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EDITORIAL

Tumour-lysis-related elevation of intraocular pressure following high-dose-rate brachytherapy for choroidal melanoma

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About 5% of all melanomas arise from the ocular and adnexal structures, and the majority (85%) of ocular melanoma are uveal in origin.[1] Uveal melanoma is the most frequent primary intraocular tumour in adults with an age-adjusted incidence of one per 4.3 per million in the United States.[2] Enucleation has been the traditional method of treatment but at present there is a trend towards radiotherapy.[3] Although various forms of radiotherapy, including helium ion radiotherapy,[4] psroton beam radiotherapy,[5] and stereotactic radiotherapy,[6] have been advocated, brachytherapy using radioactive plaques is most widely used.[7] Following the pioneering works of Moore[8] and Stallard[9] from the UK, advances in radiation physics have led to the development of low-energy plaques such as ruthenium 106 plaque[10] which is predominantly used in Europe, and iodine 125 plaque[11] used in North America. Data derived from a large number of patients treated either with ruthenium 106[12] or iodine 125 plaque[11] have shown that plaque radiotherapy is effective in controlling the primary tumour, preserving the globe in the majority of treated patients, and preserving useful vision in up to half of the treated patients. However, plaque radiotherapy does not offer any survival advantage over enucleation.[13] The delivery of plaque radiotherapy involves close cooperation with the radiation oncologists and the radiation physicists who help to design, calibrate, plan, and monitor radiation therapy. The minimal tumour dose of 85 Gy at a dose rate of 0.60–1.05 Gy/h for iodine 125 using AAPM TG-43 (American Association of Physics in Medicine Task Group 43)[14] formalism is recommended by the American Brachytherapy Society.[15] The total delivered dose and the dose rate are important in achieving the desired biological effects. It has been shown that the risk of tumour recurrence increases if the dose rate is less than 0.50 Gy/h.[16] On the other hand, risk of complications rises if the total delivered dose is higher than 160 Gy.[16] Radiation complications following plaque radiotherapy are not limited to tumour recurrence or visual loss secondary to radiation retinopathy. Radiation-induced neovascular glaucoma is particularly bothersome and is one of the main reasons for enucleation following plaque radiotherapy, especially more than 3 years after radiotherapy.[17] Multivariate analysis of the COMS data (Collaborative Ocular Melanoma Study) revealed that initial tumour height is the strongest predictor of enucleation following plaque radiotherapy, with a risk ratio of 2.4 (95% CI, 1.3–4.2) for tumours more than 5.0 mm in height.[17]

In this issue, Kıratlı and Bilgiç[18] report an unusual complication of secondary glaucoma due to pigment dispersion in eyes with uveal melanoma that were treated with Iodine 125 plaque radiotherapy. They attributed glaucoma to tumour lysis, solely based on clinical findings, as it was associated with pigment dispersion in the aqueous and vitreous and apparent blockage of the trabecular meshwork. The glaucoma occurred more than a year (mean period 17.4 months) following the plaque radiotherapy and could be controlled medically. In their series 36 of patients, seven (20%) developed glaucoma. Eyes that developed tumour

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lysis glaucoma had known risk factors for radiation-related complications greater tumour height and higher dose rate. The mean preoperative tumour thickness in eyes with tumour lysis glaucoma was 10.1 mm as compared with 6.9 mm in eyes without glaucoma. Apical dose rates of the seven patients were significantly higher ($P = 0.000$) than the rest of the treated cases (1.18–2.89 and 0.64–1.09 Gy/h, respectively). Although the glaucoma could be controlled in the majority of eyes, the visual loss was significant due to coexisting radiation damage. Due to the small number of cases in the series, no adverse effect of tumour lysis on survival could be determined. The clinical distinction between pigment dispersion related to tumour lysis,[19] from viable malignant cells indicative of tumour recurrence, can be challenging.[19,20] In the absence of evidence of the detrimental effects of observation, perhaps careful follow-up with appropriate medical therapy in such cases is initially warranted.

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