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Retinal Detachment Symposium 3

Primary Retinal Detachment Repair in Eyes Deemed High Risk for Proliferative Vitreoretinopathy: Surgical Outcomes in 605 Eyes



- M. Ali Khan, MD, FACS, FASRS
- Mirataollah Salabati, MD

Objective: Studies evaluating outcomes of rhegmatogenous retinal detachment (RRD) surgery have commonly focused on detachments with low to moderate complexity or those with advanced grades of proliferative vitreoretinopathy (PVR). Less information, however, is known regarding the clinical course of eyes deemed high-risk for PVR development based on pre-operative characteristics.
Purpose: To evaluate surgical outcomes in eyes with primary rhegmatogenous retinal detachment (RRD) deemed at high risk for proliferative vitreoretinopathy (PVR).
Methods: Multicenter, retrospective, cohort series of consecutive eyes who underwent operative repair of primary RRDs at 6 United States retina practices in 2015. Eyes with RRD were defined as “high-risk” for re-operation if they had two or more of the following pre-operative features: pre-operative PVR, vitreous hemorrhage, a retinal break greater than 1 clock-hour in size, three or more retinal breaks, choroidal detachment, and extent of detachment extending six or more clock-hours. The primary outcome measure was single surgery attachment success (SSAS) at 3 months after first surgical intervention for primary RRD. Surgical failure was defined as an additional intervention required for the purpose of retinal reattachment. Eyes with PVR Grade C or that received silicone oil tamponade were excluded.
Results: Among 2463 eyes with RRD, 605 (24.6%) were identified as high-risk and were included in this analysis. Single-surgery anatomic success (SSAS) rate among high-risk RRD eyes was 82.8% (n=501 of 605) compared to 86.8% (n=1612 of 1857) among eyes that did not meet high-risk criteria (p=0.016). No difference in SSAS was noted in high risk eyes undergoing PPV vs. PPV/SB (p=0.44). Among high-risk RRD eyes, presence of pre-operative PVR (odds ratio [OR] 1.63; 95% confidence interval [CI]: 1.1-2.40; p=0.013) was the lone risk feature with statistically significant increased odds of requiring re-operation on multivariate analysis.
Conclusion: RRDs with high-risk features had a lower SSAS rate compared to eyes without such features, with similar outcomes when repaired with PPV vs. PPV/SB. Of the clinical features evaluated, presence of pre-operative PVR was independently associated with risk of re-operation.

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Retinal Detachment Symposium 3

Interim Report of the FIXER Trial: Prevention of ProliFerative Vitreoretinopathy With Intravitreal MethotreXate in Primary Retinal DEtachment Repair



- Christopher Riemann, MD
- Muhammad Hassan, MD
- Daniel Brill, MD
- Cynthia McClard, MD PhD
- Robert Sisk, MD, FACS, FASRS
- Chloe Khoo, MD
- Minh Trinh, MD
- Tiffany Nguyen
- Sara Tan
- Emily Harris
- Abby Silvers
- Christina "Tina" Chu

Objective: Does Intraocular Methotrextae prevent proliferative vitreoretinopathy in the setting of primary retinal detachment repair?
Purpose: To provide level one evidence evaluating intraocular methotrexate (MTX) for the prevention of proliferative vitreoretinopathy (PVR) in the setting of primary rhegmatogenous retinal detachment (RRD) repair with pars plana vitrectomy (PPV).
Methods: Randomized, double-masked, IRB approved prospective clinical trial. CinicalTrials.gov # NCT06541574.

Inclusion criteria: Any adult patient, ≥18 years-old, undergoing primary rhegmatogenous retinal detachment surgery with pars plana vitrectomy at the Cincinnati Eye Institute in Blue Ash, Ohio who is able to give informed consent.

Exclusion criteria: Pregnant patients or patients of child bearing potential unwilling to utilize long term contraception, history of endophthalmitis, ruptured globe or significant trauma in the affected eye, chronic retinal detachment (symptoms ≥ six weeks), previous retinal detachment repair with pars plana vitrectomy, or scleral buckling surgery (previous pneumatic retinopexy allowed), presence of Grade C PVR, contraindications to methotrexate, including breastfeeding, pregnancy, attempting to conceive a child or any known hypersensitivity or intolerance to methotrexate, diminished mental capacity precluding their ability to give informed consent.

Study design - 12 month followup

1:1:1:1 randomization strategy into four groups:

1. Control group - receiving no methotrexate
2. Injection group - receiving standard surgery without intraoperative methotrexate followed by postoperative 400µg intravitreal methotrexate injections postop weeks 1, 3, 6, and 10.
3. Infusion group - receiving surgery with intraoperative intraocular methotrexate infusion (40mg in each 500mL balanced salt solution posterior segment infusate) and postoperative sham injections.
4. Infusion/Injection group - receiving both intraoperative intraocular methotrexate infusion (as above) and postoperative 400µg intravitreal methotrexate injections 1, 3, 6, and 10 weeks after surgery.

Primary outcome measure: Percentage of patients achieving single surgery success rate for primary rhegmatogenous retinal detachment repair in each group at 12 months.

Secondary outcome measures:
- Number of retinal detachment repair reoperations at 12 months
- ETDRS Visual Acuity at 12 months,
- Incidence of PVR at 12 months
- Time to Re-detachment from PVR
- Incidence of methotrexate-associated corneal epitheliopathy
- Other complication rate (including epiretinal membrane formation, endophthalmitis, additional ophthalmic surgeries)

Results: At the time of this writing we have randomized 79 patients and continue to enroll patients at a brisk pace. Two additional sites have been identified to accellerate

enrollment. We will present available demographic and safety data.
Conclusion: Level one evidence pertaining to the use of intraocular MTX in the setting of primary RRD repair with PPV is crucial to clinical decision making

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Intravitreal Methotrexate for the Treatment and Prevention of Proliferative Vitreoretinopathy in Pediatric Patients



- Philip Ferrone, MD, FASRS
- Michael Bouaziz

Objective: To assess the efficacy and safety of serial intravitreal methotrexate injections in the treatment and prevention of proliferative vitreoretinopathy in pediatric patients.

Purpose: Treatment of retinal detachments in pediatric patients is challenging and usually involves complex vitreoretinal surgery. These patients often have developmental and syndromic features that predispose them to ocular anomalies and vitreoretinopathies that can lead to detachment. These retinal detachments are usually more chronic which leads to a high incidence of PVR in these patients. Methotrexate has shown clinical promise as an adjuvant therapy for the management of PVR in adult studies. However, data on its safety and efficacy in the pediatric population is lacking.

Methods: This a retrospective chart review of consecutive patients treated with intravitreal methotrexate at a single retina practice. Participants included in the study were those under 18 years old who had a history of a retinal detachment that was repaired with adjunctive use of intravitreal methotrexate for the prevention and treatment of PVR. Those patients received a minimum of 4 serial intravitreal methotrexate injections at a dose of 400 µg/0.1cc. Those treated with methotrexate either had a history of advanced grade PVR, open-globe injury, or were deemed to be at risk for PVR formation. Injections were primarily given at the conclusion of retinal reattachment surgery followed by a 1-2 week interval of repeat injections. Primary outcome measures included final visual acuity at last follow-up visit, and rate of reattachment at last follow-up. Secondary outcome measures included need for additional surgeries and incidence of any corneal pathology.
Results: Patients included in the study had complex medical and ocular histories that predisposed them to complex detachments with PVR formation. These included open-globe injuries, Stickler syndrome, Blau syndrome, treated retinoblastoma, hemangioblastoma with chronic dense vitreous hemorrhage, and myopic degeneration with pathologic LRP2 variants (Table 1). Patients received an average of 9.8 injections of intravitreal methotrexate. 5 out of 9 patients required administration of the injections in the operating room under anesthesia. The average follow-up period was 8 months. Primary reattachment rate following initiation of methotrexate therapy was 77.8 % (7/9 patients). There were no occurrences of keratitis or corneal epithelial defects during the follow-up period. Visual acuity improved from a median of HM to CF at last follow-up visit (Table 2).

Conclusion: Serial intravitreal methotrexate injections are both efficacious and safe for the treatment and prevention of PVR formation in the pediatric population.

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Patient #	Age (years)	Gender	Number of previous RD surgeries	Laterality	Other contributing diagnoses
1	14	Female	3	OD	Myopic degeneration; LRP2 pathologic variant
2	11	Male	0	OS	Stickler syndrome
3	9	Male	0	OS	History of ruptured globe
4	11	Female	2	OS	Cicatricial Retinopathy of prematurity
5	6	Female	6	OD	Bilateral granulomatous uveitis, Blau syndrome
6	17	Male	3	OS	Cerebral palsy with self-hitting behavior
7	7	Male	1	OD	Hemangioblastoma with chronic dense vitreous hemorrhage
8	13	Male	0	OS	Treated retinoblastoma
9	9	Female	0	OD	History of ruptured globe

Patient demographics

Patient #	Initial VA	Indication for Methotrexate	Surgery performed	Number of methotrexate injections	Anesthesia required	Additional surgeries	Corneal complications	Final VA	Recurrent RD	Duration of follow-up (months)
1	LP	Advanced grade PVR	PPV, MP, Retinectomy, EL, SO	10	No	SO removal at post-op month 5	None	CF	No	12
2	CF	High-risk for PVR	SB, PPV, EL, SO	10	No	SO removal at post-op month 3	None	20/70	No	6
3	LP	Open globe, Advanced grade PVR	SB, PPV, MP, EL, SO	14	No	PPV, MP at post-op month 3.5; SO removal at post-op month 6	None	20/70	No	12
4	HM	Advanced grade PVR	PPV, MP, Retinectomy, EL, SO	12	No	Lensectomy, PPV, MP at post-op month 7	None	CF	No	10
5	HM	Advanced grade PVR	PPV, MP, Retinectomy, EL, SO	8	Yes	None	None	CF	No	6
6	LP	Advanced grade PVR	Lensectomy, PPV, MP, Retinectomy, EL, SO	8	Yes	None	None	LP	No	11
7	HM	Advanced grade PVR	SB, PPV, MP, EL, SO, AMG	10	Yes	PPV, MP, EL, SO at post-op month 3	None	HM	Yes	4
8	HM	High-risk for PVR	SB, PPV, MP, EL, SO	8	Yes	None	None	20/200	No	3
9	LP	Open globe	Lensectomy, PPV, MP, Retinectomy, EL, SO	8	Yes	PPV, MP, EL, SO exchange at post-op month 1.5	None	CF	Yes	4

Clinical results

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Retinal Detachment Symposium 3

Hypotony Rates After Vitrectomy for PVR: Insights on Intravitreal MTX Use



- Mostafa Mafi, MD
- Pradeep Prasad, MD, MBA
- Marcus Yamamoto, BA
- Irena Tsui, MD
- Negin Gharaei, BS

Objective: •To evaluate the rate of hypotony following vitrectomy for PVR.

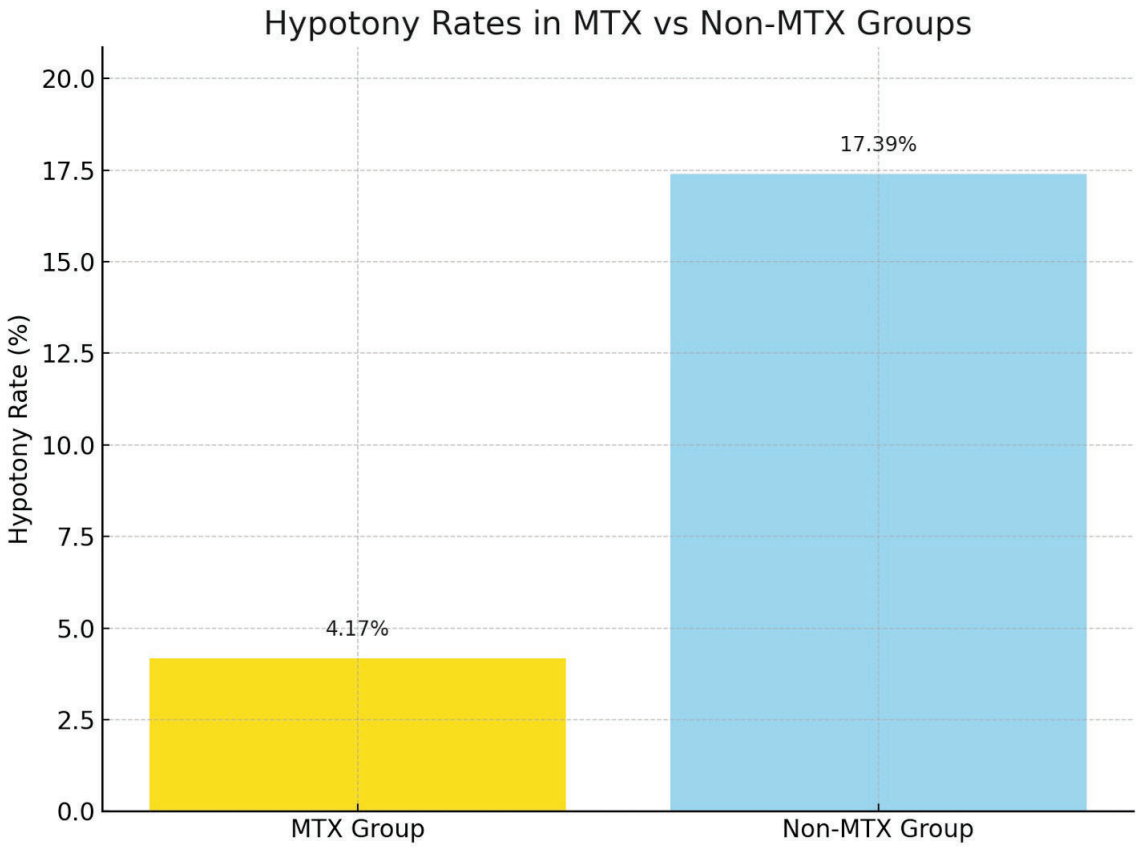
• To investigate the potential impact of intravitreal MTX injections on hypotony rates.
Purpose: To assess the incidence of hypotony in patients who underwent vitrectomy for PVR and to investigate the potential impact of intravitreal methotrexate (MTX) injections on hypotony rates in this population.

Methods: The medical records of 140 patients with PVR who underwent vitrectomy were reviewed to assess the rate of hypotony at the final follow-up. Hypotony was defined as a persistent intraocular pressure (IOP) of ≤6 mmHg for at least 6 months. Patients were grouped based on whether they received intravitreal MTX during or after the index surgery.

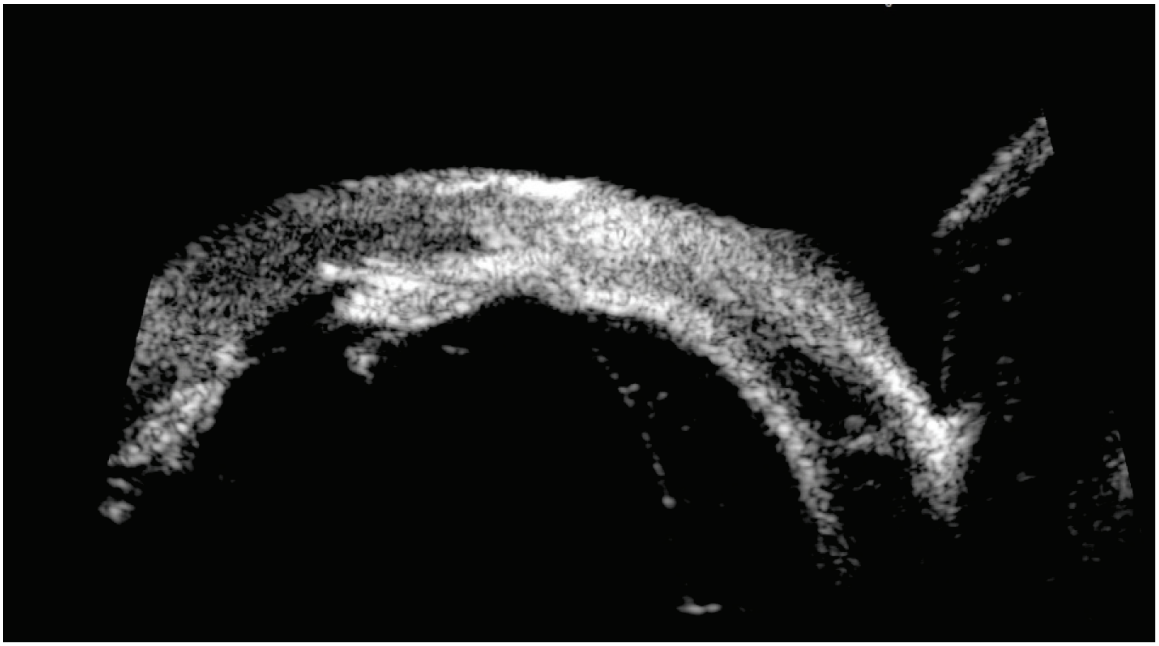
Results: Among the 140 patients studied, hypotony occurred in 18 (12.86%) with an average follow-up period of 328 days post-index surgery for PVR. The final BCVA was significantly worse in the hypotony group compared to patients with IOP >7 at the final follow-up (LogMAR 2.3 vs. LogMAR 1.1, $P < 0.001$). Hypotony was observed in 2 of the 48 patients (4.17%) who received intravitreal MTX injections during or after surgery for PVR, compared to 16 of 92 patients (17.39%) who did not receive MTX (Odds Ratio: 4.84, $P = 0.026$). Patients presenting with retinal detachment extending beyond one quadrant had a higher likelihood of developing hypotony at the final examination compared to those with retinal detachment of one quadrant or less (Odds Ratio: 4.70, $P = 0.0358$). The incidence of hypotony also varied significantly with lens status at the time of the index surgery: 25% in aphakic patients, 17.91% in pseudophakic patients, and 3.51% in phakic patients ($P = 0.0176$). Preoperative hypotony was also a significant predictor, with a 34.78% postoperative hypotony rate versus 8.55% in those without preoperative hypotony ($P = 0.0024$).

Conclusion: Intravitreal MTX injections appear to reduce the risk of hypotony in retinal detachments complicated by PVR, indicating a potential role in managing this challenging complication. Hypotony in PVR cases is more prevalent among aphakic and pseudophakic patients, those with preoperative hypotony, and individuals with extensive retinal detachment.

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Hypotony rate between MTX and non-MTX groups



UBM image of a patient with PVR and hypotony

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Encirclage and External Drainage to Enhance Vitrectomy Outcomes in Chronic Rhegmatogenous Retinal Detachment with Extensive PVR: A Retrospective Study



- Jayant Kumar, MBBS, MS, DNB, MNAMS, FICO, FVRS
- Pranshu Goel, MBBS,MS Ophthalmology,DNB Ophthalmology,FICO(1)
- Veer Singh, MS, FVRS, FMRF, FICO (Retina)
- SHISHIR VERGHESE, MS, FVRS, FAICO (Retina)
- Bivek Wagle, MD
- Malek Yassine, MD
- AVIK DEY SARKAR, MS, FVRS, FAICO(VR)

Objective: The aim of the study was to assess the utility and outcome of 360 degree encirclage and external drainage with 25 gauge vitrectomy for cases of chronic retinal detachment with severe PVR changes (more than PVR C 6)

Purpose: Chronic rhegmatogenous retinal detachment with severe PVR changes has been known to have sub-optimal outcomes, and the combination of techniques adopted by the authors has the potential to enhance outcomes and final retinal re-attachment rates with available resources. The authors have utilized the concept of Pascal's law, which states that when pressure is applied to an enclosed fluid, it gets transmitted without a change in magnitude, to every point of the fluid and walls of the container. Utilizing this concept, the authors drain the subretinal fluid externally after encirclage, inducing hypotony, followed by mechanical pulling of all four recti muscles and injection of balanced salt solution through pars plana briskly, leading to a uniform hydro-separation of membranes circumferentially, and easing up the remainder task of managing the membranes. The authors also hypothesize that the mechanical outward pulling of the four recti muscles, after drainage of subretinal fluid, also aids the opening up of retinal detachments approaching closed funnel configuration, apart from the outward push received with injection of balanced salt solution.
Methods: It was a retrospective study in which records of all cases of consecutive chronic rhegmatogenous retinal detachment with PVR changes more than grade C6, managed by encirclage, external drainage of subretinal fluid, hydro-separation of membranes, and 25 gauge vitrectomy, operated by a single surgeon at a tertiary eye care center between January 2023 and March 2024, were reviewed.
Inclusion criteria:
1. Total Chronic rhegmatogenous retinal detachment with PVR grade C6 or more
2. Age more than 18 years

Exclusion criteria:
1. Suspected exudative retinal detachment where no breaks were found.
2. Co-existing retinal pathology like vasculitis or vein occlusion
3. Co-existing macular pathology like CNVM
4. Previous Vitreo-retina surgery in the eye

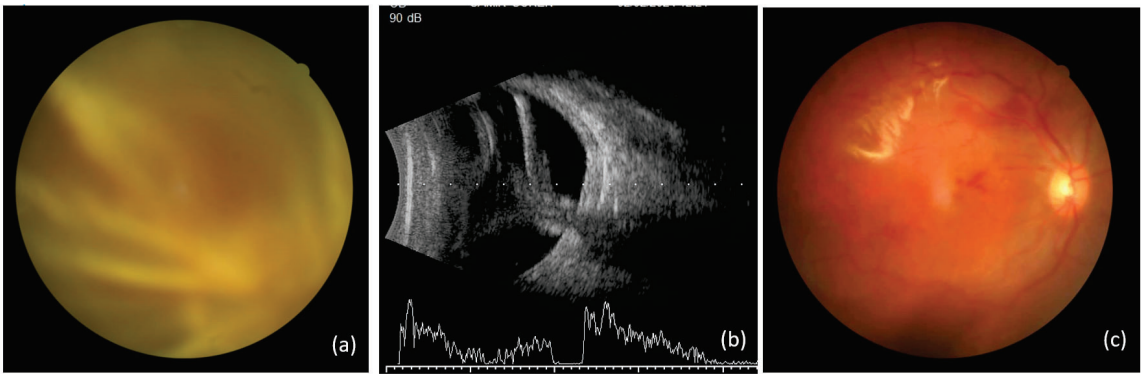
Surgical technique and underlying justification:

All cases underwent 360-degree conjunctival peritomy, hooking of the 4 recti muscles followed by encirclage with 240 band through scleral pockets in 4 quadrants followed by external drainage of SRF through a 26 gauge needle, above or below the horizontal recti. This removed the thick chronic subretinal fluid and induced severe hypotony in most of the cases. Immediately following complete external drainage of subretinal fluid, the four recti muscles were pulled by two assistants, which potentially broke the traction components of many circumferential membranes and the surgeon injected saline through pars plana, to uniformly push the detached retina with extensive membranes outwards, with uniform force as per the application of Pascal's law. The pull of the four recti muscles in a hypotonous globe, as well as the outward uniform force from the injected saline, resulted in a much simpler configuration of PVR membranes when vitrectomy was started. A routine 25-gauge vitrectomy and retinal detachment surgery was then performed.
Results: 46 eyes with Chronic retinal detachment and PVR changes more than PVR grade C6 were identified. 56.5% (26) were males and 43.5% (20) were females and one patient underwent surgery for bilateral chronic retinal detachment.
The visual acuity at presentation ranged from LogMAR 2.7 to LogMAR 1. A total of 82.6 % (38) eyes had achieved single-surgery anatomical success with an attached retina. 47.8% (22) eyes underwent silicone oil removal. In 6.52% (3) eyes, inferior subretinal fluid was noted with an attached posterior pole, and these eyes are being closely followed up. 6.52% (3) eyes had recurrent retinal detachment with macula involvement and underwent re-surgery with successful reattachment. In 4.34% (2) cases, the surgery failed to bring any anatomical or visual improvement. There was a gain in visual acuity in 95.7% (44) eyes. The mean gain in visual acuity was LogMAR 1.01. The post-operative visual acuity ranged from LogMAR 2.7 to LogMAR 0.3, with 69.56% (32) eyes attaining equal or better than LogMAR 0.8.

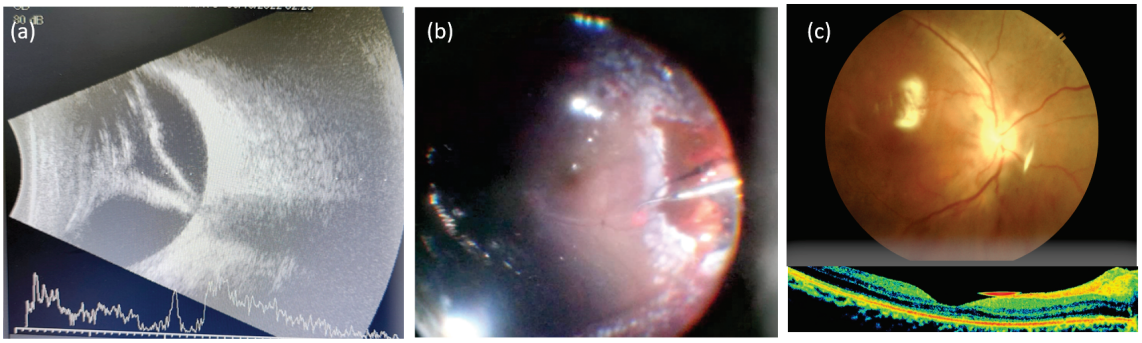
Conclusion: Our study highlights that encirclage coupled with external drainage of subretinal fluid and hydro-separation of membranes, by the application of Pascal's law, can be a useful adjunct to enhance retinal re-attachment rates in cases with chronic retinal detachment with advanced PVR changes, even in today's era of modern vitrectomy. The success rates noted are higher than many previous studies on chronic retinal detachment. Further comparative studies with prospective design are required to establish the definitive role of manoeuvers described by us in improving surgical outcomes, compared to conventional vitrectomy or encirclage with vitrectomy, in cases of chronic retinal detachment with

severe PVR changes.

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(a)Pre-op Fundus photo, (b) Pre-op B Scan and (c) Post-op Fundus Photo

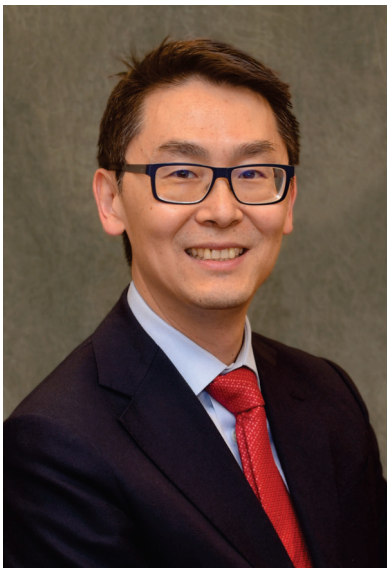


(a) Pre-op B Scan (b) Intra-op Image (c) Post-op Fundus Photo and OCT

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From Bench to Bedside: Investigating the Use of Netarsudil as a Novel Therapeutic Approach for PVR



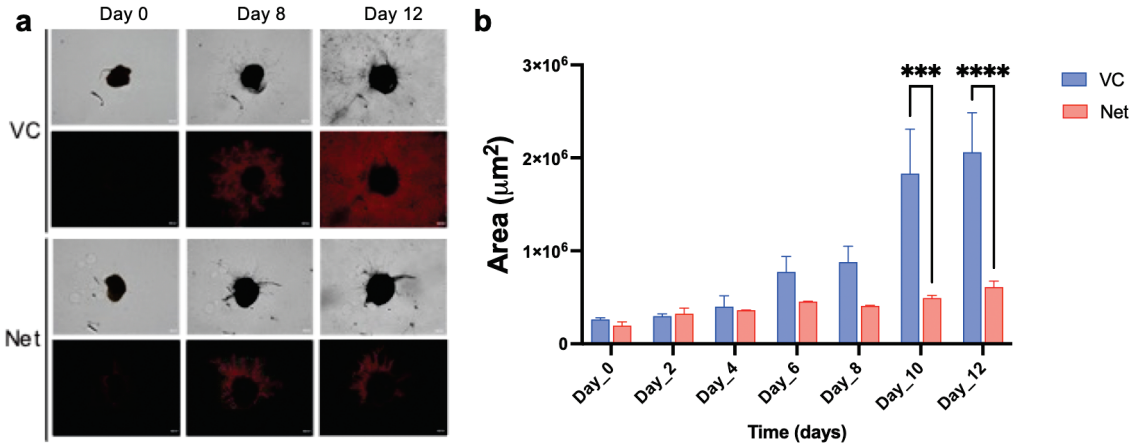
- Leo Kim, MD, PhD
- Jeysson Sanchez-Suarez, PhD
- Bernardo Bach, MD
- Edward Linton, MD
- Anil Upreti, PhD
- William Miller, PhD
- Elizabeth Rossin, MD, PhD
- Dean Eliott, MD
- Michael O'Hare, PhD
- Elliott Sohn, MD, FASRS

Objective: To evaluate the therapeutic potential of netarsudil, an FDA-approved ROCK1/2 inhibitor, in mitigating key cellular processes and molecular pathways driving proliferative vitreoretinopathy (PVR) through in vitro, ex vivo, and pilot clinical studies.
Purpose: This study aims to investigate the use of netarsudil as a therapy for PVR by demonstrating its ability to suppress disease-driving processes including: cell proliferation, migration, and contraction. By targeting the Rho-kinase pathway, a key regulator of epithelial-mesenchymal transition, we assess netarsudil's effects using patient-derived in vitro and ex vivo models, as well as a clinical pilot study, paving the way for future clinical trials and potential therapeutic adoption.
Methods: A comprehensive study was conducted, integrating preclinical laboratory findings with clinical data. For in vitro experiments, primary PVR cells were isolated from patient-derived PVR membranes obtained during vitreoretinal surgery and cultured to establish an in vitro model. The antiproliferative effects of netarsudil were evaluated using the CyQuant assay. Netarsudil was applied at a concentration of 2.5 μM for 48 hours to assess its effects on migration (scratch wound assay) and contractility (collagen-based gel contraction assay). Single-cell RNA sequencing (scRNA-seq) was employed to profile cellular heterogeneity and transcriptional shifts in PVR cells before and after treatment. For the ex vivo model, patient-derived membranes were fragmented, implanted into Cultrex, and maintained with media replenishment occurring every 48 hours. Treatments, including netarsudil and vehicle control, were applied, and growth was quantified through imaging using an inverted phase-contrast microscope. A retrospective clinical pilot study was conducted involving a cohort of 21 patients. Institutional Review Board approval was obtained at the University of Iowa Healthcare. We evaluated every pars plana vitrectomy for PVR C associated RRD performed by a single surgeon between February 2019 and September 2024. Patients treated after February 2022 were offered one netarsudil 0.02% drop nightly until at least post-op month 3. Exclusions included follow-up <3 months, no pre-op PVR, PVR B or better, uveitis, prior intravitreal methotrexate, and RRDs with macular holes. Surgeries followed similar techniques, with PVR removal and a scleral buckle placed for those without one. Retinectomies, perfluoro-n-octane (PFO) use and tamponade were decided at surgeon's discretion. Reoperation rates for recurrent PVR associated RD and potentially confounding factors were compared between groups.

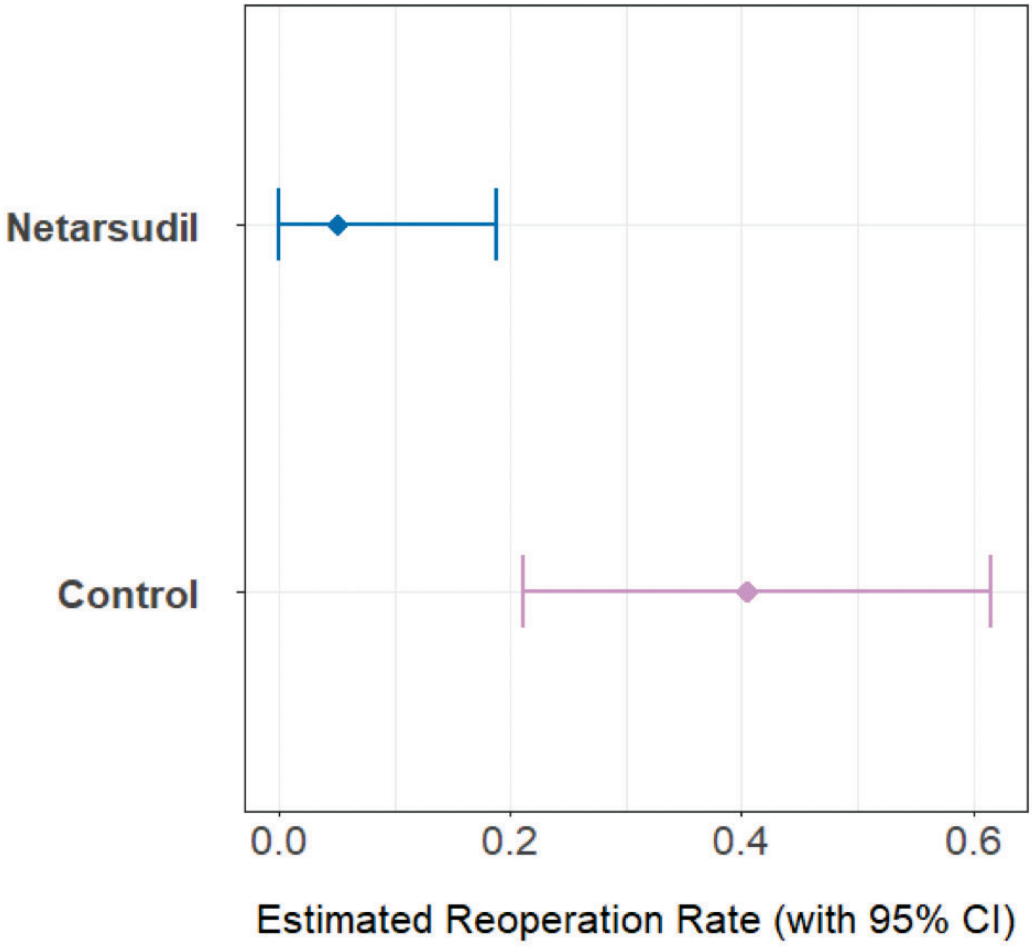
Results: Netarsudil treatment led to a marked reduction in key PVR-related mechanisms, including a 45.1% reduction in cell proliferation, a 47.1% decrease in migration, and a 58.4–71.5% reduction in TGF-β2-induced contractility ($p<0.01$). scRNA-seq analysis showed alterations in cell subpopulations, including a decrease in extracellular matrix cells, fibroblasts, and RPE cells. Furthermore, netarsudil significantly regulated key genes involved in mesenchymal transition including: PEG10, IL33, CXCL12, BMP4, and ALDH1A3, underscoring the broad molecular effects of Rho-kinase inhibition in PVR. 29 surgeries (21 patients) were included, with 9 receiving post-op netarsudil. Mean age was 71.44 years old in the netarsudil group and 66.05 in controls ($p=0.1$). No pre-op differences were found in sex, smoking, high myopia, lens status, RRD/PVR extent, or best corrected visual acuity. No reoperations for new PVR occurred in the netarsudil group vs. 8 in controls ($p=0.033$) and the Bayesian estimated 95% confidence intervals for the predicted reoperation rate did not overlap. The mean estimated event rate for reoperation due to PVR for the netarsudil group was 5%, with a 95% confidence interval of 0.0% to 18.7%, while the PVR reoperation rate for the control group was 40.5% with a 95% confidence interval of 21.1% to 61.6%. These results indicate a significant decrease in PVR reoperation rates in patients treated with netarsudil compared to controls.

Conclusion: By inhibiting critical mechanisms such as proliferation, migration, and contraction, netarsudil effectively mitigates PVR pathogenesis, driving favorable changes in cellular dynamics and gene regulation. In our pilot clinical study, no patients required additional surgeries in the netarsudil treated group, the therapeutic benefits of netarsudil appear to mirror its preclinical activity, supporting its potential as a novel intervention for PVR.

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Netarsudil limits PVR explant growth. a) Explaint images b) Quantification.



Forest plot of reoperation rates for PVR between netarsudil and control.

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Retinal Detachment Symposium 3

Postoperative Methotrexate Injections Decrease Reoperation Rate and Improve Vision Following Vitrectomy for PDR and Complex Retinal Detachments



- Alan Franklin, MD, PhD, FASRS
- Christopher Riemann, MD
- Lauren Gibson, MD
- Aly Nguyen, BS

Objective: To determine whether a decreased dose and frequency of postoperative intravitreal methotrexate injections can improve the outcome following vitrectomy surgery for proliferative diabetic retinopathy and complex retinal detachments.

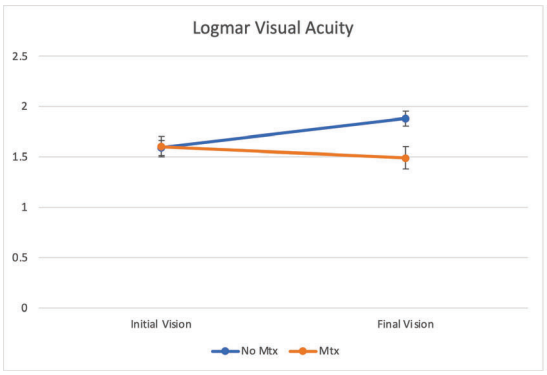
Purpose: Many studies of postoperative intravitreal methotrexate injections have shown varying efficacy for improved outcomes for retinal detachment. We employed a reduced dose and frequency of intravitreal methotrexate and targeted both complex retinal detachments and proliferative diabetic retinopathy to determine the safety and efficacy of locally administered methotrexate for two commonly encountered retinal surgical pathologies.

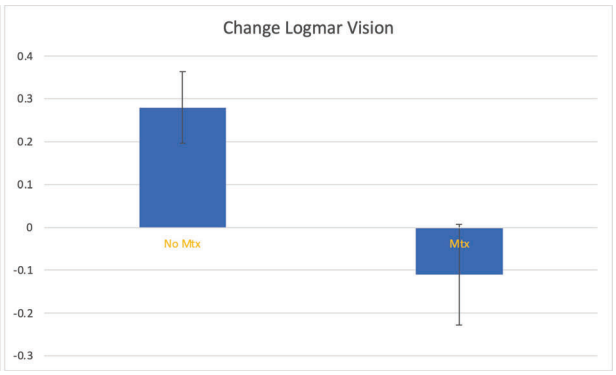
Methods: We performed a retrospective chart review on 255 patients; 94 who received postoperative intravitreal injections and 161 who did not receive injections. Subgroup analyses were performed on patients with advanced proliferative diabetic retinopathy, globe trauma, or those who were at risk for proliferative vitreoretinopathy. Those at risk of proliferative vitreoretinopathy were designated because of: 1) previous proliferative vitreoretinopathy in the operated or fellow eye; 2) retinal breaks comprising more than 2 clock hours of the peripheral retina; 3) Age under 65, or 4) family history of complicated retinal detachment repair. Either 200 or 400 µg of methotrexate was injected via the inferotemporal pars plana using the identical preparation used in our clinic for injection of other intravitreal agents. Central macular thickness was determined by macular mapping software for each machine. A masked reader was used to confirm appropriate measurement of central macular thickness as well as to determine the presence of a foveal reflex.

Results: The average initial visual acuity was 20/800 for both groups ($p = 0.92$). Other baseline characteristics were also similar. After vitrectomy, visual acuity gain was 1 lines in Methotrexate (MTX) patients compared to a 2.9-line loss in Control (CTL) patients, $p < 0.01$. This difference was consistent across subgroups, 3.6-line gain for MTX patients vs. 1.7-line gain for CTL in patients with proliferative diabetic retinopathy $p > 0.05$, and 1.5-line gain for MTX patients vs. 1.1-line loss for CTL patients with complex retinal detachment, $p > 0.05$. CTL patients had a significantly increased risk of 3-line vision loss (54%) vs. MTX patients (35%), $p < 0.002$. There was a trend towards visual improvement of 3 lines or greater in MTX vs CTL patients, 35% vs. 28%, $p = 0.12$. Moreover, reoperation rate was 57% lower in MTX patients, 0.39 vs 0.94, $p < 0.01$. Moreover, the single surgery success rate was 74% vs 41% in MTX vs CTL patients, $p < 0.01$. The decreased reoperation rate in MTX patients persisted across subgroups, 0.37 vs. 0.87 in proliferative diabetic retinopathy patients, and 0.46 vs. 1.07 in complex retinal detachment patients, both $p < 0.01$. MTX injected eyes in this group of PDR patients required fewer operations. For RD following trauma, there were lower reoperation rates encountered with MTX, 0.67, compared to CTL, 2.4. On exam, MTX eyes had less postoperative epiretinal membrane proliferation compared to CTL eyes. Reduction in central retinal thickness was similar in each group, 93 µm in MTX patients vs. 100 µm in CTL patients.

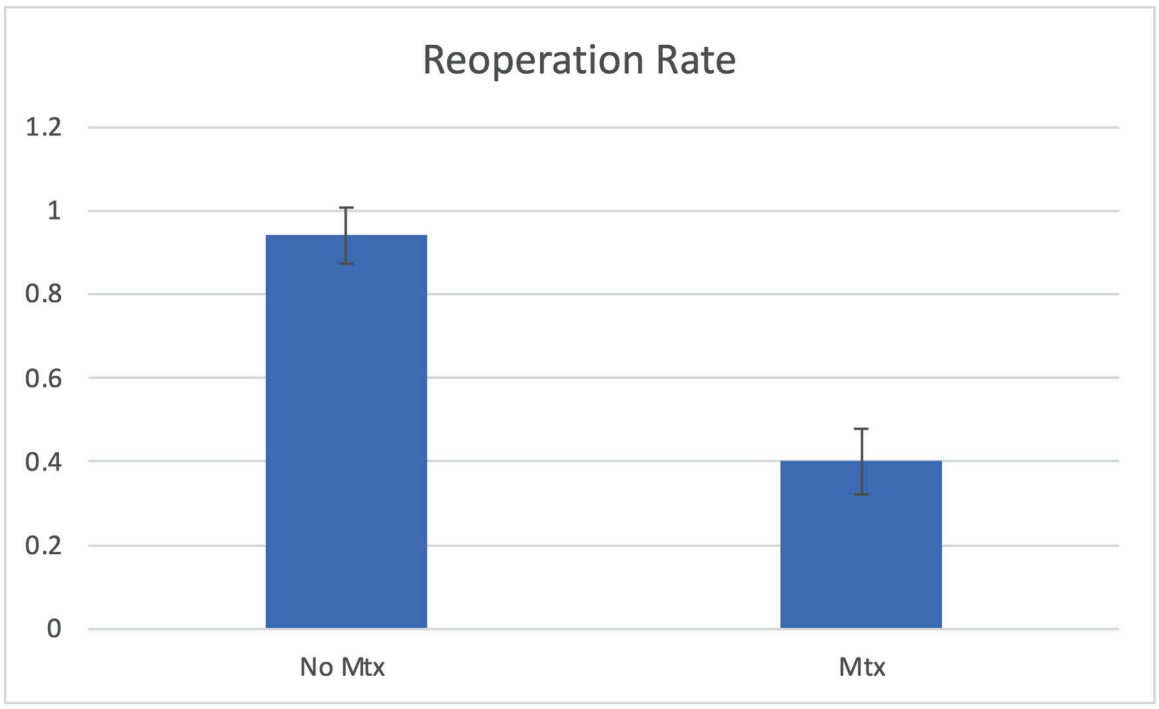
Conclusion: Postoperative injection of methotrexate in this group of eyes with complex pathology produced: 1) A marked reduction in reoperation rates; 2) improvement in vision; and 3) improved anatomic results. Collectively, these results illustrate an important improvement over the typical achieved results in this patient population. Although this is a retrospective study, the numbers in this study provide clear statistically significant data to support the use of post-operative methotrexate injections in eyes that undergo surgery for multiple complex retinal pathologies, Moreover, this is the first report of the use of methotrexate in a relatively large number of patients with advanced proliferative diabetic retinopathy. Reoperation rates were reduced by 57% for patients with both PDR and RRD. A higher number of reoperations is associated with poorer anatomic and visual outcomes. Since we were able to repair many complex diabetics with a gas tamponade only, the risk of organization and proliferation of fibrotic tissue from recurrent vitreous hemorrhage at the posterior meniscus of silicone oil bubble was reduced and fewer patients required reoperation to remove fibrosis as well as for silicone oil removal. This is also the first report of improved visual acuity after postoperative methotrexate injections to further reinforce the significant benefit of this intervention. Moreover, there was a significant reduction in 3-line or greater loss of vision in the MTX group further supporting the observed reduction in reoperation rate as more reoperations are associated with worse visual outcomes.

IRB APPROVAL





Initial And Final Visual Acuity For All Groups



Reoperation Rate For Control And Methotrexate Treated Eyes