

Feasibility and Clinical Utility of Hand-held Optical Coherence Tomography in Children with Retinoblastoma

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Abstract

Purpose : Early tumour detection is of the highest importance for the preservation of vision and reducing the risk of metastasis in Retinoblastoma (Rb). We aim to investigate whether hand-held optical coherence tomography (HH-OCT) can improve diagnosis, treatment and outcomes in children with Rb compared to conventional investigations.

Methods : In this prospective study, eligible participants with suspected Rb were consented and recruited. During examination under anaesthesia, HH-OCT was performed in addition to the standard clinical care and imaging (fundus photography and ultrasound). We recorded the: (1) success rates of imaging based on tumour location, (2) management plans blinded to the OCT scans and (3) change in management after analysis of OCT scans.

Results : Fifty-six Rb eyes of 44 children (age range 2 weeks to 7.5 years old) were imaged in 108 OCT sessions. The scan acquisition success rate was 89% with the tumours located in Zone M (Macular, success rate 90%), Zone 1 (posterior pole, success rate 93%), Zone 2 (equatorial zone, success rate 58%) and Zone 3 (Anterior retina, success rate 7.9%). OCT enabled new tumour detection (93%), subclinical recurrence detection (86%), monitoring treatment (75%) and monitoring vitreous seeds (75%). HH-OCT altered management in 27% of all OCT sessions.

Conclusions : HH-OCT provides high-resolution 3-dimensional images of the Rb, which can improve clinical judgement and monitor changes in the tumour, vitreous seeds and scar at microscopic resolution. We highlight the feasibility of this technology in Rb diagnostic and management workflows. However, further studies with larger numbers would be beneficial.

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