CASE REPORT

Systemic bevacizumab for simultaneous treatment of cancer and choroidal neovascularisation

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SUMMARY

A 47-year-old woman with a medical history of pseudoxanthoma elasticum and associated choroidal neovascularisation that was successfully managed with intravitreal bevacizumab injections developed non-squamous non-small cell lung carcinoma. The patient's oncological medication regimen included systemic bevacizumab. During the 22 months that the patient received systemic bevacizumab for management of her malignancy, intravitreal bevacizumab injections were held and the patient's visual acuity remained stable and the subretinal space was free of fluid leakage.

BACKGROUND

Systemic bevacizumab has been shown to be efficacious in the management of multiple oncological conditions as well as choroidal neovascular membranes (CNV) in wet age-related macular degeneration (AMD).^{1 2} Intravitreal delivery of bevacizumab is currently the preferred method of administration for a host of ophthalmic conditions.^{3 4} Herein, we report the successful use of systemic bevacizumab for the treatment of non-squamous non-small cell lung cancer (NSCLC) and coexisting CNV in a patient with pseudoxanthoma elasticum (PXE).

CASE PRESENTATION

A 47-year-old woman with PXE presented with diminution of vision in the right eye to a best corrected visual acuity (BCVA) of 20/60. She was found to have subretinal fluid, and CNV secondary to angioid streaks (AS) related to her PXE (figure 1). Intravitreal therapy with bevacizumab was initiated with drying of the subretinal fluid. Monthly maintenance injections were required to control the CNV. The patient developed coexisting NSCLC, and her oncological regimen included systemic bevacizumab (15 mg/kg infused every 3 weeks). During her 22 months on systemic bevacizumab, her BCVA remained at 20/50, her optical coherence tomography remained free of subretinal fluid, and she did not require any intravitreal maintenance injections (figure 2). Once systemic bevacizumab was stopped, due to progression of her cancer, she once again required resumption of intravitreal therapy.

DISCUSSION

Bevacizumab, a full-length recombinant humanised anti-vascular endothelial growth factor (VEGF) monoclonal antibody, is approved by the Food and Drug Administration (FDA) for many oncological indications. Lung cancer is the leading cause of

Figure 1 Colour fundus photograph (A), fluorescein angiogram depicting subretinal neovascular leakage (B); optical coherence tomography (OCT) demonstrating subretinal fluid (arrow) (C); scanning laser ophthalmoscopy image depicting the location of OCT (D) at initial presentation.

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Figure 2 Optical coherence tomography (OCT) demonstrating resolution of subretinal fluid (A); scanning laser ophthalmoscopy image depicting the location of OCT (B); and the corresponding colour fundus photograph (C) following 4 months of systemic bevacizumab.

cancer-related deaths worldwide with NSCLC accounting for 80% of cases.¹ First-line therapy for unresectable, locally advanced, recurrent or metastatic NSCLC includes chemotherapy plus bevacizumab (15 mg/kg).⁵

PXE is an inherited condition, with an incidence of 1:25 000–100 000 that is associated with mutations in the *ABCC6* gene on chromosome 16p13.1. This systemic condition commonly affects the skin, eyes and the cardiovascular system (figure 3). Ocular findings include peau d'orange, chorioretinal atrophies, AS and CNV. AS are breaks in the calcified and thickened Bruch's membrane (BM) that develop in nearly all affected patients and can lead to CNV, resulting in significant visual loss at a young age.⁶

Systemic administration of bevacizumab (5 mg/kg) was investigated for the treatment of CNV. In the SANA study,² Moshfeghi *et al* reported visual and anatomic improvement in neovascular AMD. However, the authors were unable to exclude the possibility of thromboembolic events in AMD patients, as was reported in cancer patients. Moshfeghi *et al* concluded that it was unlikely that systemic bevacizumab would be studied in a large clinical trial for the treatment of neovascular AMD based on the potential risks and on the perception that intravitreal injection was safer. The efficacy of intravitreal bevacizumab has been demonstrated for the treatment of CNV in wet AMD⁴ and non-AMD diseases, including PXE.³

In our patient, the NSCLC was treated with the standard oncological dose of bevacizumab (15 mg/kg), which was three

times higher than the dose used in the SANA study² (5 mg/kg). The patient's oncologist closely monitored her for the potential systemic side effects of bevacizumab. No systemic complications were observed, and the NSCLC and CNV responded clinically.

Intravitreal therapies, and not systemic ones, are the current standard in managing CNV. However, as our case illustrates, there may be a role for systemic bevacizumab in patients with coexisting cancer and CNV.

Learning points

- ▶ Systemic bevacizumab is currently indicated for the management of multiple oncological conditions, including non-squamous non-small cell lung cancer.
- ▶ Intravitreal administration of bevacizumab is the current standard for the management of choroidal neovascularisation secondary to a multitude of ophthalmic conditions, including pseudoxanthoma elasticum.
- ▶ In patients that have comorbid choroidal neovascularisation and cancer where systemic bevacizumab is an indicated therapy for the malignancy, the secondary ocular benefit of systemic bevacizumab should be considered.

Contributors NS and BR, provided substantial contributions to the conception, design, drafting, revising and the final approval of the enclosed manuscript.

Competing interests None.

Patient consent Obtained.

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Figure 3 Image of lateral neck at presentation, depicting a soft yellow-ivory papular rash: a common initial skin finding in pseudoxanthoma elasticum.

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