarcinoma of the retina that potentially derive from adenocarcinoma of the colon. In 1 case, the patient had Muir-Torre syndrome with sebaceous adenomas of the face and neck, uterine leiomyoma, adenocarcinoma of the breast, colonic adenocarcinoma, keratoacanthoma of the eyelid and squamous cell carcinoma of the forehead.\(^2\) In the same case, histopathologic analysis of the retinal tumor had occurred following enucleation of a painful eye. Although the retinal lesion was an adenocarcinoma, it had clear cell features that were lacking in the adenocarcinoma of the colon.\(^3\) During the course of care, the patient had also undergone previous mastectomy for the adenocarcinoma of the breast and excision of the sebaceous adenomas, but the samples were reported to be unavailable for review.\(^4\) As such, the source of the retinal metastasis remained unverified. The second case was described by Kennedy et al\(^5\) as a patient with an adenocarcinoma of the rectosigmoid region who underwent enucleation following metastasis to the macula.

We describe a patient with an adenocarcinoma arising in the cecum. He developed a solitary retinal metastasis located along the inferior temporal arcade that was excised. The initial examination was unusual, as the appearance was that of a retinal hemorrhage. The resulting histopathology was consistent with the primary tumor.

Report of a Case. A 39-year-old white man with adenocarcinoma of the cecum, Dukes stage D (tumors that have spread to distant sites) metastatic to the lung and liver, sought treatment at the Wilmer Ophthalmological Institute with complaint of a superior visual field defect in the left eye of 1 day’s duration. During the previous 6 weeks, the patient had been treated with a chemotherapeutic regimen consisting of leucovorin, 5-fluorouracil, and irinotecan hydrochloride. Three months prior to onset of the visual complaints, the patient had undergone right hemicolecotomy.

Ophthalmologic examination disclosed an uncorrected visual acuity of 20/20 in each eye and full extraocular movements. There was no relative afferent pupillary defect. Intraocular pressures were 16 mm Hg in each eye, and slitlamp examination of the anterior segments was unremarkable. Dilated fundus examination of the right eye showed a cup-disc ratio of 0.3 with a normal disc, macula, retinal vasculature, and peripheral retina. Examination of the left eye showed a cup-disc ratio of 0.3, and a 3–disc diameter circular area of subretinal hemorrhage along the inferotemporal arcade. A component of the hemorrhage was noted to be superficial to the retinal vessels. There was no identifiable mass lesion on examination. The retinal periphery was unremarkable. The fundus photograph of the retinal hemorrhage obtained at first examination was unavailable for review, however, the fluorescein angiogram performed on the same day demonstrated the funduscopic findings. Fluorescein angiogram showed a discrete area of blocked fluorescence deep to the retinal vessels corresponding to the subretinal hemorrhage (Figure 1A). A smaller area of more superficially blocked fluorescence was identified, as evidenced by blockage of the fluorescence of the retinal vasculature within the larger area of blocked fluorescence. No mass lesion was evident. The differential diagnosis at that time was combined subretinal and intraretinal hemorrhage due to retinal macular edema, cavernous hemangioma, choroidal neovascularization, and in this setting, metastatic tumor.

Disease-related circumstances kept the patient from ophthalmologic follow-up for a period of 10 weeks. During that time, he noted worsening of his vision. Uncorrected visual acuity was 20/60 in the affected eye with no improvement using pinhole visual acuity testing. Examination of the right eye remained unremarkable. Dilated funduscopic examination of the left eye revealed a mass along the inferotemporal arcade that was deep to the retinal vessels and associated with mild hemorrhage (Figure 1B). The lesion was associated with an exudative retinal detachment with involvement of the foveal center. Fluorescein angiogram showed hyperfluorescence corresponding to the retinal mass with intraretinal leakage. Most of the retinal vessels appeared to course superficial to the lesion.

Ultrasonography identified a dome-shaped, solid retinal lesion, inferotemporal to the optic nerve with no internal vascularity (Figure 1C). The reflectivity and structure of the lesion were irregular. No choroidal or extraocular extension was identified. The maximal thickness was 2.8 mm. The lateral and radial dimensions were 5.3 mm and 6.6 mm, respectively.

One month later, ophthalmoscopic examination disclosed that the mass was stable but that the exudative detachment had progressed and there was increased lipid content. The angiographic appearance of the lesion was essentially un-
changed. Ultrasonography verified the stability of the lesion size as well as progression of the associated exudative detachment. Given the poor systemic prognosis and the relative stability of the lesion, observation was recommended.

One month later, uncorrected visual acuity had decreased to 20/250 OS. Ophthalmoscopy disclosed enlargement of the mass and of the associated exudative retinal detachment (Figure 1D). The lesion appeared to be intrinsic to the retina and its growth was primarily along the inferior temporal vasculature, in the direction of the optic nerve head. Despite prior loss of macular vision, the patient had increasing complaint of progressive loss of peripheral vision and depth perception. Ultrasonogra-
with mucin-containing cytoplasmic vacuoles (arrow) arranged in an adenomatous papillary pattern

phy documented significant growth of the mass and confirmed its intraretinal location (Figure 1E). The increasing elevation of the exudative detachment allowed for echographic documentation of no choroidal involvement. Following central nervous system imaging, this single ocular lesion was the only evidence of central nervous system disease. The liver metastases were stable on current chemotherapy. The patient continued to function at a relatively high level of activity at both home and work.

The patient received 3 additional cycles of chemotherapy from the time that the retinal lesion was initially diagnosed. Because the presumed retinal metastasis with associated exudative retinal detachment did not respond to chemotherapy and was the only evidence of central nervous system disease, a tissue diagnosis was sought prior to instituting additional treatment. While it was felt that adenocarcinoma of the cecum, metastatic to retina, was highly probable, it was conceded that this had not been previously reported. A decision to biopsy the mass was reached only after an extensive discussion of the potential risks and benefits with the patient.

A 3-port pars plana vitrectomy was performed. During the course of mobilization of the tumor, it became apparent that its confinement to the retina would allow removal of the entire mass with minimal additional surgery. The lesion was mobilized via retinotomy and retinectomy. During removal, a limited margin of grossly uninvolved retina surrounding the lesion was excised. The optic nerve head and adjacent retina were free of tumor. The entire lesion was delivered en bloc through a pars plana incision. The retina was flattened under perfluorochemical, after which a fluid-air exchange and focal laser endophotocoagulation to the retinal margin was performed. The attached retina was left under silicone oil.

Histopathologic examination of the lesion demonstrates tall, hyperchromatic, pleomorphic cells with mucin-containing cytoplasmic vacuoles (arrow) arranged in an adenomatous papillary pattern (periodic acid–Schiff, original magnification × 100).

These findings lead to the diagnosis of mucin-secreting adenocarcinoma similar to the primary colon adenocarcinoma.

The patient was referred for radiation therapy and subsequently received palliative orbital radiation. At the 3-month follow-up examination, uncorrected visual acuity was 7/200 OS and the retina was attached under silicone oil without evidence of recurrent tumor. At last examination, no other central nervous system or ocular metastatic disease had been detected. The eye was nonpainful with a normal intraocular pressure. The patient expressed appreciation for the peripheral vision that had returned following retinal reattachment.

Comment. Intraocular metastases isolated to the retina are rare.1 The first case was reported by Smoleroff and Agatston1 and was secondary to a gastroesophageal adenocarcinoma. In a historical review of retinal metastases, Pelzek and Schachat1 summarized the literature which at that time consisted of 20 additional cases of intraocular metastases localized to the retina and 4 cases of retinal metastases that were associated with additional intraocular metastases. No case to date has been histopathologically confirmed to have derived from an adenocarcinoma of the cecum as the primary tumor. As described earlier in this report, Spraul et al2 reported a patient with Muir-Torre syndrome and a metastatic adenocarcinoma to the retina and Kennedy et al3 reported an adenocarcinoma metastatic to the macula from the rectosigmoid region. In addition, Curtin4 examined a patient with anaplastic carcinoma of the colon and retinal metastasis.

The initial manifestation of this metastatic lesion is of interest because detection of a mass was preceded by the presence of a small intraretinal and modest subretinal hemorrhage that while highly suspect in this patient with known disease, would have presented a greater diagnostic conundrum in an otherwise well-appearing 39-year-old man. In this case, it is reasonable to assume that a collection of cells with metastatic potential entered the retinal vasculature and that a small hemorrhage resulted from their early disruption of the retinal microvasculature.

Figure 2. Histopathologic examination of the lesion demonstrates tall, hyperchromatic, pleomorphic cells and clusters of tumor cells. (periodic acid–Schiff, alcian blue, periodic acid–Schiff–positive granular material, hematoxylin-eosin, original magnification × 100).
The fact that an excisional biopsy preceded the administration of palliative radiation therapy in this case does not suggest that this approach is necessarily indicated in other cases of retinal metastasis. However, some surgical considerations are worth noting. In this case of an isolated retinal metastasis with exudative detachment, removal of the entire lesion was not significantly more difficult than removing a smaller part of it. Because the remaining retina was mobile, reattachment by current methods was routine. The potential benefits in this patient may include the following: the restoration of some peripheral vision and depth perception through reattachment of remaining retina, histological characterization of the retinal mass, elimination of significant tumor mass (potentially making extension of tumor to adjacent structures less likely in the patient’s lifetime), and psychological benefit to the patient from knowing that the visible tumor had been removed.

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Late Traumatic Corneal Wound Dehiscence After Penetrating Keratoplasty

Penetrating keratoplasty wound dehiscence usually occurs early in the postoperative period and is associated with premature suture removal, abnormal wound healing, sudden increases in intraocular pressure, corneal edema, and trauma.1,2 Binder et al1 noted in their series an incidence of full-thickness wound separation or partial wound gape of 5.7%; all cases occurred within the first 2 years following the initial surgery. Penetrating keratoplasty wound separation infrequently develops late in the postoperative course and usually results from direct trauma.3 In a series by Raber et al3 on traumatic wound dehiscence following penetrating keratoplasty, all cases occurred within 18 months of the initial surgery. However, one of the most recent cases of traumatic penetrating keratoplasty wound dehiscence reported in the American literature occurred 13 years after initial surgery.4 In the European literature, Rohrbach et al4 noted one case occurring 25 years after grafting.

At the Wilmer Eye Institute (Baltimore, Md), we followed up 6 patients who had sustained traumatic penetrating keratoplasty wound dehiscence 10 to 19 years after initial surgery. To our knowledge, this is the largest reported series of graft dehiscence occurring a decade or more after penetrating keratoplasty.

Report of Cases. Case 1. A 79-year-old white woman who had undergone penetrating keratoplasty for aphakic bullous keratopathy 19 years earlier injured her right eye while trying to remove a rigid contact lens. When she was unable to remove the contact lens, she enlisted the assistance of a neighbor, who attempted to remove the lens using a contact lens plunger. After repeated attempts, they were unable to retrieve the lens. During the episode, the patient noticed some pain and decreased vision. The next morning, as she bent down to pick an object off the floor, she noted sharp pain in her right eye and an acute reduction in her vision. On examination at the Wilmer Eye Institute, her vision was light perception, and she was noted to have a choroidal hemorrhage with kissing choriolds. Her graft had dehisced inferiorly for 4 clock hours, with incarcerated iris plugging the wound (Figure 1). The wound was repaired the same day, with a postoperative best-corrected acuity of 20/400 (Figure 2). Her graft has remained clear since repair 3 years ago.

Case 2. A 79-year-old white woman with an extensive past medical history who had undergone penetrating keratoplasty for Fuchs endothelial dystrophy in her right eye 16 years earlier injured her right eye. She slipped in her kitchen, striking her eye against the edge of a freezer. On examination, she had light perception vision in the right eye, with 8 clock hours of graft dehiscence temporally and uveal prolapse. Because of her poor overall health and because she had recently eaten, the decision was made to postpone the repair until the following day. By the next morning, an expulsive choroidal hemorrhage had occurred, and an evisceration was subsequently performed (Figure 3).

Case 3. A 36-year-old African American man had undergone penetrating keratoplasty for keratoconus in his left eye 17 years before he suffered the current football injury that affected this eye. Examination revealed a temporal graft dehiscence of approximately 5 clock hours, with extrusion of the crystalline lens and iris prolapse through the wound. The corneal dehiscence was repaired at a local hospital. The patient later recovered a best-corrected visual acuity of 20/25. His graft has remained clear since repair 2 years ago.

Case 4. A 55-year-old white man underwent penetrating keratoplasty for keratoconus 18 years prior to sustaining a lacratal injury to his left eye. At the time of injury, he had been wearing polycarbonate sports safety goggles, but the force of impact caused the protective spectacle lens to dislodge from the frame and strike his left eye. Although the lens remained unshattered, the pa-