Episcleritis and Scleritis:
unlocking the differences

Dr Dipika Patel & Prof Charles McGhee

University of Auckland

Learning Objectives

- 1. Identify and differentiate between episcleritis & scleritis
- 2. Knowledge of the systemic associations of scleritis
- 3. Understand the classification and management and therapeutic aspects of scleritis

- **Suggested reading:**
- Okhravi N. Odufuwa B. McCluskey P. Lightman S. Scleritis. *Survey of Ophthalmology. 50(4):351-63, 2005 Jul-Aug.*
- Pavesio CE. Meier FM. Systemic disorders associated with episcleritis and scleritis. *Current Opinion in Ophthalmology. 12(6):471-8, 2001 Dec.*

Lecture outline

1. Applied anatomy
2. Episcleritis
3. Anterior scleritis
4. Posterior scleritis
5. Peripheral ulcerative keratitis
6. Case examples

Applied anatomy 1

- Collagen bundles
  - Varying size
  - Varying shape
  - Less uniform orientation than cornea
  - Inner layer blends with uveal tract

Applied anatomy 2: vascular layers

- Conjunctival vessels
  - Most superficial
- Superficial Episcleral vessels
  - Within Tenon's capsule
  - Radial configuration
- Deep Vascular plexus
  - Lies adjacent to sclera

Episcleritis: clinical features

- Common
- Benign
- Self-limiting
- Recurrent
- Never progresses to scleritis
- Rarely associated with systemic disease

Episcleritis: diagnosis

The hue of hyperemia: pink to red in episcleritis
blue to purplish-red in scleritis

Episcleritis: diagnosis

- Vessels remain radial and mobile
- ● Palpation of the globe often elicits marked tenderness in scleritis, but generally not in episcleritis.
- Remember phenylephrine diagnostic test:

  Hyperemia usually blanches with topical phenylephrine (2.5%) in episcleritis but not in scleritis.

Episcleritis: classification

- Simple episcleritis
  - Sectoral redness
  - Diffuse redness
  - Resolves in 1-2 weeks
- Nodular episcleritis
  - Focal, raised, nodular
  - Sclera uninvolved
  - Longer to resolve

Episcleritis: management

- **Mild cases**
  - Usually no specific Rx
  - If discomfort
    - Lubricant
    - Topical NSAID eg acular (keterolac trimethamine)
    - Mild topical corticosteroid (e.g. Flucon)

Episcleritis: management

- **Recurrent or unresponsive cases**
  - Systemic NSAID – e.g. Ibuprofen
  - Refer for investigation if 3 or more recurrences

Scleritis

SCLERITIS

- Relatively rare
- Granulomatous inflammation
- Mild to blinding spectrum

Consult your optometrist regularly

Scleritis: classification

Based on anatomical location plus vascular changes

1. **Anterior Scleritis**

   Non-necrotizing – diffuse or nodular

   Necrotizing - with or without inflammation

2. **Posterior Scleritis**

Associated systemic diseases

- Rheumatoid Arthritis
  - 1:200 develop scleritis
- Connective Tissue Disease
  - Wegener granulomatosis
  - Systemic lupus erythematosus
  - Polyarteritis nodosa
- Herpes Zoster Ophthalmicus
- Miscellaneous
  - Surgically induced
  - Infectious

Detecting an underlying cause

- History
  - Diagnosed associated systemic disease
  - Joint pain/swelling/stiffness
  - Rash/shingles
  - Hypertension
  - Renal dysfunction
  - Recurrent nose-bleeds
  - Breathing problems/haemoptysis
  - Recent eye trauma/surgery

Detecting an underlying cause

- Investigations
  - Blood tests
    - FBC, ESR, CRP
    - Rheumatoid factor
    - ANCA
    - ANA, anti-ds DNA
    - Urea and electrolytes
  - Check Blood pressure
  - Other tests depending on history and examination eg. X-rays

Anterior Scleritis: non-necrotizing

1. Diffuse scleritis

   Widespread redness

   Sectorial or entire ant. Sclera

   Loss of radial vessel pattern of sclera

   Does not progress to nodular or necrotizing

   Relatively benign

Diffuse Anterior Scleritis

Diffuse Scleritis: “red-blue” injection

Anterior Scleritis: non-necrotizing

Nodular Scleritis

On initial assessment like episcleritis

Scleral nodule immobile

Tender to palpation

Nodular and diffuse scleritis

Sclero-keratitis

Scleritis Management

- Refer ALL cases to an ophthalmologist for
  - Investigation of underlying disorder
  - Treatment of scleritis

Anterior Scleritis: non-necrotizing

- Management
  - Oral NSAID
    - Initial Rx Ibuprofen 100mg TDS
  - Oral Prednisone
    - 40-80mg day if intolerant or unresponsive to NSAIDS
  - Combined therapy
    - At lower steroid dose if either drug ineffective alone

Side effects of systemic steroids

- Depends on dose, route of administration and duration.
- Hypertension
- Diabetes
- Peptic ulcer disease
- Mood disturbance (euphoria or depression)
- Sleep disturbance
- Weight gain
- Osteoporosis
- Avascular necrosis of the hip

Anterior Scleritis: non-necrotizing

- Management

Immunosuppressives

Cyclophosphamide, azathioprine or cyclosporine in steroid resistant cases (ie relapse on more than 10mg/day)

Manage in conjunction with a physician

Infectious scleritis

- Management
  - Need to treat the underlying infection
  - Caution with steroids!

Anterior necrotizing scleritis with inflammation

Anterior necrotizing scleritis: with inflammation

Clinical signs

1. Distortion & occlusion of BVs
2. Avascular patches in episcleral tissue
3. Scleral necrosis
4. Underlying uvea visible
5. Necrosis spreads, may become confluent
6. Anterior uveitis means ciliary body involvement

Anterior necrotizing scleritis: with inflammation

Severe form of disease

Gradual onset

Pain and local redness

Anterior necrotizing scleritis: with inflammation

Treatment

Oral prednisone 1mg/kg/day

Or Pulsed IV Methylprednisolone (500-1000mg)

Monitor pain in first 2-3 days

Taper dose of steroids to response

Anterior necrotizing scleritis: with inflammation

Treatment (cont'd)

Immunosuppressives

Cyclophosphamide, azathioprine or cyclosporine in steroid resistant cases (ie relapse on more than 10mg/day)

Manage in conjunction with a physician

Anterior necrotizing scleritis: without inflammation

Scleromalacia perforans

- Asymptomatic
- Mainly in females with longstanding RhA
- Commences with yellow necrotic scleral patch
- Large areas of uvea eventually exposed
- Spontaneous perforation rare
- No effective treatment

Anterior necrotizing scleritis: without inflammation

Scleromalacia perforans

Posterior Scleritis

Defined as primarily arising posterior to the equator

- 20% of scleritis is posterior
- 30% have systemic disease
- 30% less than 40 years old
- 85% develop visual impairment
  - Maculopathy
  - Optic neuropathy
  - Exudative retinal detachment

Posterior Scleritis

- Presentation
  - Variable
  - Pain
  - Visual impairment
  - Anterior scleritis present in 40%

Posterior Scleritis: signs

- External eye
  - variable
  - eyelid oedema
  - proptosis
  - ophthalmoplegia

Posterior Scleritis: signs

Ophthalmoscopy

Common

- Disc swelling
- Macular oedema
- Exudative retinal detachment

Other signs

- Vitritis
- Choroidal folds
- Subretinal exudates

Posterior Scleritis: differential diagnosis

1. Posterior scleritis
2. Optic neuritis
3. Rhegmatogenous retinal detachment
4. Choroidal tumour
5. Orbital inflammatory disease
6. Uveal effusion syndrome
7. Harada disease

Posterior Scleritis: investigations

- Ultrasonography
- CT scan
- Fluorescein angiography

Posterior Scleritis: treatment

- Elderly patients with systemic disease
  - treat as necrotizing anterior scleritis
- Young patients without systemic disease
  - Treat with NSAIDS

Case Example

Ocular Presentation

Blurred vision 6/52, no pain, no redness, nil other

Systemic History

Generally well, no neuro or other symptoms

Ocular examination

R Eye: 6/60, no RAPD, mild lid swelling
mild proptosis - 2 to 3mm axially

L Eye: 6/6, no abnormality

Fundus examination at presentation

OD disc oedema, dilated veins, choroidal folds

Fluorescein Angiography

Ultrasonography

- Thickening of choroid & sclera
- Oedema of Tenons space
- T-sign
- No mass lesion

Six weeks after initial presentation

Admitted with exacerbation

6/52 after initial presentation

Painful red eye with vision of HM, RAPD

Extensive exudative retinal detachment

➔ Urgent CT-scan

CT-Scan: Orbits and globes

Posterior Scleritis: Management

80mg / day oral prednisone tapered

Dramatic resolution of subretinal fluid by day 10

Home on 40mg prednisone

At 3/52 retina flat, but macular oedema

Vision 6/60 at 6 weeks

Vision 6/36 at 9 weeks (15mg prednisolone)

At 3 months, vision 6/12, pigmentary macular changes

Peripheral Ulcerative Keratitis

Crescent-shaped, destructive, inflammatory lesion of the perilimbal cornea

Epithelial defect

Infiltrate at leading edge

Peripheral Ulcerative Keratitis

Presumed autoimmune

Associated with

Rheumatoid arthritis,
Systemic lupus erythematosis,
Polyarteritis nodosa,
Wegeners granulomatosis,
Churg-Strauss syndrome
Relapsing polychondritis

Mooren's Ulcer - no systemic association

Peripheral Ulcerative Keratitis

Exact path of keratolysis unknown

Peripheral cornea site of immune complex deposition

Auto-antibodies to cornea

Matrix metalloproteinases degrade extracellular matrix

MMPs higher in tear film

MMPs higher in cornea

Peripheral Ulcerative Keratitis

Usually PUK presents after systemic symptoms

Persisting PUK unexplained by co-existing ocular disease should prompt a search for systemic collagen vascular disease

Systemic disorders associated with peripheral corneal ulceration.
Ladas JG, Mondino BJ. Curr Opin Ophthalmol 2000;11:468-471

Case presentation

- JW, 45yr female
- Medically fit & well
- No previous ophthalmic history
- Presented June 1999 with R ocular pain
- Precipitated by foreign body exposure?
- Diagnosis: Peripheral Ulcerative Keratitis

Investigations

- Following review and discussion with Rheumatology Service:
- CXR, XRay hands & feet, ESR, CRP, ANA, C3, C4, RhF, ANCA, serum electrophoresis, anti-DS DNA, anti- Ro/SSA, La/SSB, Jo1, SC1-70, RNP, ENA, RNP, cytoplasmic Abs, Hep A/C

- Positive: HBsAg, anti-HBcore

Diagnosis: Mooren's Ulcer

- Rare idiopathic peripheral ulcerative keratitis
- Approximately 2-3% of PUK
- Any age group
- May be 'primary' or 'secondary' (to surgery, trauma or infection)

Initial Examination

- Vision: R 6/48 L 6/9
- Corneal melt (grey)
- Corneal perforation with iris prolapse, 5.5mm x 4mm (red)
- Left eye: normal

Initial surgical treatment

Ten Weeks

- Further thinning
- Flat anterior chamber: iris/corneal touch
- Aqueous leak

Six months post surgery

PUK: systemic immunosuppression

- PUK in systemic disease is life-threatening and topical steroids of variable utility. Management With Rheumatologist/immunologist
  1. Systemic corticosteroid
  2. Methotrexate
  3. Cyclophosphamide
  4. Azathioprine
  5. Cyclosporine / topical cyclosporine

Kervick GN, et al. Paracentral rheumatoid corneal ulceration. Clinical features and cyclosporine therapy. Ophthalmology 1992:99;80-8
Brown BA, Parker CT et al. Effective steroid-sparing treatment of peripheral ulcerative keratitis. Cornea 2001:20:117-119

PUK: corneal surgery, systemic disease and outcome

Series (N=9) PUK & Rheumatoid Arthritis

Longstanding arthropathy

Poor visual outcome all eyes

Emergency corneal surgery (N=5)

Two developed systemic vasculitis, one died

Squirrell DM, Winfield J, Amos RS. Peripheral ulcerative keratitis “corneal melt” and rheumatoid arthritis: a case series. Rheumatology 1999; 38(12):1245-8

PUK & necrotizing scleritis: systemic immunosuppression and mortality

Series of PUK or NS with RA (N=34)

Non-cytotoxic group (n=17)

- 9 died within 10 years
- 13 ocular disease progressed
- 5 developed vasculitic lesions

Cytotoxic group (n=17)

- 1 died within 10 years
- No progression of ocular disease
- No extraocular vasculitis

Foster CS, Forstot SL et al. Mortality rate in rheumatoid arthritis patients developing necrotizing scleritis or peripheral ulcerative keratitis. Effects of systemic immunosuppression. Ophthalmology 1984;91:1253-63

Conclusion: systemic immunosuppression is essential

Systemic Rx in addition to corticosteroids

Cyclophosphamide or methotrexate

Early aggressive surgical intervention

Inflammation halted and globe preserved in 92%

Visual acuity improved in 68% of PUK

Messmer EM, Foster CS. Destructive corneal and scleral disease associated with rheumatoid arthritis. Medical and surgical management. Cornea 1995;14:408-17

Thank you