



# Aqueous Humor Dynamics in a Patient with Chronic Hypotony, Cyclodialysis Clefts, and Ciliochoroidal Detachment

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# Purpose

- To describe the aqueous humor dynamics and pathophysiology of hypotony in a patient with traumatic circumferential cyclodialysis clefts, hypotony, choroidal folds, and hypotony maculopathy.
- To describe a non-surgical alternative for management of cyclodialysis clefts.

# Clinical Vignette

- 17-year old Caucasian patient presented to the ophthalmology department at the Mayo Clinic for evaluation of hypotony
  - Traumatic injury to left eye with a paintball
  - Initially treated with Difluprednate 0.05% QID, Atropine 1% BID and Ketorolac 0.4% QID
- VA: Right: 20/25, ph 20/20 Left: 20/400.
- IOP: Right: 13 mmHg                      Left: 4 mmHg
- No rAPD

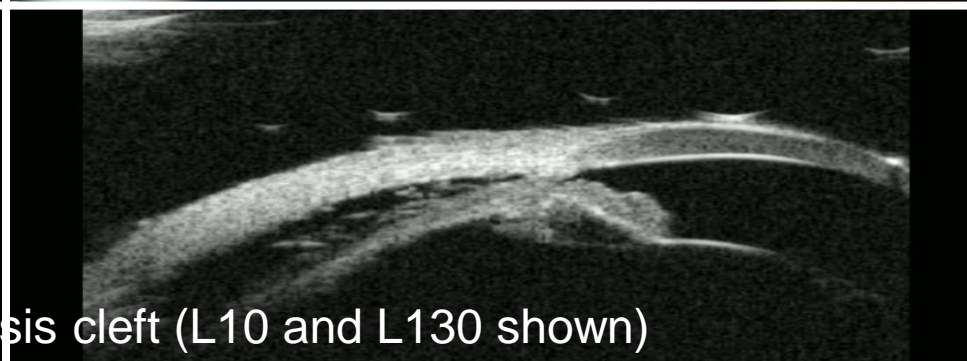
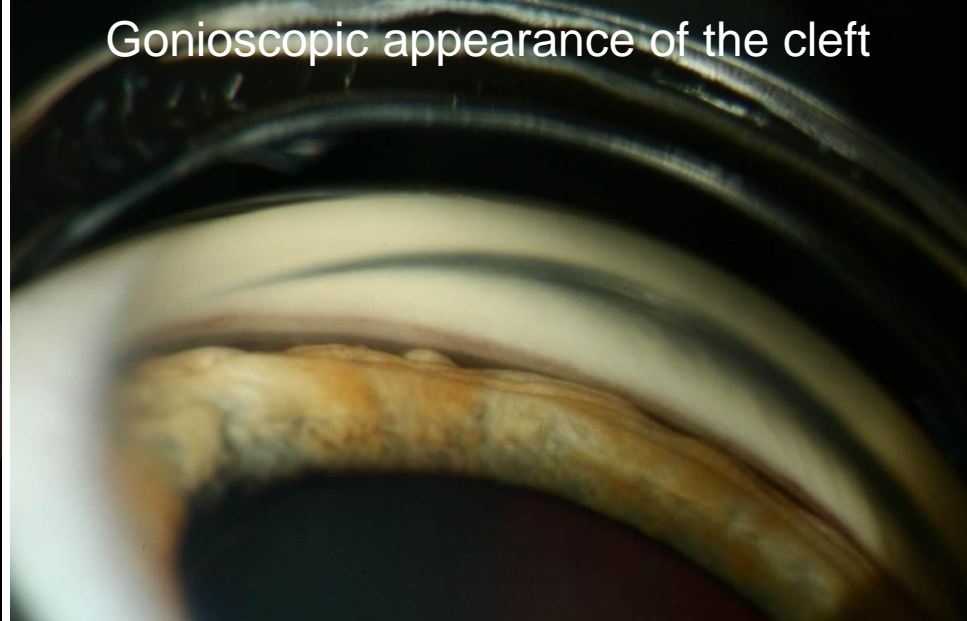
# Clinical Vignette

- Circumferential cyclodialysis cleft, left eye.
  - Confirmed by SLE, gonioscopy and UBM
- Subluxed crystalline lens
- Funduscopic examination:
  - Clear vitreous
  - Optic nerve swelling
  - Vascular tortuosity
  - Chorioretinal folds involving the macula

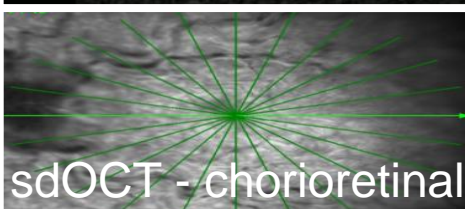
Disc edema and chorioretinal folds



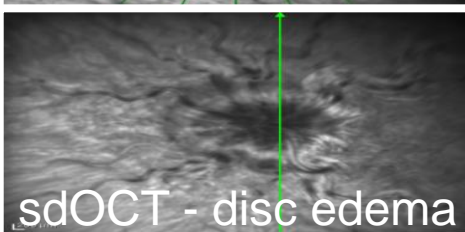
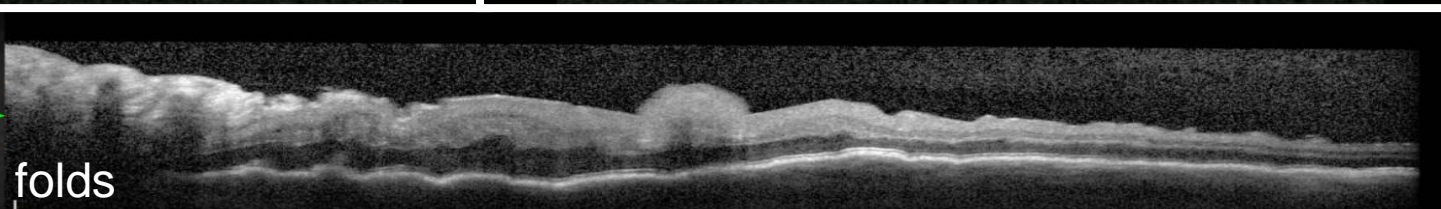
Gonioscopic appearance of the cleft



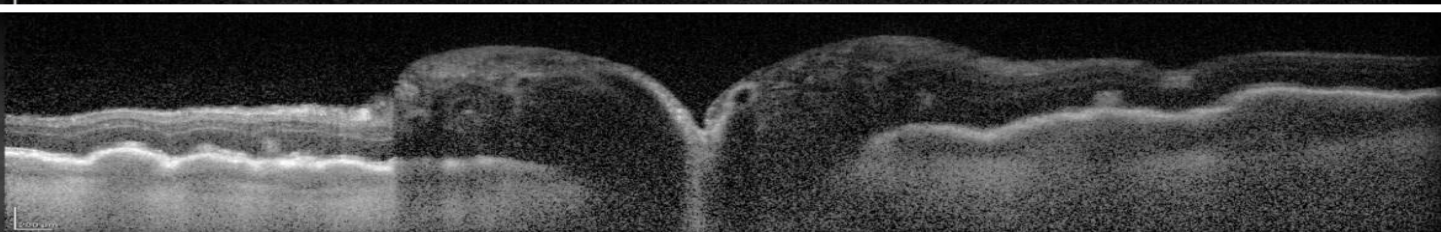
UBM - circumferential cyclodialysis cleft (L10 and L130 shown)



sdOCT - chorioretinal folds



sdOCT - disc edema



# Methods

- Confirmation of circumferential cyclodialysis cleft
  - Aqueous humor flow measured by fluorescein clearance
- Estimated flow rates compared with normal controls<sup>4</sup>
- Confirmation of cyclodialysis cleft closure
  - Repeated aqueous humor flow measurement by fluorophotometry

# Therapeutic Interventions

- 3 months of topical anti-inflammatory agents and cycloplegia
  - no improvement
- Argon laser to areas of visualized cyclodialysis to promote closure of the clefts
  - No change in IOP or configuration of the clefts
- Prednisone 80mg daily tapered over 3 weeks.

After 7 days:

- Visual acuity: 6/200, ph 20/150.
- IOP: 21 mmHg
- Decreased disc and macular edema
- Gonioscopy and UBM confirmed closure of cleft.

# Results

- Initial
  - Estimated aqueous humor flow rate = 7  $\mu\text{l}/\text{min}$ 
    - Much higher than normal (2.2-3.1  $\mu\text{l}/\text{min}$ )<sup>4</sup>
    - Flow rate was likely an artifact of accelerated loss of fluorescein through cleft
- 7 days after PO Prednisone – 4 mos after injury
  - Aqueous humor flow rate = 3.3  $\mu\text{l}/\text{min}$



# Discussion

- Proposed theory of hypotony
  - Cyclodialysis cleft
    - Aqueous humor loss through low resistance path
    - Nonconventional outflow leading to hypotony
  - Uveal inflammation
    - Fluid transudation from choroidal vessels
    - Ciliochoroidal detachment and hypotony
  - Compromised blood flow to ciliary body
    - Decreased aqueous humor production
- Oral steroids decrease uveal inflammation, causing disruption of feedback loop, and increase IOP



# Conclusions

- Fluorophotometry in a patient with a large traumatic cyclodialysis cleft over-estimates aqueous humor flow.
- Hypotony is secondary to loss of aqueous humor through cyclodialysis cleft.
- Oral steroids are a potential non-surgical option in these patients, as evidenced by the closure of the cleft and subsequent normalization of the intraocular pressure and the fluorophotometric estimates of aqueous flow.

# References

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