Radiation retinopathy in a case of acute lymphocytic leukaemia

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DESCRIPTION

A 37-year-old man presented to us with diminution of vision in his both eyes since 1 month. He was a known case of acute lymphocytic leukaemia since 1 year and had received external beam radiotherapy of 24 Gy in 15 fractions of 1.6 Gy daily over 3 weeks for central nervous system spread in the past. He was currently under remission with maintenance dose of 6-mercaptopurine 125 mg 3 weeks a month and methotrexate 25 mg once weekly. On examination, his best corrected visual acuity was 20/400 in the right eye and 20/125 in the left eye. Anterior segment examination was essentially normal in both eyes and there was no evidence of any rubeosis iridis. Intraocular pressure in the right and left eye was 14 and 12 mm Hg, respectively. Fundus examination of both eyes (figure 1A and B) showed cotton-wool spots, retinal haemorrhages, venous beading, microaneurysms and retinal pigment epithelial atrophy at macula. Fundus fluorescein angiography of both eyes (figure 1C and D) revealed multiple microaneurysms, macular ischaemia and extensive capillary non-perfusion areas. An optical coherence tomography of both eyes (figure 1E and F) showed macular oedema. So, a diagnosis of both eyes radiation retinopathy (RR) was made and he was treated with intravitreal anti-Vascular endothelial growth factor (VEGF) injection (IVA) followed by panretinal photocoagulation (PRP) in both the eyes.

RR can occur after exposure to any radiation source including external beam and plaque brachytherapy. Occurrence of RR depends on fractionation, field design, type and rate of administration of radiation, and the incidence of retinopathy has been reported to increase steadily at doses greater than 45 Gy.[1] Fractionation of radiation dose is defined as division of total radiation dose into multiple smaller doses over a span of several days thereby reducing its toxic effects. Hyperfractionation has been associated with a decreased incidence of RR.[2] Comorbidities such as diabetes, hypertension and simultaneous chemotherapy are also associated with an increased risk of RR.[3] Though fractionation of radiation dose was done in our patient, concurrent chemotherapy might have increased the risk of RR in our case.

RR can present with microaneurysms, macular oedema, cotton-wool spots, retinal neovascularisation, vitreous haemorrhage, tractional retinal detachment and neovascular glaucoma.[4] IVA injections and PRP remain mainstay of treatment in early proliferative stages, and surgical intervention may be warranted in advanced stages.

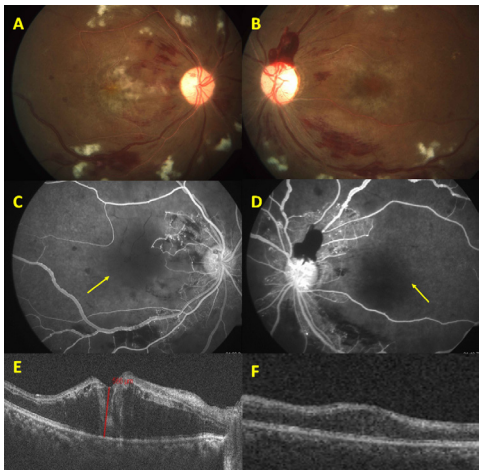

Figure 1 (A,B) Fundus photograph of right and left eye, respectively, showing multiple flame shaped, intraretinal haemorrhages, cotton-wool spots, microaneurysms, sclerosis of arteries, beading of venules in both the eyes and preretinal haemorrhage superior to disc in the left eye. (C,D) FFA of right and left eye, respectively, showing blocked fluorescence due to haemorrhages, extensive capillary non-perfusion areas, microaneurysms and enlarged foveal avascular zone (yellow arrow). (E,F) OCT of right and left eye, respectively, showing macular oedema. FFA, fundus fluorescein angiography; OCT, optical coherence tomography.

RR has been known to occur as early as 5 months after receiving radiation and has also been reported to occur many years later.[5 6] Therefore, all patients subjected to a plaque brachytherapy for intraocular tumours or local external beam radiotherapy require regular ophthalmic evaluations, and a high index of suspicion for RR with regular follow-ups are essential in these patients. Controlling systemic comorbidities also plays a crucial role in patients receiving radiotherapy.

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Learning points

- Diabetics, hypertensives and people on concurrent chemotherapy are more predisposed to develop radiation retinopathy (RR).
- Occurrence of RR depends on fractionation, field design, type and rate of administration of radiation, and hyperfractionation can decrease incidence of RR.
- Stringent screening criteria are essential for all patients receiving radiotherapy to look for any early signs of RR and to limit subsequent vision loss.

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