



## Retinal tumour outcome with IVC in retinoblastoma

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### To the Editor:

Retinoblastoma is the most common paediatric intraocular malignancy. Recently, targeted treatment like intravitreal chemotherapy (ivc) and intra-arterial chemotherapy have become popular for managing advanced intraocular retinoblastoma [1]. Targeted treatment eliminates systemic side effects of treatment while allowing a remarkable increase in the chemotherapy dose delivered to the tumour. Hence, they are more effective and less toxic than the conventional systemic chemotherapy.

Most of the studies reported in the literature on ivc in retinoblastoma have studied treatment outcomes in cases of retinoblastoma with recalcitrant or recurrent vitreous seeds [2, 3]. In this study, we investigated whether ivc can cause retinal tumour regression in cases of retinoblastoma without seeds. This was a prospective, non-comparative interventional study (CTRI/2018/09/015860). Ethical clearance was obtained from the institutional ethics committee. This research adhered to the tenets of the Declaration of Helsinki. All eyes with retinoblastoma that showed disease progression/relapse in retina with standard intravenous chemotherapy and were planned for enucleation were evaluated for the study. Following clinical parameters were noted during examination under anaesthesia: anterior and posterior chamber findings, retinal tumour details including number, location and dimensions on ocular

ultrasonography, presence and extent of retinal detachment and IOP as measured with Perkins applanation tonometer. All eyes with group E tumour as defined by International Classification of Retinoblastoma were excluded [4]. Eyes where there was total retinal detachment/size of tumour precluded the visualisation of all tumour edges were also excluded from the study. Photographic documentation was done using Retcam (Retcam III; Clarity Medical systems, Pleasanton, CA) in all cases. Written informed consent was taken from the parents. All eyes were administered intravitreal injection of melphalan (20 µg in 0.1 ml volume) using safety enhanced technique as described by Munier [5]. Tumour response evaluation was to be done during examination under anaesthesia after 2 weeks of injection. It was planned that in cases where reduction was noted in tumour size, the injection would be repeated till there was complete tumour regression (maximum of six injections) or it became feasible for focal treatment. In case no change or increase in tumour size was noted, the eye would be enucleated. Histopathological evaluation would be performed and the presence of any high-risk features/microscopic residual disease and any seeding of needle track will be looked for and noted.

Five eyes of five retinoblastoma patients were recruited in the study. The mean age was 21.8 months (range: 12–34 months). Three out of five patients had a unilateral disease, while two out of five had bilateral disease (group B in two cases). Tumour response evaluation done within 2 weeks of the intravitreal injection showed no response of the tumour to the ivc in one case, while in four out of five cases tumour showed progression (Fig. 1). Enucleation was advised in all cases. Four out of five cases underwent enucleation, while one was lost to follow-up. On histopathological examination of enucleated eyes, no evidence of needle track seeding was noted. No extraocular disease was found on histopathological examination. High-risk features were noted in one case, which were massive choroidal invasion and ciliary body invasion.

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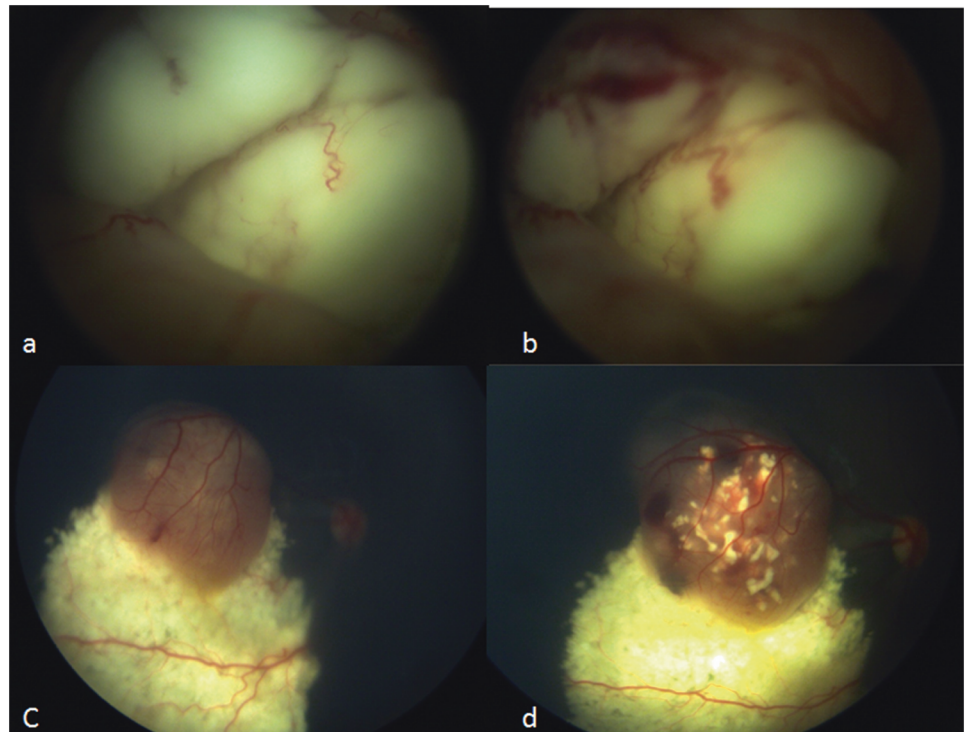
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**Fig. 1 Pre and post-treatment fundus photographs of two eyes with retinoblastoma showing no response and tumor progression respectively after ivc. a** Fundus photo showing a large tumour with adjacent retinal detachment, **b** fundus photo of the same eye with no significant change in tumour size after 1 injection of ivc, **c** fundus photo of a recurrent retinoblastoma arising in a calcified macular tumour, **d** fundus photo of the same eye showing an increase in tumour size after one injection of ivc.



To conclude, this is the first study reporting treatment outcomes using ivc for retinal tumour in retinoblastoma. No tumour response was seen with ivc for retinal tumour in the current study. Whether intraleSIONAL chemotherapy will work as targeted treatment in these tumours is an idea that needs to be explored in further studies.

### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

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