Indocyanine green augmented transpupillary thermotherapy in the management of choroidal metastasis from breast carcinoma

P. PURI, M. GUPTA, P.A. RUNDLE,
I.G. RENNIE

Abstract

Purpose To demonstrate the efficacy of indocyanine green augmented transpupillary thermotherapy (TTT) in the management of choroidal metastasis from breast carcinoma.

Methods A retrospective study was performed on 4 women aged 39–59 years with solitary choroidal metastasis from breast carcinoma in whom choroidal metastasis was managed using TTT. All patients had undergone indocyanine green (ICG) augmented TTT using a diode laser (810 nm) treatment to these lesions and had a mean post-treatment follow-up of 13.2 months.

Results In all the patients there was a gradual regression of the lesion over a mean follow-up of 13.2 months with retention of good visual acuity.

Conclusion Indocyanine green augmented transpupillary thermotherapy is a viable alternative for management of solitary choroidal metastasis from breast carcinoma.

Key words Choroid, Metastasis, Indocyanine green, Laser, Thermotherapy

Transpupillary thermotherapy (TTT), a technique of tumour heating by infrared radiation delivered through the pupil, has been widely used in the management of choroidal melanomas.^{1–3} It is also now increasingly being used for the management of choroidal haemangioma and other choroidal tumours.^{4–7} However, its use in the management of choroidal metastasis is still in its infancy.⁶ We present the results of four cases of choroidal metastasis treated by TTT.

Case reports

Case 1

A 41-year-old woman attended ophthalmic casualty and was subsequently seen in the ocular oncology unit in January 1998 with a 2 week history of reduced vision. One year

previously she had undergone a left radical mastectomy with high-dose chemotherapy with stem cell support for grade III, invasive ductal carcinoma.

Her best corrected visual acuity was 6/5 in the right eye and 6/12 in the left. Anterior segment examination was normal. Fundus evaluation revealed bilateral solitary choroidal metastases (Fig. 1). An ocular B-scan (Fig. 2) along with fundus fluorescein angiography (Fig. 3) and indocyanine green (ICG) angiography (Fig. 4) were done to confirm the nature of the lesion. In view of the location and size of the lesion a decision was made to subject the right eye to fractionated radiotherapy while the left eye was subjected to ICG augmented TTT using a diode laser (810 nm). The left eye received seven applications, 3 mm in size, of 1 min duration and 1000 mW power to the metastasis under retrobulbar anaesthesia using 1% lignocaine. At 6 weeks follow-up her visual acuity was 6/6 in both eyes. There was an excellent response to the treatment with flattening of the lesion (Fig. 5). The patient was subsequently followed for a period of 15 months, during which the vision remained stable in both eyes.

Case 2

A 50-year-old woman was referred to the oncology unit in August 1998 complaining of a shadow in front of her right eye. She was a known case of carcinoma of the left breast, had undergone left mastectomy and had now developed multiple cutaneous metastases along with a tumour in her right breast.

Ocular examination revealed a normal anterior segment with a best corrected visual acuity of 6/6 in both eyes. Fundus examination showed an amelanotic mass inferior and nasal to the right optic disc. Ultrasound B-scan confirmed the solid nature of the lesion. In view of her previous history a diagnosis of choroidal

P. Puri
M. Gupta
P.A. Rundle
I.G. Rennie
Department of
Ophthalmology
Royal Hallamshire Hospital
Sheffield, UK

Mr P. Puri ✉
Department of
Ophthalmology
Royal Hallamshire Hospital
Glossop Road
Sheffield S10 2JF, UK

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Fig. 1. Case 1. Colour fundus photograph showing choroidal metastasis.

metastasis from a breast primary was made and the patient received ICG augmented TTT under local anaesthesia. The patient received five applications of 1 min duration and 1150 mW power to the lesion. The original referral centre subsequently saw the patient, reporting the lesion to be smaller and stable at 6 months follow-up.

Case 3

A 59-year-old woman with metastatic breast carcinoma and undergoing adjuvant chemotherapy was seen in the oncology clinic in December 1999 with a 3 month history of photopsia in her left eye. Her best corrected visual acuity was 6/6 in the right eye and 6/18 in the left. Fundus examination showed a 6×4 mm choroidal mass superotemporal to the left optic disc with a small cuff of subretinal fluid (SRF). A diagnosis of a solitary choroidal metastasis was made and the patient was treated with ICG augmented TTT. The patient received seven applications of 1 min duration and 1050–1250 mW power. Follow-up at 6 weeks showed an increase in the

Fig. 2. Case 1. Ultrasound B-scan of the eye showing the metastatic lesion.

visual acuity to 6/9 and the choroidal mass appeared to be flatter. B-scan ultrasound performed at this visit showed mild flattening of the mass with resolution of SRF. The size of the metastasis and vision remained stable for a period of 7 months, when the patient once again complained of falling vision. Ocular examination now revealed recurrent SRF around the lesion. The size of the mass, however, was unchanged. However, in view of the recurrence of the SRF the lesion was thought to be active and the patient was retreated with TTT. She received eight 3 mm applications of 1 min duration and 1000–1250 mW power. The lesion was subsequently followed for a period of 6 months, during which it remained stable with resolution of SRF. The patient died 12 months into follow-up.

Case 4

A 39-year-old woman with metastatic breast carcinoma with choroidal metastasis in the left eye for which she was receiving fragmented radiotherapy was noticed to have two small 1.5 mm choroidal deposits along the superotemporal arcade. A diagnosis of choroidal

(a)

(b)

Fig. 3. Case 1. (a) Early phase of fundus fluorescein angiography showing relative hypofluorescence of the lesion. (b) Late phase of fundus fluorescein angiography showing a progressive mottled hyperfluorescence.

Fig. 4. Case 1. Indocyanine green angiography showing a relatively hypofluorescent lesion.

metastasis was made and the patient underwent TTT. Follow-up at 6 weeks showed complete resolution of the lesion, with no recurrence at 18 months follow-up.

Discussion

External beam radiotherapy to the globe has been the mainstay of treatment for choroidal metastasis.⁶⁻¹¹ Although shown to be very effective, the treatment entails multiple visits to the department during its

planning and then application.⁹ In addition there is undue exposure of other ocular contents of the globe, which can result in a number of short-term and long-term radiation-induced complications that at times can be sight-threatening.¹¹

As life expectancy in the presence of choroidal metastasis is short, a one-stop treatment, which could be directed to the lesion and with minimal ocular complications, would be welcome in this situation. TTT is a well-established treatment for management of choroidal melanomas,¹⁻⁴ and was therefore thought of as an alternative. In addition, the use of ICG has been shown to augment the response of amelanotic tumours⁷ and this led us to adopt ICG augmented TTT as a treatment for choroidal metastasis.

Four cases of choroidal metastasis were treated using a diode laser (810 nm) under retrobulbar anaesthesia and followed over an average period of 6 months. In three of these cases only one treatment was required and the lesion regressed. In the fourth case appearance of SRF after 6 months of initial treatment prompted re-treatment. This patient is currently stable following treatment. All four patients have maintained good visual acuity up to their last follow-up visit. No complications were noted following treatment or re-treatment.

It therefore appears that ICG augmented TTT is a very promising technique for management of small, potentially sight-threatening choroidal metastases and provides comparable results to radiation therapy with minimal complications.

Fig. 5. Case 1. Colour fundus photograph showing the scarring 5 months following TTT.

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