fungal colonies around the incision. The organisms adhered to the tip of the injector nozzle when IOL was inserted, resulting in the intraocular infection. Slit lamp biomicroscopy showed cicatricial membranes around the superior corneal incision linking to the surface of IOL, which correspond to the pathogenic mechanism.

Interestingly, the presentation of intraocular inflammation in this case exhibited several clinical features in association with Propionibacterium acnes endophthalmitis. Similar to the acnes infection, the case showed chronic intraocular inflammation with enlarging white plaques within the lens capsular sac and appeared to be the sequestration of the organism. Trichophyton spp. is known to have low metabolic activities and rates of oxygen consumption, and usually need an environment with a weak immune system, a lack of adequate blood circulation and inadequate oxygen in the blood. Therefore, both Trichophyton spp. and Propionibacterium acnes can grow in the capsular bag where oxygen pressure is low. Because the capsule was sealed around IOL, adequate amounts of the antibiotics failed to reach the lens capsular sac. Therefore, the combination of vitrectomy and antifungal agents appears to be the best therapy for fungal endophthalmitis. Thus, in the current case, the intraocular infection recurred just 1 week after the first intravitreal amphotericin B injection. Since the resistant cell walls of fungi enable them to be shielded from antifungal therapy, newer antifungal agents were developed to expand the treatment armamentarium. Voriconazole has excellent oral bioavailability and intraocular penetration. Recent reports have suggested that voriconazole has a broader spectrum of antifungal activity than amphotericin B.4

In conclusion, we report the first case of post-operative Trichophyton endophthalmitis after cataract surgery. The clinical presentation mimics Propionibacterium acnes endophthalmitis. Early and complete removal of the sequestration in the capsular bag and IOL was essential to eliminate the adherence of the fungal colonies to IOL surface and differential diagnosis. Our patient made a good recovery after a combination of intravitreal amphotericin B injection and systemic voriconazole, but further studies are essential to determine optimal treatments.

Metastatic carcinoma to the vitreous: an optical coherence tomography and ultrawide field imaging study

It is quite rare for carcinomas to metastasize to the retina, and only a few cases have been reported in the literature.1–3 Nevertheless, metastatic carcinoma to the choroid has been well described.4 Although imaging technology (e.g. optical coherence tomography [OCT] and ultrawide field retinal imaging) has rapidly advanced, the metastatic invasion process of a carcinoma to the eye has rarely been documented on OCT5 and has never been documented on Optos wide-field imaging (Optos PLC, Dunfermline, Scotland). Here, we present a case where an oesophageal carcinoma metastasized to the retina, as documented on spectral-domain OCT and Optos ultrawide field imaging.

A 70-year-old man was referred to our institution because of complaints of increased floaters in the left eye for 3 months. He had a history of surgery for oesophageal carcinoma and was undergoing chemoradiation therapy for pulmonary and thoracic lymph node relapse. His visual acuity was 6.0/4.8 in both eyes. Fundus examination revealed a vitreous opacity, which contained minute particles, and was localized to the peripheral retina (Fig. 1a). Although no pathological changes, including radiation retinopathy, were seen in the retina, fluorescein angiography showed vascular leakage at the location corresponding to the vitreous opacity (Fig. 2a). A spectral-domain OCT (SD-OCT; Spectralis; Heidelberg Engineering, Heidelberg, Germany) scan centred on the fovea showed no abnormal findings, except for the mild granular opacity in the vitreous space (Fig. 1c).

Eight weeks later, fundus examination revealed an increase in the vitreous opacity and a retinal clouding and thickening, which now extended from the peripheral retina to the posterior pole (Fig. 1d). The OCT scans showed an increase in the granular opacity in the vitreous space and its deposition onto the macular surface. A horizontal,

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foveal-centred OCT scan revealed an overlying hyperreflective membrane, which mimicked the retinal nerve fibre layer on the temporal side of the macula (Fig. 1f). This was not detected on earlier OCT scans.

Fourteen weeks later, the fundus was difficult to visualize because the vitreous opacity had progressed. Additionally, most of the retina, including the macula, was covered by a white deposition (Fig. 1g,h). The OCT scans showed layers of widespread deposition onto the retina. The underlying retinal architecture seemed to be intact (Fig. 1i).

A 25-gauge pars plana vitrectomy was performed to biopsy the vitreous, using a lower cut rate of 500 cpm to avoid crushing cells in the vitreous. The retinal deposition could not be peeled from the retina (Fig. 2c), and scraping the deposition with a tapered needle only induced a retinal break (Fig. 2d). Endophotocoagulation was performed around the retinal break, and an intraocular tamponade was used at the end of surgery. Pathological findings showed an increased numbers of atypical cells with nuclear enlargement and hyperchromasia (Fig. 2e). Cell mutual inclusion in the nucleus and dense cytoplasm against many necrotic materials were also observed in the nucleus, consistent with squamous cell carcinoma. Because no other possible causes of vitreous opacification, including bacterial or viral, could be identified, and because the patient had already been diagnosed with metastatic oesophageal squamous cell carcinoma (pulmonary, thoracic lymph node), metastasis to the vitreous cavity with deposition onto the retinal surface was presumed.

Seven days after surgery, the fundus was most easily visualised. At this time, most of the retina remained covered by whitish floc and visual acuity remained at 6/30 in the left eye (Figs 1j,k). A deposition layer covered the macula, but a demarcation line between the retina and the deposit, was detectable (arrows).

Figure 1. Serial spectral-domain optical coherence tomography (OCT) and Optos ultrawide field retinal imaging documenting a carcinoma metastasizing to the retina. (a) The initial Optos image showing a peripheral vitreous opacity. (b) Fundus photograph showing no abnormalities. (c) Horizontal OCT line scan through the fovea (horizontal arrow in b) showing a mild granular opacity in the vitreous. (d) Eight weeks later, an Optos image showed an increase in the size and density of the vitreous opacity. Retinal clouding and thickening extending from the periphery to the posterior pole is visible. (e) Fundus photograph showing a white granular vitreous opacity. (f) An OCT scan showing a vitreous granular opacity and particle deposition on the macular surface. An overlying hyperreflective membrane mimicked the retinal nerve fibre layer (RNFL) temporal to the macula (arrow). (g, h) Approximately 14 weeks later, the vitreous opacity had increased in size, covering most of the retina, including the macula, with a white floc. (i) An OCT scan showing widespread layers of hyperreflective particles on the retinal surface (arrows). The underlying retinal architecture remained intact. (j, k) After surgery, the retina was still largely covered by a white deposition. (l) After surgery, the deposition over the macula, as a demarcation line between the retina and the deposit, was detectable (arrows).
Although we could not determine how a tumour could metastasize to the vitreous, we speculated that tumour cells gained access to the vitreous cavity through the retinal circulation. It might have been that the blood retinal barrier was weakened by a previous retinal vascular disorder, which would explain the vascular leakage on fluorescein angiography at the location corresponding to the initial location of the vitreous opacity. Potential causes for vascular fluorescein leakage might have been radiation retinopathy or a previous branch retinal vein occlusion, despite the lack of ophthalmic findings. Serial Optos imaging documented the cancer invasion and showed a continuous spreading from the retinal periphery over nearly the entire retina. Synchronous multiple lesions were not identified on the retina, indicating metastasis along the retinal surface. Although the metastatic pathway and spreading pattern may differ by cancer origin and initial ocular invasion site, our OCT and Optos images were helpful in understanding these rare metastases to the vitreous cavity and central nervous system.

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Structure–function correlation of focal and diffuse temporal perifoveolar thinning in Alport syndrome

An 18-year-old man with a history of early onset renal disease was referred by our paediatric genetics clinic for

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