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# Choroidal metastasis from esophageal squamous cell carcinoma

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### Abstract:

We presented a rare case of a sole choroidal metastatic tumor from esophageal squamous cell carcinoma (ESCC) without other organ metastasis in Taiwan. A 43-year-old male with ESCC was referred for a 1-month history of decreased vision in his left eye. A 5.7 mm thick, yellow choroidal tumor occupied posterior pole, featured with pinpoint hyperfluorescence on angiography and subretinal fluid on optical coherence tomography. Positron emission tomography showed a singular hypermetabolic focus in the left eye. The tumor regressed with complete response and the vision preserved after radiation with total 57.60 gray applied by tomotherapy. The gastrointestinal system is the third most common metastatic origin in Taiwan while esophageal cancer metastasizing to choroid is rare. The discrepancy between the high prevalence of primary ESCC and the rareness of choroidal metastasis from ESCC is undetermined.

### Keywords:

Carcinoma, choroid neoplasms, esophageal neoplasms, neoplasm metastasis, squamous cell

## Introduction

Metastatic tumors to the eye are not uncommon. Studies have reported that 4%–8% of patients with malignancy had uveal metastatic foci histologically.<sup>[1,2]</sup> Three-quarters of uveal metastases happened unilaterally.<sup>[3]</sup> At the time of ocular diagnosis, 66% could trace back a history of a primary cancer. Nearly 88% of uveal metastasis involves choroid.

In Taiwan, esophageal cancer (EC) was the ninth leading cause of cancer death in year 2016.<sup>[4]</sup> Choroidal metastases from lung and breast cancer are more common. However, choroidal metastasis from EC is infrequent. We present a rare case of choroidal metastasis from esophageal squamous cell carcinoma (ESCC) in Taiwan.

## Case Report

A 43-year-old male with EC was referred for a 1-month history of decreased vision

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in his left eye. The patient had symptoms of dysphagia and weight loss for 4 months. The specimen was confirmed as ESCC from the esophagogastroduodenoscopy. Computed tomography showed a tumor in the middle esophagus and enlargement of lymph nodes without evidence of adjacent invasion or distant metastasis. With the diagnosis of ESCC, Stage IIIB, the patient received preoperative concurrent chemoradiotherapy, followed by total esophagectomy and reconstruction. He denied any history of neither ocular disease nor intraocular surgery.

The patient presented with visual deterioration in the left eye 1 month after surgery. At presentation, his best-corrected visual acuity was 20/20 OD and 20/100 OS. The anterior segment evaluation revealed no inflammation. Dilated fundus examination showed normal appearance in the right eye. In the left eye, however, vertical concentric folds between disc and mottled macula with diminished foveal reflex were found. An elevated yellow choroidal tumor, in size of seven-disc diameters, occupied posterior

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pole extending through temporal quadrant. There was neither vitreous opacity nor disc edema in the left eye [Figure 1a].

The inferiotemporally located choroidal tumor had an width of 17.0 mm and a thickness of 5.7 mm measured by B-scan ultrasonography (Echoscan US-4000; NIDEK, Gamagori, Japan) [Figure 1b]. Spectral-domain optical coherence tomography (OCT) (SPECTRALIS OCT; Heidelberg Engineering GmbH., Heidelberg, Germany) showed a bulky choroidal mass with subretinal fluid [Figure 1c]. Fluorescein angiography (SPECTRALIS scanning laser angiography; Heidelberg Engineering GmbH., Heidelberg, Germany) demonstrated pinpoint hyperfluorescent dye leakage of the choroidal tumor in the early phase, and fluorescein pooling into subretinal space in the late frames [Figure 1d and e]. Indocyanine green angiography showed a blockage of background staining over the tumor area [Figure 1f].

Magnetic resonance imaging depicted a hypointense T1- and T2-weighted focal lesions on the walls of the left eyeball with contrast enhancement, and an abnormal

diffusion restriction on diffusion-weighted imaging and apparent diffusion coefficient map [Figure 2a]. Positron emission tomography and computed tomography showed a singular hypermetabolic focus in the left eye [Figure 2b]. With the above findings, left choroidal metastasis from EC was impressed.

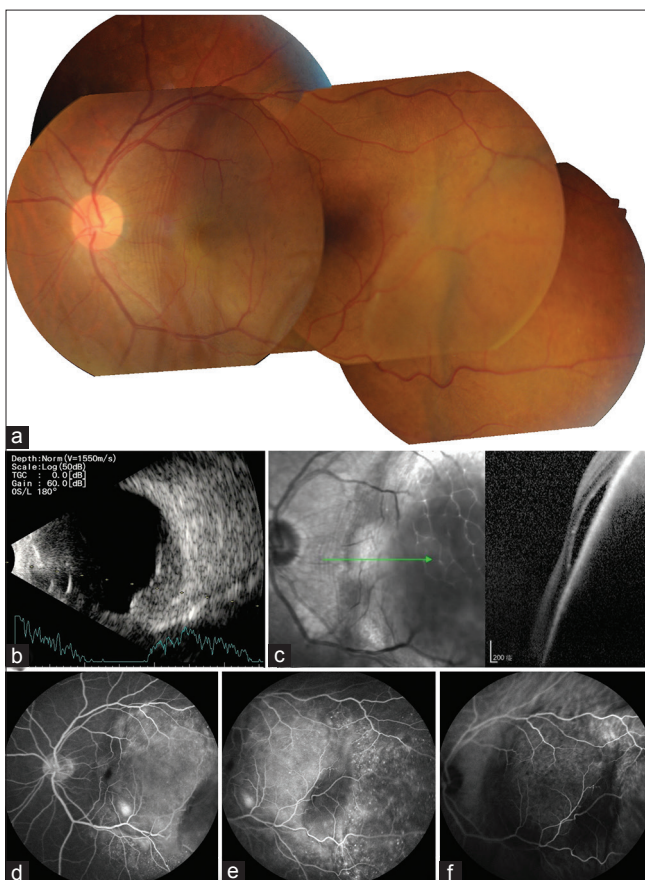
After discussion with his oncologist, palliative chemotherapy with cisplatin and fluorouracil was started. Concerning the rareness of distant metastatic site, in addition, radiation of 57.60 gray (Gy) in 48 fractions covering the field of choroidal metastatic tumor was also applied through tomotherapy. Other critical organs were within the normal range of a tolerable dose. After 3 months of treatments, the size of choroidal tumor reduced, the surface of the lesion flattened, and pigmentary change of retinal pigment epithelium (RPE) over the tumor area was noted [Figure 3a]. Cup-to-disc ratio in the left eye remained 0.2, and the neuroretinal rim had a uniform width without pallor. No further elevated lesion was seen by B scan [Figure 3b]. OCT scan revealed attenuation of outer retinal layers with indistinguishable ellipsoid zone and interdigitation zone and irregular clumps of RPE/Bruch's membrane complex [Figure 3c]. His visual acuity remained 20/20 OD and 20/100 OS. There was neither recurrence nor new choroidal lesion during 5 months of follow-up.

## Discussion

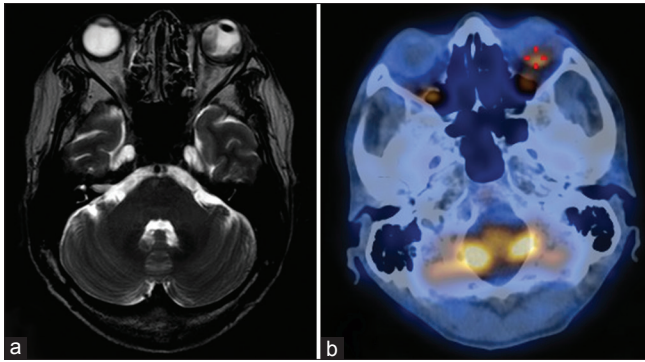
Declined visual acuity, monocular diplopia, visual-field defects, metamorphopsia, photophobia, or ocular pain are common symptoms of choroidal metastasis. Metastatic choroidal tumor usually presented as a bulging lesion with creamy, yellowish plateau surface, where mostly located between the equator and the macula.<sup>[3]</sup> Approximately 70% of choroidal metastasis had single focus, whereas others had multifoci in one eye. As our patient, more than half had an alteration of the RPE. Secondary exudative retinal detachment is another common finding almost 70% had subretinal fluid.

Lung cancer and breast cancer are the two most common origins of choroidal metastases.<sup>[3,5,6]</sup> The gastrointestinal tract is the third most common metastatic origin in Taiwan, which is more prevalent than other Western studies.<sup>[6]</sup> The most frequent sites of GI malignancy to choroid originate from colon and stomach<sup>[6]</sup> while choroidal metastasis from EC is rare and sporadic.<sup>[5]</sup>

In general, if choroidal tumor presents, it often combines with systemic metastasis. Thorough work-up should be performed to rule out other metastasis, especially the brain. In our patient, there were no other metastatic foci found. Left choroidal lesion was the only primary metastasis of the EC.



**Figure 1:** An elevated yellow choroidal tumor occupied posterior pole (a). B-scan showed the tumor was 5.7 mm in thick (b). Optical coherence tomography showed a choroidal mass with subretinal fluid (c). Fluorescein angiography showed dye leakage in late frames (d and e), and indocyanine green angiography showed blockage of background staining (f)



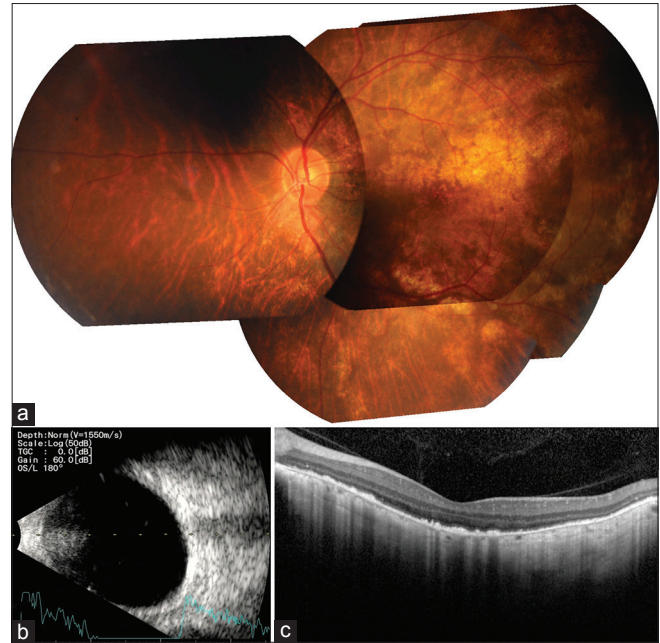
**Figure 2:** Magnetic resonance imaging showed a hypointense T2-weighted focal lesions on the walls of the left eyeball (a), and positron emission tomography and computed tomography showed a hypermetabolic focus in the left eye (b), suggestive of choroidal metastasis from esophageal cancer

Usually, EC spreads to liver, lung, and bone hematogenously, and it seldom metastasize to ocular structure. Esophageal carcinoma has two major histological subtype: ESCC and esophageal adenocarcinoma (EAC), with distinct risk factors. ESCC is related to tobacco and alcohol, and EAC is linked to acid reflux and is arisen from Barrett's esophagus.

ESCC is about 20 times the incidence of EAC in Asia.<sup>[7]</sup> Conversely, Caucasians have lower rates of ESCC. The previous reports often mentioned the infrequency of EAC choroidal metastasis.<sup>[8-10]</sup> According to the literatures searched from MEDLINE and our case, 11 cases of EAC with choroidal metastasis were identified,<sup>[8-17]</sup> whereas four cases of choroidal tumor from ESCC were documented.<sup>[18-20]</sup>

The discrepancy between the incidences of primary EC and choroidal metastasis from different subtypes may have following reasons. First, cases of EAC with choroidal metastasis were predominantly reported from the Western countries, and the metastatic rate was correlated with the higher incidence of EAC in these regions.<sup>[8,10,13,14,16,17]</sup> Second, the prevalence of choroidal metastasis from ESCC may be underestimated. The ophthalmologist is referred until the patient experiences significant ocular symptoms. Small, asymptomatic choroidal tumors from ESCC could be overlooked.

The management of choroidal metastases from EC depends on the condition of health, the ocular symptoms, and the presence of other metastatic lesions. Observation, chemotherapy, external beam radiation therapy (EBRT), and enucleation can be considered. The 5-year survival was 36% of overall EC and was about 15% of metastatic ESCC, decreasing with advancing age.<sup>[21]</sup> Considering our patient's relatively young age, fair life expectancy, and quality of living, we tried chemoradiotherapy instead of enucleation. Enucleation is usually reserved for tumor invasion beyond eyeball structure or intractable



**Figure 3:** After chemoradiotherapy, the lesion flattened with pigmentary change of retinal pigment epithelium (a). Complete tumor regression was seen (b). Optical coherence tomography revealed attenuation of outer retinal layers with indistinguishable ellipsoid zone and interdigitation zone, and irregularity of retinal pigment epithelium/Bruch's membrane complex (c)

pain.<sup>[8]</sup> Palliative chemoradiotherapy worked well on our patient, with complete tumor regression and visual maintenance.

Our patient had the pigmentary change of RPE and a markedly destruction of the outer retinal layer. Postradiational ocular complications include cataract, retinopathy, and optic neuropathy. Wiegel *et al.* reported that acceptable side effects with skin erythema and conjunctivitis in half of the patients after EBRT with 40 Gy in 20 fractions on choroidal metastasis. Only one developed retinopathy 4 months after treatment and one had optic neuropathy 2 years after radiation.<sup>[22]</sup> Accurate delivery of radiation with modern technique of tomotherapy can avoid the possible damages to radiosensitive ocular structures. While, median survival time lengthens with the improvement of therapeutic strategies on malignancy, postradiational changes of vision, lens, retina, and optic nerve still need to be monitored.

## Conclusion

We presented a rare case of choroidal metastasis from ESCC in Taiwan. The tumor regressed and the vision preserved with chemoradiotherapy. The RPE change and outer retinal layer attenuation on OCT were the major postradiational findings. The incidence of metastatic choroidal tumor originating from ESCC is rare, nevertheless, careful ophthalmic examination plays

an important role, considering ESCC is the predominant EC type among Asian population.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

The authors declare that there are no conflicts of interests of this paper.

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