Scleritis

Introduction
A painful, destructive, and potentially blinding disorder
Highly symptomatic
High association with systemic disease
Immunosuppressive agents

Anatomy
A. Bulbar conjunctival plexus
   - Freely moveable, hair-like vessels
   - Bright red when inflamed
B. Episcleral plexus
   - Straight, radially arranged
   - Salmon pink color when inflamed
C. Scleral plexus
   - Immobile criss-cross vessels
   - Bluish-red color when inflamed
Scleritis Subtypes

Scleritis Subtypes

Anterior, 90%
Posterior, 10%

Anterior scleritis

Diffuse
Nodular
Necrotizing

Inflammatory
Non-inflammatory

Necrotizing with inflammation
Scleromalacia perforans
Necrotizing anterior scleritis

Least common, but most severe
Older women
With inflammation
Without inflammation
  - Scleromalacia perforans

Necrotizing with inflammation

SYSTEMIC DISEASE ASSOCIATIONS

~50% of cases
  - Rheumatoid arthritis (18%)
  - Inflammatory bowel disease (7%)
  - Systemic lupus erythematosus (4%)
  - Relapsing polychondritis (3%)
  - Infection (8%)
    - Zoster
    - Simplex
    - HIV
    - Lyme

Systemic diseases associated with scleritis

<table>
<thead>
<tr>
<th>Connective tissue diseases</th>
<th>Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatoid arthritis</td>
<td>Syphilis</td>
</tr>
<tr>
<td>Involvement</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>Systemic lupus erythematosus</td>
<td>Lyme disease</td>
</tr>
<tr>
<td>Relapsing polychondritis</td>
<td>Herpes zoster</td>
</tr>
<tr>
<td>Scleromalacia perforans</td>
<td>Aspergillosis</td>
</tr>
<tr>
<td>Other</td>
<td>Diabetic neuropathy</td>
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</tbody>
</table>

Inflammatory bowel diseases
Classification of the vasculitides

<table>
<thead>
<tr>
<th>Vasculitis</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
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<tbody>
<tr>
<td>Large</td>
<td>Giant cell arteritis, temporal arteritis</td>
<td>Agranular granulocytes, diffuse mononuclear infiltrate, fibrinoid necrosis</td>
</tr>
<tr>
<td>Medium</td>
<td>Polymyalgia rheumatica, Takayasu disease, primary ANCA syndrome</td>
<td>Hepatitis</td>
</tr>
<tr>
<td>Small</td>
<td>ANCA-related</td>
<td>Wegener granulomatosis, Churg-Strauss syndrome</td>
</tr>
<tr>
<td>Non-ANCA-related</td>
<td>Wegener granulomatosis, polyarteritis nodosa, Takayasu disease, primary ANCA syndrome</td>
<td>Drugs, connective tissue disease, SLE, RA, Wegener granulomatosis, Wegener granulomatosis, C-ANCA, rheumatoid arthritis, vasculitis</td>
</tr>
</tbody>
</table>

Review of systems

Ocular complaint may be the most prominent
A careful review of systems
Constitutional symptoms
Whole body examination

PATHOPHYSIOLOGY

Not well-defined

Vasculitis
Vasculitides-Introduction

Presence of inflammatory leukocytes in vessel walls
Loss of vessel integrity
Tissue ischemia and necrosis

Three different pathogenic models:
1) distribution of the antigen
2) accumulation of infiltrate
3) non-endothelial participation

Vasculitis

<table>
<thead>
<tr>
<th>Disease category</th>
<th>Percent with disease</th>
<th>Male age at disease onset</th>
<th>Female age at disease onset</th>
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<tbody>
<tr>
<td>Polyarteritis nodosa</td>
<td>0</td>
<td>50</td>
<td>57</td>
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<tr>
<td>Necrotizing granulomatosis with polyangiitis (Churg-Strauss)</td>
<td>5</td>
<td>49</td>
<td>57</td>
</tr>
<tr>
<td>Granulomatosis with polyangiitis (Wegener’s)</td>
<td>36</td>
<td>49</td>
<td>57</td>
</tr>
<tr>
<td>Wegener’s, vasculitis</td>
<td>5</td>
<td>57</td>
<td>56</td>
</tr>
<tr>
<td>Lupus arteritis</td>
<td>50</td>
<td>57</td>
<td>54</td>
</tr>
<tr>
<td>Vasculitis, IgG related</td>
<td>40</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>Other systemic/lupus-related</td>
<td>4</td>
<td>56</td>
<td>59</td>
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</tbody>
</table>


Small vessel vasculitis

Eosinophilic granulomatosis with polyangiitis (Churg-Strauss)
Granulomatosis with polyangiitis (Wegener’s)
Microscopic polyangiitis
Systemic lupus erythematosus
A chronic inflammatory disease
Skin, joints, kidneys, lungs, nervous system
Antinuclear antibodies
Periods of remissions and of chronic or acute relapses
Women 20s and 30s

<table>
<thead>
<tr>
<th>Fatigue</th>
<th>Fever</th>
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<tbody>
<tr>
<td>Weight loss</td>
<td></td>
</tr>
<tr>
<td>Arthritis or arthralgia</td>
<td></td>
</tr>
<tr>
<td>Skin</td>
<td></td>
</tr>
<tr>
<td>Raynaud's phenomenon</td>
<td></td>
</tr>
<tr>
<td>Malar rash</td>
<td></td>
</tr>
<tr>
<td>Nonarthritis joint</td>
<td></td>
</tr>
<tr>
<td>Oral ulcers</td>
<td></td>
</tr>
<tr>
<td>Renal</td>
<td></td>
</tr>
<tr>
<td>Neuro</td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td></td>
</tr>
<tr>
<td>Pulmonary</td>
<td></td>
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</tbody>
</table>

CLINICAL FEATURES
Severe, constant boring pain
Pain with eye movements
Sleep disturbance
Headache, photophobia

Ocular Examination

<table>
<thead>
<tr>
<th>Examination</th>
<th>Episcleritis</th>
<th>Scleritis</th>
</tr>
</thead>
<tbody>
<tr>
<td>In daylight</td>
<td>Salmon pink</td>
<td>Purple/grey choroid</td>
</tr>
<tr>
<td>Slt-lamp (red-free)</td>
<td>Yellow patch</td>
<td>Scleral edema, vessels, avascular patches</td>
</tr>
<tr>
<td>10% phenylephrine</td>
<td>More constriction</td>
<td>Minimal constriction</td>
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</tbody>
</table>
Scleritis: Diffuse vs Nodular

DIFFUSE ANTERIOR SCLERITIS
- Widespread ocular erythema
- Scleral edema

NODULAR ANTERIOR SCLERITIS
- Localized area of tender
- Intense dilation of scleral vessels

Necrotizing anterior scleritis
- Severe ocular and periorbital pain
- Intense vasodilatation of deep episcleral plexus
- Thinning of the sclera
- Peripheral ulcerative keratitis

Scleromalacia perforans
- Commonly bilateral
- Lack of symptoms
- Scleral thinning
- A decrease in vision
Posterior scleritis

Diplopia
Pain upon eye movement
Impaired vision

Involvement of other ocular structures

<table>
<thead>
<tr>
<th>Cornea</th>
<th>Posterior segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral ulcerative keratitis</td>
<td>Posterior scleritis</td>
</tr>
<tr>
<td>Uveal tract</td>
<td>Lens</td>
</tr>
<tr>
<td>Anterior uveitis (40%)</td>
<td>Cataract</td>
</tr>
</tbody>
</table>

LABORATORY ASSESSMENT

<table>
<thead>
<tr>
<th>Blood and serologic testing</th>
<th>Skin tests</th>
<th>Radiologic testing</th>
</tr>
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<tbody>
<tr>
<td>Complete blood count</td>
<td>Tinepillin skin test</td>
<td>Chest x-ray</td>
</tr>
<tr>
<td>Erythrocyte sedimentation rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antinuclear antibody</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serafla serology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheumatic factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angiotensive converting enzyme levels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antinuclear factorantibody</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serum vito and renunciation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinalysis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
** Extensive Lab Workup  
- Rheumatoid factor
- Rheumatoid vasculitis
- Antibodies to cyclic citrullinated peptides (anti-CCP antibodies)
- Rheumatoid arthritis
- Antineutrophil cytoplasmic antibodies (ANCA)
- Wegener's polyangiitis
- Antinuclear antibody (ANA)

** Serum complement C3, C4**
- Antibodies to dsDNA
- Antibodies to Ro, La, Sm, or RNP antigens

** IMAGING STUDIES AND BIOPSY  
- Chest X-ray
- Ultrasonography
  - B-scan
- Cross-sectional imaging
  - CT and MRI
- Biopsy

** TREATMENT GUIDELINES  
- Systemic therapy
  - NSAIDs
  - Glucocorticoids
- Ophthalmology & Rheumatologist
- Necrotizing scleritis requires immunosuppressants
### Anti-inflammatory Drugs

**NSAIDS**
- Diffuse and nodular anterior scleritis
  - Indomethacin 25-75mg PO tid

**GLUCOCORTICOIDS**
- Diffuse and nodular anterior scleritis
  - 1mg/kg/day, up to 80mg X 4 wks
  - Immunosuppressive agent

[Image of Medication]

### Glucocorticoid tapering regimen

A total of 24 weeks to reach daily dose of 5 mg:
- The prednisone dose is tapered by 10 mg each week until a dose of 40 mg/day is reached.
- After one week on 40 mg/day, the prednisone dose is tapered by 5 mg each week until the dose reaches 20mg/day.
- After one week on 20 mg/day, the prednisone dose is tapered by 2.5 mg each week until the dose reaches 10 mg/day.
- After one week on 10 mg/day, the prednisone dose is tapered by 1 mg every two weeks until the dose reaches 5 mg/day.

### Immunosuppressive medications

- Rituximab
- Cyclophosphamide
- Cyclosporine
- Mycophenolate mofetil
- Methotrexate
COURSE AND PROGNOSIS

Quick response to therapy (~ 2 wks)

Disease-associated morbidity
- Diffuse anterior scleritis (10%)
- Nodular scleritis (25%)
- Necrotizing scleritis (75-85%)
- Posterior scleritis (75-85%)

Cardinal features

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Anterior</th>
<th>Posterior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Ocular pressure</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Visual acuity</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Exudates</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Inflammation</td>
<td>Absent</td>
<td>Absent</td>
</tr>
</tbody>
</table>

Conclusions

- Risk of losing sight
- Ocular comorbidities
- Association with systemic disease
- Ophthalmologist and rheumatologist
References