What’s Your Diagnosis of the Lesion?
Initially Presumed Choroidal Hematoma
Amber Zaunbrecher, O.D.
UABSO Family Practice Resident

ABSTRACT:
A healthy 44-year-old Caucasian male presents with a chief complaint of blurry vision at near. Fundus examination reveals a 2 disc-diameter low-lying retinal lesion with overriding blood vessels in the superior aspect of right eye.

I. Case History
   a. Patient demographics: 44 year-old Caucasian male
   b. Chief complaint: Blurry vision at near
   c. Ocular history: Unremarkable
   d. Medical history: Unremarkable
   e. Medications: None

II. Pertinent Findings
*NOTE: Findings associated with images to be included in presentation are in bold
   a. Initial Presentation
      i. Aided visual acuities thru habitual correction: 20/20 OD, OS, and OU with habitual correction of -1.50 - 0.50 x 018 OD and -1.25 - 0.50 x 173 OS
      ii. Best corrected visual acuities: 20/15-2 OD, 20/15 OS and 20/15 OU with manifest refraction of -2.00 - 0.75 x 020 OD, -1.50 - 0.50 x 173 OS
      iii. Near testing through manifest: plus build up add +1.00 OU
      iv. Pupils: equal, round, reactive to light with no afferent pupillary defect
      v. Cover test: aligned by orthophoria at distance and near
      vi. Extraocular eye movements: full range of movement OD, OS
      vii. Visual fields: full to finger count OD, OS
      viii. External exam: No anterior segment abnormalities OD, OS
      ix: Goldmann intraocular pressures: 18mmHg OD and OS at 14:40
      x. Dilated fundus exam: trace-1+ NS OD, OS. Optic nerve demonstrates an intact neural retinal rim with distinct margins and a C/D ratio of .45 Round OD, OS. Posterior segment vessels are of normal course and caliber. Macula is flat and intact with foveal light reflex present OD, OS. Peripheral retina OD reveals pavingstone degeneration inferior and a dark, elevated lesion close to superior
ora, over which the vessels course. Scleral depression was not performed at this exam.

xi. Patient referred to ophthalmology that day for evaluation of elevated retinal lesion.

b. Same Day Ophthalmology Consult
   i. Same-day ophthalmology consult was obtained for evaluation of the elevated retinal lesion of the right eye.
   ii. Entrance testing: unremarkable and stable from previous visit
   iii. Dilated fundus exam reveals nerves that are sharp, pink and healthy with flat and dry maculae. Peripheral vessels are flat and attached 360 degrees except for previously mentioned lesion in the right eye. A low lying elevation with overriding blood vessels and an associated area of pigment are noted in the superior aspect of the right eye. The lesion does not change pigmentation on scleral depression. The area is well elevated and has no associated orange pigment, drusen, or subretinal fluid.
   iv. B scan shows a relatively flat lesion with no hypo echoic areas centrally.
   v. Formal ultrasound reveals a dome-shaped solid mass with moderate sound reflectivity with no internal blood supply. The consulting ophthalmologist believes the lesion to be benign but could not rule out the possibility of a small choroidal melanoma
   vi. Ultrasound examination OD reveals a small, dome shaped mass superiorly. The lesion is of moderate sound reflectivity and did not demonstrate any internal blood flow echoes. No extraocular extension is noted. Retina appears flat OD. The chorioretinal thickness of the lesion measures 1.3mm. The lesion is too small for tissue diagnosis, but the ophthalmologist cannot rule out the possibility of a small choroidal melanoma. A repeat ultrasound is recommended in six to nine months to re-check the size and appearance of the lesion.

d. Ophthalmology 2 week follow-up
   i. Best corrected visual acuities: 20/20 OD, OS and OU
   ii. Goldmann intraocular pressures: 11 OD, OS
   iii. External exam: No anterior segment abnormalities OD, OS
   iv. Dilated fundus exam: Dilated exam shows nerves that are sharp, pink, and healthy. His maculae are flat and dry OU. Peripheral vessels are flat and attached 360 degrees except for the previously mentioned lesion in his right eye. The lesion is a low-lying elevation with overriding blood vessels in the superior aspect of the right eye with associated pigment. There is no associated orange pigment, drusen, or subretinal fluid and the lesion at this time is approximately
1.5-2DD in size. **Flourescein angiography reveals a hypo dense area during choroidal filling representing no choroidal flow to the area.** Baseline fundus photography taken.

v. **Impression:** the elevated retinal lesion is likely a choroidal hematoma as a result of weight lifting. The patient is extremely physically fit and reports performing many dead lifts and exercise routines requiring valsalva maneuvers. The patient denies any episodes of eye pain or temporary vision loss.

vi. The patient is scheduled to return for retinal grand rounds for a second opinion the following week. The patient is to receive a repeat ultrasound in six months.

vii. Lesion is to be followed with serial exams until resolution to rule out the possibility of choroidal melanoma or advancing malignancy.

e. **Ophthalmology 4 week follow up**

i. Best corrected visual acuities: 20/20 OD, OS and OU

ii. Goldmann intraocular pressures: 11 OD, OS

iii. External exam: No anterior segment abnormalities OD, OS

iv. Dilated fundus exam revealed a mass in the superior temporal region of the right eye. Lesion does not appear to have changed in size and remains to be 1.5-2 disc diameters large. It is round, or oblong in shape with sharp borders. There are no drusen, orange pigmentation or feeder vessels in the lesion. It is substantially far from the optic disc and is less than 3mm thick indicating a low risk of metastasis if the lesion is a melanoma.

v. The initial diagnosis of choroidal hematoma was changed to atypical choroidal nevus due to the lack of resolution of the lesion.

f. **Ophthalmology 3 month follow up**

i. Best corrected visual acuities: 20/20 OD, OS and OU

ii. Goldmann intraocular pressures: 13 OD, OS

iii. External exam: No anterior segment abnormalities OD, OS

iv. Dilated fundus exam reveals a 1.5-2 disc diameter mass in the superior temporal region of the right eye. The lesion is less than 3mm thick indicating a low risk for metastasis. No clear diagnosis was achieved at this visit and patient is scheduled for a repeat retinal evaluation in four months.

g. **Ophthalmology 6 month follow up**

i. History of present illness denotes that the patient has been seen by numerous ophthalmologists and there is a difference of opinion as to the nature of the
lesion from a subretinal hematoma to a choroidal nevus. The opinion of a retinal specialist has not been obtained.

ii. Best corrected visual acuities: 20/20 OD, OS and OU

iii. Goldmann intraocular pressures: 13 OD, OS

iv. External exam: No anterior segment abnormalities OD, OS

v. Dilated fundus exam demonstrated a sharp, pink disc OD with a central cup. The lesion is located posterior to the equator superior-nasally of the right eye and is easily visualized. It is linear with a rolled appearance. It is slightly elevated. The borders are not discreet and it is not darkly pigmented. There is no pigmentation on the surface of the lesion.

vi. Fundus photography repeated today

vii. Patient is to be seen again in four months for re-evaluation.

III. Differential Diagnosis:

a. Primary/Leading:
   i. Choroidal Hematoma secondary to valsava OD
   ii. Benign Choroidal Nevus OD
   iii. Small Malignant Melanoma OD

b. Others:
   i. Tumors:
      1. Choroid
         a. Melanocytoma
         b. Hemangioma
         c. Metastatic carcinoma
         d. Nervous tumor
         e. Osteoma
         f. Lymphoid hyperplasia
      2. Retinal pigment epithelium
         a. Congenital hyperplasia
         b. Hamartoma
         c. Acquired hyperplasia
         d. Adenoma
         e. Carcinoma
      3. Retina
         a. Hemangioma
         b. Nervous tumor
      ii. Intraocular hemorrhage
         1. Intraretinal
         2. Subretinal
iii. Retinal detachment (rhegmatogenous or serous secondary to retinal vascular disease)
iv. Choroidal detachment (serous or hemorrhagic)
v. Retinal pigment epithelium detachment (serous or hemorrhagic)
vi. Cystic lesion:
   1. Retinal
   2. Retinoschisis
   3. Parasitic
vii. Foreign body

IV. Diagnosis and Discussion

a. Diagnosis
   i. Despite being examined by multiple physicians, a clear diagnosis of the retinal lesion has not been obtained. Several impressions of an accurate diagnosis are valid.

b. Discussion
   This case is an example of a lesion that, despite being carefully watched, has not lead to any type of conclusive diagnosis. With current technology, such as A scan, B scan, OCT, MRI and fluorescein angiography, it would be logical to conclude that a clear diagnosis would be found. Characteristic visual symptoms of retinal lesions include, but are not limited to: blurred vision, floaters, visual field loss, pain or asymptomatic. The patient of record is asymptomatic. His last dilated exam was in 2008 in the military where no mention of a retinal lesion was noted.

   The first differential diagnosis for the retinal lesion is a choroidal nevus. Choroidal nevi are present in 5-10% of all Caucasians\(^1\). Ninety percent of all uveal melanomas have been diagnosed in the white, non-Hispanic population\(^2\). The majority of choroidal nevi are present at birth. They can undergo sporadic growth, primarily in the teen years, and then plateau post puberty. If a nevus does continue to grow into adulthood, this growth is a red-flag to a growing malignancy. The histological presentation of a nevus is a proliferation of spindle cell melanocytes, the melanin producing cells located in the middle layer of the uvea. A typical nevus will demonstrate indistinct margins, dimensions less than three disc diameters in size and of less than 1mm in thickness, surface drusen (especially in larger lesions), and low risk of malignancy. The associated drusen in a nevus are in contrast to the orange pigment or lipofucin more commonly associated with malignant melanoma. This patient’s retinal lesion is slightly thicker than 1mm and also had distinct margins visible on dilated fundus exam. Choroidal nevi may sometimes represent precursor lesions for choroidal melanomas with 1 in 500 choroidal nevi evolving into choroidal melanomas\(^3,4\). Predictive factors include growth, thickness greater than 2mm,
subretinal fluid, orange pigment, tumor margin within 3mm of disc, and hollowness on ultrasonography.\(^5\)

A second retinal lesion possibility in this case is a choroidal melanoma. Choroidal melanomas are the most common primary intraocular malignancy in adults.\(^6\) With an ambiguity in diagnostic features, the diagnosis of a choroidal melanoma diagnostic challenge. With clear media, the Collaborative Ocular Melanoma Study Group published results of misdiagnosis rate among eyes with clear media of only 0.48%\(^7\). Ocular Melanoma’s represent 5.3% of all melanomas.\(^6\) Maximum incidence of a uveal melanoma is between the 6\(^{th}\) and 7\(^{th}\) decade of life. Risk factors for uveal melanoma include but are not limited to: larger tumor diameter, extrascleral growth, tumor margin location, anterior to equator of eye, older age, and male gender.\(^3,5\) Choroidal melanomas a histologically comprised of two types of cells: spindle or epithelioid. Lesions may range in thickness from flat to dome or mushroom shaped. A mushroom shaped tumor signifies that the tumor has ruptured through Bruch’s membrane into the subretinal space.\(^8\) The rogue cells invade the scleral channels in search of blood vessels to nourish the growing tumor. The presentation of a choroidal melanoma can range from darkly pigmented to amelanotic. Overlying orange pigmentation, representing lipofucin, which involves the retinal pigment epithelium is pathognemonic for a malignant melanoma. A ten year risk of metastasis was reported at 12% for 1.1-2.0 millimeter thick lesions.\(^9\)

Although there is no specific diagnostic pattern of vasculature on fluorescein angiography, the most common finding is a mottled fluorescence during the arteriovenous phase and late diffuse leakage and staining.\(^1\) Ultrasound will demonstrate homogeneity, choroidal excavation and a high initial spike and low to medium internal reflectivity.\(^6\)

A third possibility for the retinal lesion of interest in this case is a circumscribed choroidal hemangioma. Histologically, choroidal hemangiomas are a vascular mass within the choroid. This benign tumor is composed of endothelium-lined vascular channels that extend to involve full thickness of the choroid with secondary changes of the overlying retinal pigment epithelium\(^10\). They typically present between the second and fourth decade of life and may or may not lead to visual disturbances.\(^11\) The presentation is an oval, orange mass with indistinct margins typically at the posterior pole. Dimensions are typically less than three disc diameters wide and three millimeters thick. Fluorescein angiography will demonstrate hyperfluorescence in the early arterial phase followed by intense late hyperfluorescence. Ultrasound will show a sharp bordered solid lesion with no choroidal excavation. A-scan will show a high initial spike followed by low to medium internal reflectivity.
A variant of choroidal hemangioma is a suprachoroidal hematoma. This is a benign lesion of the posterior segment that is formed from a collection of blood vessels in the suprachoroidal space. Spontaneous rupture of a branch of the short or long posterior ciliary artery allows for blood to leak into the suprachoroidal space\(^{(12)}\). This space is approximately 30 µm thick and consists of a fine network of collagen laminas arranged tangentially and attached to the sclera\(^{(13)}\). Increased episcleral venous pressure can compromise the vasculature that guards the border of the suprachoroidal space. Relatively few of these lesions have been documented and it is not well recognized in the ophthalmologic literature\(^{(12)}\). The lesions appear as dark masses with dimensions ranging from three to five disc diameters wide and one to five millimeters thick. Most documented suprachoroidal hematomas develop post-cataract surgery and resolve within several months. Fluorescein angiography demonstrates normal choroidal filling throughout the entire test with no late leaking or staining. B-scan ultrasonography will show a smooth mass with no choroidal excavation. A-scan ultrasonography will show a low-amplitude internal reflectivity.

The final differential in the discussion for this case is a metastatic tumor. The choroid is the primary site for uveal metastases. The typical areas for metastatic lesions to radiate from are the breast and lungs. Retinal metastases are typically fast-growing lesions that may or may not have associated pigmentation. Ultrasound will show a placoid tumor with choroidal thickening. Metastatic tumors rarely demonstrate a ballooned or mushroom appearance unlike a choroidal melanoma. Fluorescein angiography will show an early hyperfluorescence with late staining with no dual circulation.

This particular patient’s retinal lesion is approximately 2 disc diameters in size by 1.3mm in depth. It is oblong in shape with sharp borders. There are no drusen, orange pigmentation or feeder vessels contained within the lesion. Fluorescein angiography is a diagnostic tool which allows us to assess the blood flow to the retina. A fluorescein angiography of the lesion in question reveals a hypo dense area during choroidal filling representing no choroidal flow to the area. A malignant melanoma would have demonstrated diffuse late leakage and staining. A choroidal hemangioma shows a hyperfluorescence in the early arterial phase followed by intense late hyperfluorescence. A suprachoroidal hematoma demonstrates normal choroidal filling throughout the entire test with no late leakage or staining. Diagnostically, the lesion in question most closely matches a suprachoroidal hematoma based on fluorescein angiography. A-scan ultrasonography of the lesion shows a low-amplitude internal reflectivity similar to a suprachoroidal hematoma, malignant melanoma, and choroidal hemangioma. B-scan ultrasonography of a suprachoroidal hematoma shows a smooth mass with no
choroidal excavation, much like the peripheral mass in question. No extraocular extension is noted unlike a choroidal melanoma. Throughout the visits, the mass is stable in size, shape and pigment.

V. **Treatment and Management**

a. The patient has remained untreated but is currently being managed by repeat photography and ultrasonography every four months.

b. Alternative diagnostic methods would be beneficial to the patient including:
   i. Referral of patient to an ocular oncologist
   ii. Referral of patient to a retina specialist
   iii. Magnetic resonance imaging with T1 and T2 weighting
   iv. Fine needle aspiration biopsy with a pathological report of tumor cell type

c. The approach of the treatment and management of this patient is a conservative approach stemming primarily from the lack of definitive diagnosis of the lesion in question. If the lesion were a choroidal melanoma, growth as well as invasion of the choroid would be visible on ultrasonography. Choroidal and suprachoroidal hemangiomas would be expected to reduce in size and shape as the leaking of the posterior ciliary artery decreased. Reduction rates are of typical choroidal hematoma’s are typically within months. Although, the atypical presentation and likely etiology of this retinal lesion lean to an atypical resolution time. The lack of venous flow to the area of interest will also slow the reduction of the lesion. No similar case report was able to be obtained by the author in the literature for a comparison of resolution.

VI. **Conclusion**

The misdiagnosis of lesions masquerading as posterior uveal melanoma presents a diagnostic dilemma. It is the impression of this author that the lesion in question is a suprachoroidal hematoma. This hematoma was exacerbated by repetitive valsalva induced leakage of the posterior ciliary artery. The patient continued weight lifting and continued the increased venous pressure necessary to facilitate blood flow to the lesion. Time is the only diagnostic factor of true value in the care for this patient. If the lesion resolves, the diagnosis of a suprachoroidal hematoma will be confirmed. If the lesion persists, thickness greater than 2mm, subretinal fluid, symptoms, orange pigment and proximity of the lesion to the disc will prove of diagnostic value in labeling the mystery lesion\(^{(4)}\). Regardless of the resolution, the patient should be referred for a
second opinion to an ocular oncologist in the frightening chance that the lesion is a malignant melanoma

VII. References: