Prophylactic Intravitreal Methotrexate for PVR Prophylaxis

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Introduction

Proliferative Vitreoretinopathy (PVR) is the most common cause of anatomic failure after vitrectomy for rhegmatogenous retinal detachment (RRD). PVR is secondary to formation and proliferation of epiretinal and/or subretinal fibrocellular membranes. Contraction of these membranes result in recurrent, tractional RD. No medical intervention has been shown to reliably prevent PVR formation.

Methotrexate (MTX) impairs cell proliferation by competitively inhibiting dihydrofolate reductase. It also has additional antisecretory and anti-inflammatory properties, downregulating immunomodulatory enzymes and significantly reducing collagen synthesis.

Methods

Retrospective chart review at the Cincinnati Eye Institute from 2012 to 2019.

Inclusion Criteria

-Bilateral sequential RD

-History of PVR in the contralateral eye

-Primary RD treated with intravitreal MTX in index eye.

Treatment

-MTX infusion during the aqueous phase of vitrectomy surgery (40mg MTX / 500mL BSS)

-Intravitreal injection (IVI) (400ug / 0.1 mL) at 1, 3, 6, and 10 weeks

Study Group

Variable	Methotrexate (n = 9)
Age *Years*	62 +/- 12
Lens Status, *Phakic/Pseudophakic*	3 / 6
Macula Status, *attached/detached*	5 / 4
Size of Retinal Detachment *≥2 Quadrant Involvement*	7 / 9
Giant Retinal Tear	1 / 9
Baseline BCVA *LogMAR*	0.36 +/- 0.36

Results

Outcome	Methotrexate (n=9)
Functional Success *(BCVA ≥ 1.3 LogMAR at 6m)*	9 (100%)
Anatomical Success *(% at 6m)*	9 (100%)
Final Anatomical Success *(%, at final visit)*	9 (100%)
Membrane Formation *(%, at final visit)*	2 (22%)
MTX-associated complications	0 (0%)

Discussion

This is the first series describing the use of MTX in primary RRD repair. Rates of retinal reattachment were excellent without suggestion of insufficient laser retinopexy adhesion due to MTX. Concerns of MTX-related corneal toxicity also seem unfounded.

This study is not without limitations. There is no consensus on the incidence of PVR in patients with PVR in the contralateral eye but is likely increased over this baseline risk. Without an appropriate control group, the efficacy of intraocular MTX in preventing PVR cannot be evaluated. Changes in surgical technique over time are also not controlled for in this retrospective study.

Ongoing work on this project includes characterizing an appropriate control group for statistical analysis. The important result suggesting that intraocular MTX may reduce the risk of PVR would benefit from a prospective randomized controlled trial to confirm findings.

Conclusion

This small consecutive case series suggests that intraocular MTX in the setting of primary RRD repair is safe and may be considered in selected eyes at high risk for PVR.

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