Update on Central Serous Chorioretinopathy
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Retina Update 2017

No financial interest
Off label use of Spironolactone, Eplerenone, Melatonin, Verteporfin, Rifampin

Classic Central Serous
Young Anxious Male
"Smokestack"
Spontaneous Recovery

55 Year Old Woman 20/150 OD
Inferior Exudative Retinal Detachment

Central Serous Chorioretinopathy
Common Condition
Affects Adults of All Ages
Men and Women
Potentially Severe
Treatable

11 Year Course of Repeated Episodes in Spite of Multiple Therapies
Severe Permanent Vision Loss in Right Eye

Valuable Insights into Ocular Function
The Most Important Part is Under the Surface
Rapid Circulation
Leaky Vessels
Steroid Receptors

Smaller vessels: Sattler's Layer (Choriocapillaris)

Larger vessels: Haller's Layer

Smaller vessels:

Rapid Circulation
Leaky Vessels
Steroid Receptors

Functions to Bring Oxygen Carry Away Waste Dissipate Heat

Can Now Image Choroid Easily

Enhanced Depth Imaging “EDI” OCT
Swept Source OCT

What is Normal?

Appearance of Choroid Varies with Age, Refractive Error

Normal Choroidal Thickness Decreases with Myopia

- 10 Myope
- 3 Myope
+5 Hyperope

Temporal Choroid is Thicker than Nasal

89 y.o.
28 y.o.

31 year old
Variation in Choroidal Thickness

Decreases with:
- High Myopia
  Emmetropia: 316, High Myopia: 97
- Age
  Young Adult: 320, Older than 70: 160

Risk Factors for CSC

Steroid use, particularly glucocorticoids, Cushing's Disease
- "Stress", type A personality, psychopharmacological medications
- Irregular sleep cycle or sleep apnea
- Normal menstrual cycles seem protective
- Women usually post menopausal or pregnant
- Testosterone use is a risk factor

Steroids and the Eye

Steroids and Central Serous

Corticosteroids induce choroidal thickening.
Corticosteroids can cause Central Serous.
Steroid blocking agents might be used as treatment.
Many Cases are Mild and Resolve Spontaneously

Often no treatment is indicated.
First acute episode of central serous in a young patient of less than 3 months duration: usually observe without treatment.

Consider Treatment

Severe vision loss
Occupational need for excellent binocular vision
Chronic sub-retinal fluid (3-6 months)
Repeated episodes
Older patient

Risk Factors for Prolonged Sub-retinal Fluid

Sub-foveal choroidal thickness greater than 500 microns
PED higher than 50 microns at leakage site
Age greater than forty

Daruich et.al. Retina 2017

Multiple Treatment Options

Thermal Laser

Focal leak away from foveal center
Fluid extends into the center
Very light treatment directly to leak
Corticosteroid Antagonists

Small case series have reported benefit in using several antagonists to corticosteroids.
Ketoconazole, mifepristone, finasteride, rifampin.
Rifampin is CYP450 inducer, increases metabolism of steroid hormones.
I have seen benefit from rifampin in several patients, but concern over side effects of long term use limit appeal.

Spironolactone

Non-selective antagonist to aldosterone.
Some cross antagonism to glucocorticoid, androgen and progesterone receptors.
Must monitor renal function and potassium levels.
Hormonal side effects: gynecomastia, decreased libido, menstrual irregularity. Must not be used in pregnancy.
Used off label for treatment of acne in women.
Side effects uncommon at low doses.

Spironolactone

Dosage range 25 mg to 200 mg/day, typically use 25 mg/day for CSC.
Low cost.
Work with primary care doctor, particularly in the elderly.
Trimethoprim/sulfamethoxazole, ACE inhibitors, and NSAIDs may increase the effect on potassium levels.

Eplerenone

Selective inhibitor of aldosterone. Less effect on other hormones than spironolactone.
Less strong, fewer hormonal side effects.
Typical dose 50 mg/day.
Metabolized by P4503A4 system, and effect may be increased by inhibitor drugs (amifostine, cyclosporine, fluconazole, itraconazole, ketoconazole, mifepristone, clarithromycin, tacrolimus, bactrim, voriconazole).

Randomized Controlled Study (Crossover) Of Spironolactone for Central Serous

16 patients randomized to spironolactone 50/mg day or placebo, treated for one month, and switched.
Statistically significant reduction in sub-retinal fluid and choroidal thickness.

Bousquet, E. et al. Retina 2015
Pooled Data (282 Eyes) of Eyes Treated with Aldosterone Antagonists

71% of treated eyes showed some objective improvement.
46.5% complete resolution of sub-retinal fluid.
Side effects in 8% eplerenone and 22% spironolactone (gynecomastia and elevated potassium each in about 1% of patients).

Rahimy, E et. al. Retinal Physician, 2016

Melatonin for Chronic Central Serous

13 patients with chronic CSC, 8 randomized to 3mg TID, 5 to placebo for one month.
87% of treated patients improved, 37% complete resolution of sub-retinal fluid.
No changes in control group.

Gramajo, A, Eye, 2015

Melatonin for Central Serous

Daytime sleepiness can be a problem at dose used in study.
Response more limited.
I do try, and will continue 3mg at bedtime, particularly if history of sleep problems or shift work.
No FDA oversight of supplements.

Verteporfin PDT for Central Serous

Affects choroid and causes choroidal thinning
Can treat larger areas with little risk of vision loss
Has shown effectiveness in many series
One time treatment
Verteporfin PDT for Central Serous: Newer Protocols

- Halved dose of drug
- Halved fluence (laser intensity)
- Halved time of light exposure
- All reported good improvement rates with low side effect rate in short term follow up

Verteporfin PDT for Central Serous: Problems

- Cost of drug: over $2000 per dose.
- Insurance coverage for non-FDA approved use.
- Concern of long term RPE or choriocapillaris atrophy.
- Low risk of severe vision loss at time of treatment seen in AMD treatment. Lack of large prospective studies at any of the dosage regimens.

My Treatment Protocol for CSC

- Observe first episode for 3 months unless severe or occupational needs for bilateral vision
- Avoid corticosteroids: Oral, nasal sprays, joint injections, skin ointments
- Consider Cushing’s Disease
- Treat sleep problems: Shift work, sleep apnea
- Consider Melatonin: 3 mg at bedtime

My Treatment Protocol for CSC

- Focal leak away from fovea: Thermal laser.
- Diffuse leak under fovea, good health and normal renal function: Consider mineralocorticoid antagonist such as spironolactone 25 mg/day.
- Poor candidates or failures of Spironolactone: Offer PDT.

Spectrum of Related Diseases: Thick Choroid

Central Serous Chorioretinopathy
Pachychoroid Pigment Epitheliopathy
Pachychoroidal Neovasculopathy
Polypoidal Choroidal Vasculopathy

Warrow et al. Retina 2013
Pachychoroidal Neovasculopathy

Older patient
Neovascularization under the RPE occurring over areas of choroidal thickening
Lack of drusen
Reduced fundus tessellation
“Double Layer Sign” of RPE consistent with type 1 choroidal neovascularization

Pang and Freund, Retina 2015

Common
Difficult to differentiate from exudative AMD
Less responsive to typical anti-VEGF therapy
May respond to combination therapy or PDT

74 y.o. man
20/50 OS
1 month blurring and distortion

Initial OCT

Diagnosis: Pachychoroidal Neovasculopathy
Treated with one dose of anti-VEGF
Spironolactone 25 mg/day after checking electrolytes

1 month 20/20, dry
No further Anti-VEGF
Continued spironolactone
6 months still dry
Summary

Central Serous Chorioretinopathy often resolves without treatment, but can be severe, prolonged, and vision threatening.

Multiple treatments are available, including oral medications. Mineralocorticoid blocking agents appear promising.

Summary

Older patients with thickened choroid may develop choroidal neovascularization. These patients may be part of a spectrum of disease that includes Central Serous Chorioretinopathy.