

Vein Occlusion Studies

BRVOS

Introduction: The BRVOS is a multi-center, randomized, controlled clinical trial designed to answer the following three questions:

- 1) Can argon laser prevent NV?
- 2) Can argon laser prevent VH?
- 3) Can argon laser improve VA with ME and VA >20/40?

BRVOS for Macular Edema (Am J Ophthalmol 1984: 98:271-282)

Eligibility:

- 1) BRVO 3 to 18 months.
- 2) VA 20/40 or worse.
- 3) Sufficient clearing of heme.
- 4) FA confirms leakage involving fovea (ME). NOT NONPERFUSION.
- 5) No foveal heme.

Major study design: Eyes randomized to treatment with grid argon laser vs controls who were followed. Study stopped after 18 months. Follow up available for 3.1 years.

Treatment: Patients followed every 2 to 4 months. Argon laser grid pattern. Inside arcades and not closer than FAZ AG, 0.1 sec, 50 to 100 μ , medium white burn, one spot apart. Repeat if persistent edema and repeat FA identifies are of not treated leakage

Results:

Criteria Measured	Treatment Group	Controls
% gaining 2 lines	65%	37%
% having decrease in VA	12%	17%
<20/40 at 3.1 years	60%	34%
>20/200	12%	23%
Avg. VA	20/40 to 20/50	20/70
Avg. Line Gain	1.33	0.23

Conclusions: Treat ME in BRVO if above criteria met!
Argon laser for prevention of VH and NV (Arch Ophthalmol 1986: 104:34-41)

- Eligibility:
- 1) BRVO 3 to 18 months.
 - 2) Area of 5 DD of involvement.
 - 3) Sufficient clearing of heme.
 - 4) No diabetic retinopathy.
 - 5) Absence of ocular disease.
 - 6) Group with NV: Disc and/or peripheral NV.

Treatment: Scatter photocoagulation AG, 200 to 500 μ , 2DD from center, medium white burn.
One burn width apart not inside 2 DD of FAZ.

Results: Prevention of NV: Outcome measure is NV.

	Treated	Controls
Percentage	12%	22%

Prevention of VH with NV present. Outcome measured is VH.

	Treated	Controls
Percentage	29%	61%

NB: 12% of nonperfused eyes had VH when tx'd before NV develops.
9% of nonperfused eyes had VH when tx'd after NV develops.

Conclusions: **Area > 5 disc diameters.**

- 1) Wait for clearing of heme for high quality FA.
- 2) Evaluate FA. If more than 5 DD of nonperfusion follow at 4 month intervals.
- 3) If NV develops than laser in involved quadrant according to protocol.

CRVOS (Ophthalmol 1995;102:1425-44, Arch ophthalmol 1993;111:1087-1095)

Introduction: The CRVOS is a multi-center, randomized, controlled clinical trial designed to answer the following three questions:

- 1) Does PRP prevent NVI (TC-INV/ANV) with ischemic CRVO?
- 2) Does macular grid pattern improve VA in CRVO?
- 3) Natural history of CVO?

Natural history:

Group	Conversion at 4 months
Perfused	16%
Indeterminate	83%

Group M (Macular edema)

There is no significant differences between treated and untreated patients at any follow up.

Group P (Perfused)

Non perfusion < 10DA

Group N (> 10 DA of non perfusion)

- Eligibility:**
- 1) CRVO
 - 2) No NVI.
 - 3) CRVO < 1 year. Intra retinal heme in 4 quads.
 - 4) At least 10 DA of non perfusion.
 - 5) VA > LP.
 - 6) Good FA.

Basic study design: Eyes randomized to early treatment received PRP following protocol. Supplemental PC was applied if TC-INV/ANV developed after PRP. Eyes assigned to the no early treatment group were no treated unless TC-INV/ANV developed.

- Treatment:**
- 1) 1000-2000 spots
 - 2) Beyond equator.

- 3) No closer than 2 DD of center.
- 4) 500 to 1000 μ , 0.2 sec, moderate whitening.

Results:

Development of TC-INV/ANV

	Treated	Non treated
Development of TC-INV/ANV	20%	35%

NB. Not significant when adjusted for baseline imbalances.

Response to PRP

	Early Tx	No early Tx
Regression within 1 month	22%	56%

Major stats from CRVO Study

- Of total 714 eyes 117 (16%) developed INV/ANV
- group N or I 35% with INV
- group P (initial categorization) 10% with INV
- Risk factors for development of INV/ANV
 - 1) VA > 20/200
 - 2) 30 DA non perfusion
 - 3) Mod-severe venous tortuosity
 - 4) Retinal hemorrhage
 - 5) Duration less than 1 month
- Risk of fellow eye 0.9%/year of any vascular occlusion
- VA pretty much what you present with is what you end up with.

Conclusions: Basically if non perfused or indeterminate you have a high risk of developing NVI in first few months post CRVO. If NVI develops at any point then treat.