

Iris Metastasis from Small-Cell Lung Cancer

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A 54-year-old man underwent computed tomography and was suspected of having lung cancer. The patient underwent video-assisted thoracoscopic partial lobectomy and was histopathologically diagnosed with small-cell lung cancer. For the treatment of the residual tumor, including the metastatic mediastinal lymph nodes, he subsequently received chemoradiotherapy combined with chemotherapy (cisplatin and etoposide) and radiotherapy at a total dose of 60 Gy delivered in 30 fractions. The patient was successfully treated and had a complete response. However, at 4 months after surgery, blurred vision was evident in the right eye; a mass measuring 5 mm in size was observed in the right iris using slit lamp microscopy. No abnormalities were found in the ocular fundus, including the retina, and ocular tension. The corrected visual acuity was measured at 0.9 in the visual acuity test using the Landolt ring chart; this corresponded to 18 of 20 in the Snellen chart. The patient was diagnosed with iris metastasis. No other diseases were detected on chest and abdominal computed tomography, head magnetic resonance imaging, and bone scintigraphy. Subsequently, chemotherapy with cisplatin and etoposide was administered. The metastatic tumor exhibited a transient reduction in size but then regrew. Consequently, the patient received radiotherapy with 7-MeV electrons through an anterior port for treatment of the iris metastasis. Because the patient was treated with radiotherapy without computed tomography simulation, for reference, dose distribution curves obtained using a representative radiotherapy simulation model are shown in Fig. 1. Daily fraction size was 2 Gy, 5 days per week, and the total dose was 40 Gy delivered in 20 fractions. A bolus with a 5 mm water-equivalent thickness was used to compensate for the surface dose in the tumor. The overall treatment time was 30 days. The tumor volume decreased rapidly after the initiation of radiotherapy and had completely disappeared by the completion of treatment (Fig. 2). Regarding acute toxicities, the patient had mild radiation keratitis, conjunctivitis, and dermatitis; however, these reactions had all resolved shortly after the completion of radiotherapy.

COMMENTS

During the clinical course of cancer patients rarely experience uveal metastasis. Among uveal metastases, almost 90% are accounted for by choroidal metastasis; iris metastasis is

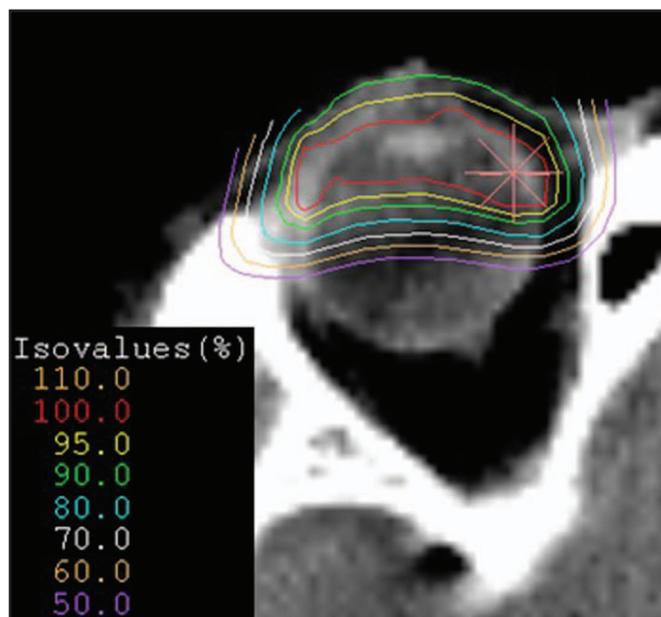


FIGURE 1. Photograph of a computed tomography slice showing the isodose distribution in the right eye using a radiotherapy simulation model. Electron beams are delivered through an anterior port to the iris, which is homogeneously encompassed within the 100% dose level. The radiation dose to the ocular fundus is reduced to less than 50% of the prescribed dose because of rapid dose falloff.

an extremely rare presentation with an incidence of less than 10%.¹ There have been few reports regarding cases of distant metastasis that have occurred exclusively in the iris. Among iris tumors, primary melanoma accounts for almost 50% and metastatic tumors approximately 20%.² Of the primary tumors from which iris metastases originate, lung cancer is the second most common malignancy next to breast cancer; these two cancers account for two-thirds of all primary tumors.^{1,3} Iris metastasis can cause various symptoms, including blurred vision and visual field defects, and in some patients secondary glaucoma because of angle closure. Surgery (enucleation) and chemotherapy have been used for the treatment of iris metastasis

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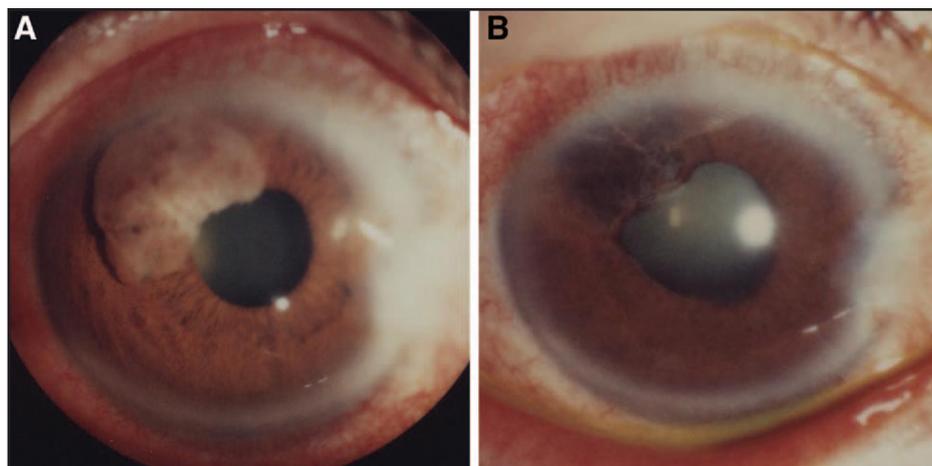


FIGURE 2. Photographs of the site of the metastatic tumor derived from small-cell lung cancer in the iris of the right eye, (A) before and (B) at the completion of radiotherapy. The metastatic tumor had completely disappeared after treatment and only residual pigmentation remained.

with palliative intent. Usually, surgical procedures such as enucleation are considered as being unfavorable for palliative care, and less invasive treatments are considered more favorable. From the point of view of systemic disease with distant metastasis, chemotherapy is generally considered to be the first choice in the treatment of iris metastasis. However, in the present case, chemotherapy was ineffective for the control of iris metastasis and accordingly radiotherapy was given. To date, there have been few studies that have reported on the outcome of radiotherapy for iris metastasis. Generally, palliative radiotherapy regimens are completed within a short period using low radiation doses, because patients with distant metastasis have a poor prognosis with regard to survival. Indeed, the median survival time for patients with iris metastasis from lung cancer is reported to be only 4 months.³ However, our patient exhibited good tumor control with the exception of iris metastasis and was expected to have a long survival time. Therefore, a relatively high radiation dose was delivered in conventional fractions. Although the optimal radiation dose for this disease is unclear at this stage, the present total dose of 40 Gy may be sufficient to control the metastatic tumor from small-cell lung cancer, because it is a relatively radiosensitive tumor. In addition, electrons were used for radiotherapy in the current study. Relative to photons (x-rays), the use of electrons in radiotherapy

can considerably reduce the radiation dose and treatment volume regarding the retina. This is because electron beams exhibit a rapid dose falloff relative to photon beams. Although the tolerance dose for the retina is generally estimated to be approximately 50 Gy, when delivered in conventional fractions, it has been reported that even a dose of less than or equal to 40 Gy can cause severe retinopathy.^{4,5} Accordingly, the use of electrons in the treatment of iris metastasis is considered as being a safer approach. This treatment appeared to contribute to an improvement in the patient's quality of life because of effective control of the metastatic tumor in the iris.

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