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Case Report

Retinoblastoma regression following intra-arterial chemotherapy to the contralateral eye

Grace L. Su; Li-Anne S. Lim; R. Joel Welch; Carol L. Shields *

Abstract

Intra-arterial chemotherapy (IAC) has assumed a major role in the management of retinoblastoma. This targeted therapy involves the delivery of chemotherapy directly into the ophthalmic artery, minimizing systemic absorption. We report a case of retinoblastoma regression in the untreated eye following IAC to the contralateral eye.

Keywords: Retina, Retinoblastoma, Intra-arterial chemotherapy, Optical coherence tomography

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Introduction

Intra-arterial chemotherapy (IAC) is a safe and effective treatment modality for tumor control of retinoblastoma, with minimal systemic effect.[1–3] The chemotherapeutic agents are delivered by arterial catheterization of the ophthalmic artery ostium to the affected eye, with no documented impact on the opposite eye.[1–3] Herein, we report an observation of IAC effect leading to retinoblastoma regression in the contralateral eye.

Case report

A Hispanic girl was found to have bilateral retinoblastoma at birth, classified as group B in each eye (OU) using the International Classification of Retinoblastoma (ICRB). She was treated elsewhere with 6 cycles of intravenous carboplatin showing good initial response, but bilateral tumor recurrence one month later led to 2 additional cycles of intravenous chemotherapy using vincristine, etoposide and carboplatin. Despite this, bilateral recurrence worsened, and she was referred for our management at 9 months of age.

On our examination, the right eye (OD) showed 2 sites of recurrence with one in the macula measuring 7 × 6 × 4 mm and the other superonasally measuring 2 × 2 × 2 mm. In the left eye (OS), there was recurrence in the macula measuring 10 × 8 × 4 mm with overlying vitreous seeds.

Alternating single-eye dosing of ophthalmic artery IAC using melphalan 5 mg was commenced at an interval of 20 days, leading to tumor regression OU. Four months later, macular tumor recurrences were seen OU with measured thickness of 1580 microns OD (Fig. 1) and 1170 microns OS (Fig. 2) using optical coherence tomography (OCT). Higher-dose single-eye IAC using melphalan 7.5 mg and topotecan 1 mg was given initially to the right eye, and we observed that both the right (Fig. 1) and the left eye (Fig. 2) showed tumor reduction, despite absence of treatment to the left eye at that time.

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Ocular Oncology Service, Wills Eye Hospital, Thomas Jefferson University, 840 Walnut Street, Suite 1440, Philadelphia, PA 19107, USA

* Corresponding author.
e-mail address: carolshields@gmail.com (C.L. Shields).

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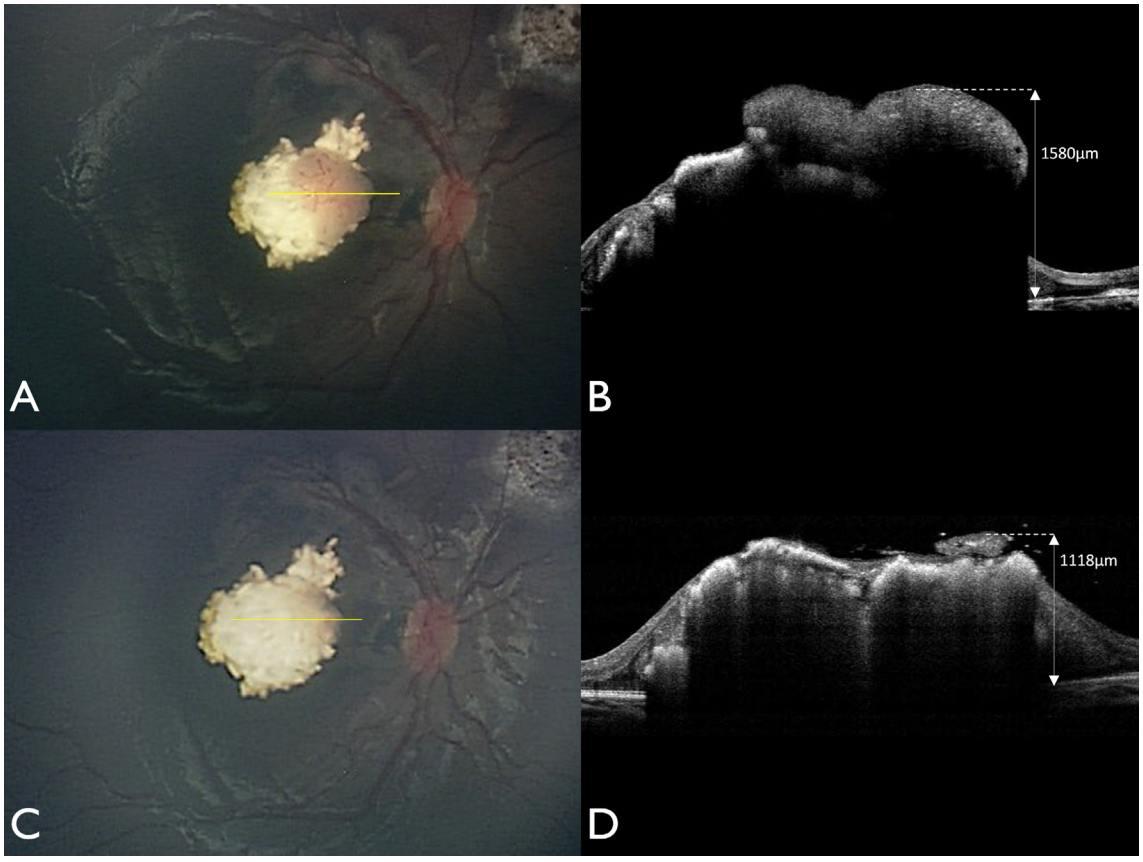

Fig. 1. A 9-month-old child with bilateral retinoblastoma demonstrated (A) tumor recurrence in the right eye measuring (B) 1580 microns in thickness by optical coherence tomography (OCT). After intra-arterial chemotherapy (IAC) to the ophthalmic artery of this eye, the (C) tumor regressed to (D) 1118 microns.

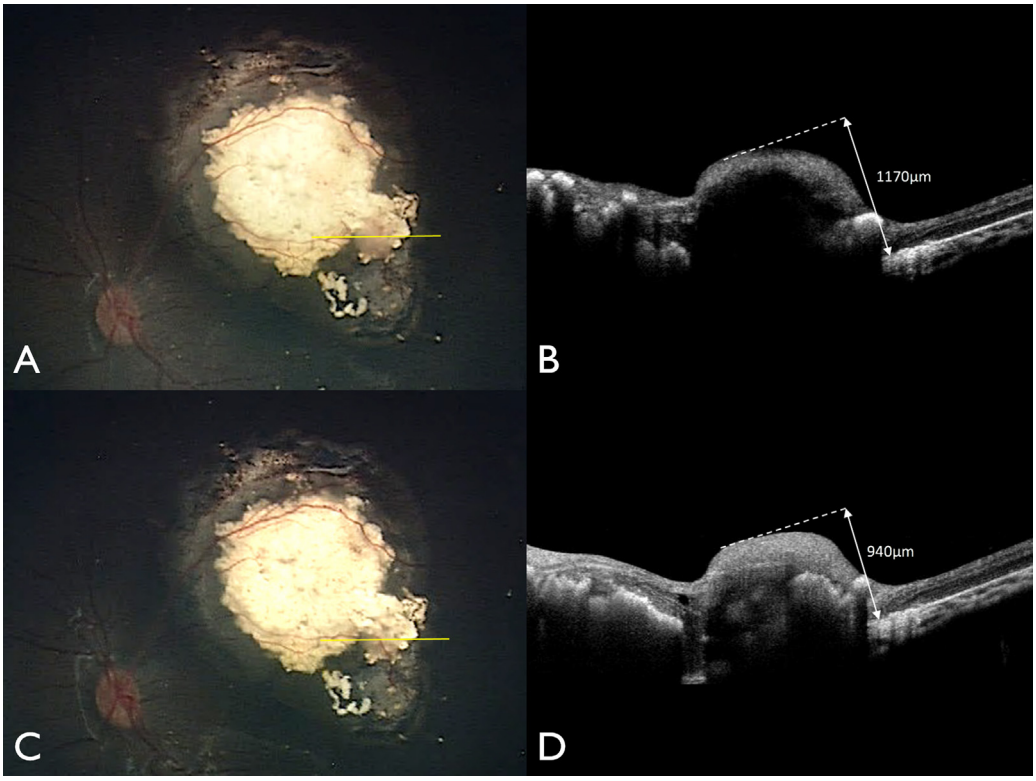

Fig. 2. In the contralateral left eye, (A) tumor recurrence of (B) 1170 microns in thickness was noted. One month after intra-arterial chemotherapy (IAC) to the opposite right eye and no treatment left eye, the retinoblastoma showed (C) regression to (D) 940 microns with tumor opacification.

Discussion

Intra-arterial chemotherapy is effective as primary therapy in 72% of cases and as secondary therapy, following failure of other methods, in 62%.[2] Currently, IAC and selective use of intravitreal chemotherapy has led to retinoblastoma control in 100% of group B and C eyes, 80% of group D, and 79% of selected group E eyes.[4] Although the chemotherapeutic agents are delivered directly into the ophthalmic artery, systemic effects have been noted such as neutropenia (11.4%).[3] Melphalan can cause myelosuppression at doses higher than 0.5 mg/kg[3] and is often given with topotecan for tumors unresponsive to single-agent therapy, achieving a synergistic effect.[5]

In this case, we documented retinoblastoma response to IAC that was delivered to the opposite eye. In fact, the treated eye (OD) showed dramatic response and the untreated eye (OS) showed partial response, as documented on OCT. Nevertheless, this is evidence that the medication can circulate in the system with potential remote effect. A similar phenomenon has been reported in eyes with macular degeneration in which an intravitreal injection of anti-vascular endothelial growth factor (VEGF) agent resulted in decreased macular edema of the untreated contralateral eye.[6] To our knowledge, this is the first report of contralateral tumor regression following IAC treatment.

In summary, this case highlights an unexpected finding following IAC for bilateral retinoblastoma. Intra-arterial chemotherapy is an effective globe-sparing therapy with directed impact on the treated eye and potential additional effect on the untreated eye.

Conflict of interest

The authors declared that there is no conflict of interest.

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