Peripheral Corneal Melts

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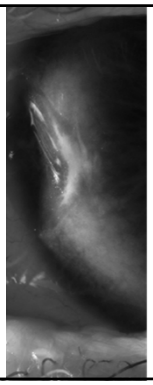
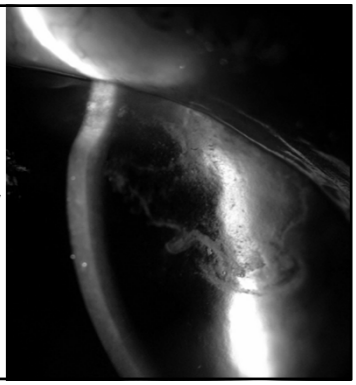
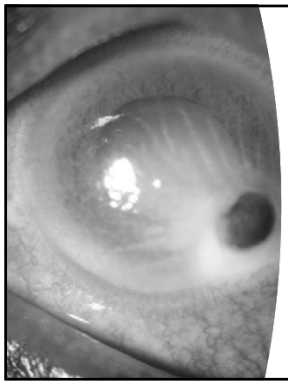


Peripheral Corneal Melt

- Destructive inflammatory corneal disease
- Progressive juxtalimbal corneal stroma thinning
- Multiple pathologies
- Mechanism poorly understood



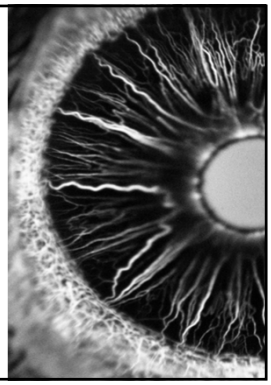


Complications

- Systemic implications
- Potentially serious eye complications include
  - corneal perforation
  - severe corneal scarring with thinning
  - vascularisation

Perilimbal Arcades

- Central cornea derives oxygen from tear film and aqueous
- Peripheral cornea derives additional oxygen /nutrients from the **perilimbal capillary arcades**
- Perilimbal vascular and lymphatic arcades primarily act as a **reservoir for immunocompetent cells**



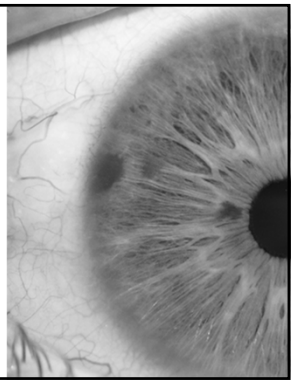
Perilimbal Arcades

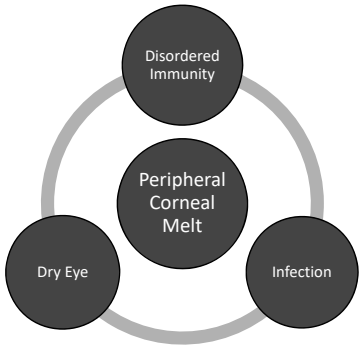
Deposition of immune complexes in the terminal ends of limbal vessels

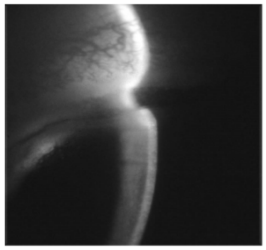
➔increases immunologic activity

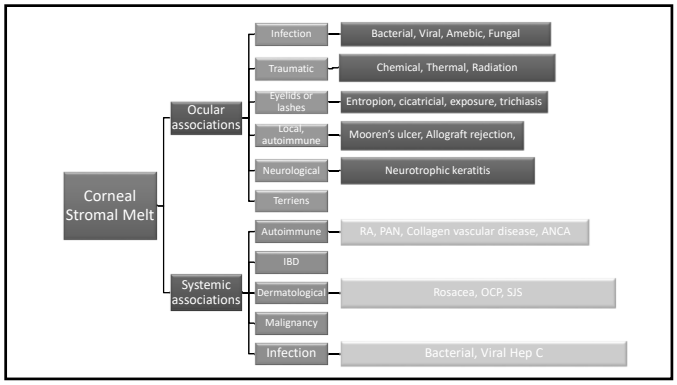
➔ vascular occlusion

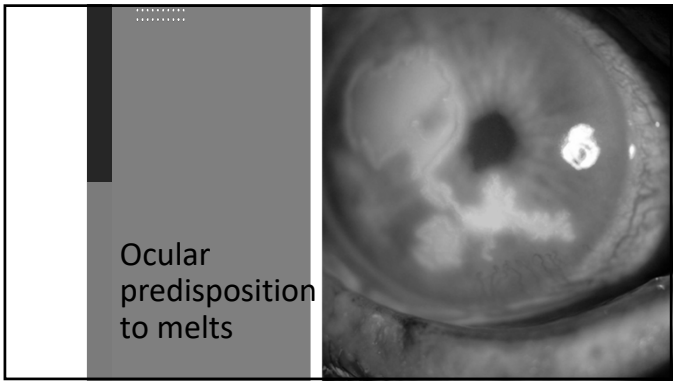
➔ subsequent leakage of inflammatory cells, along with collagenases and proteases

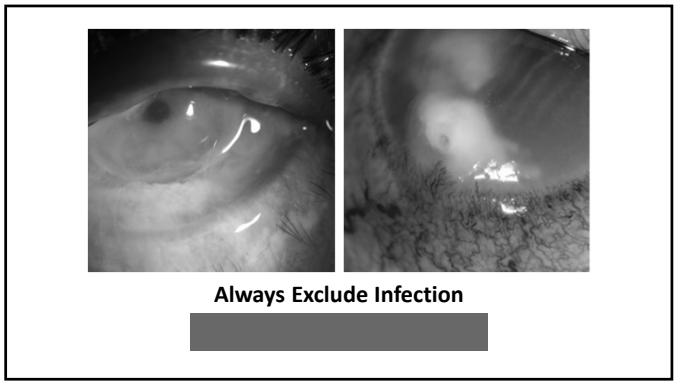


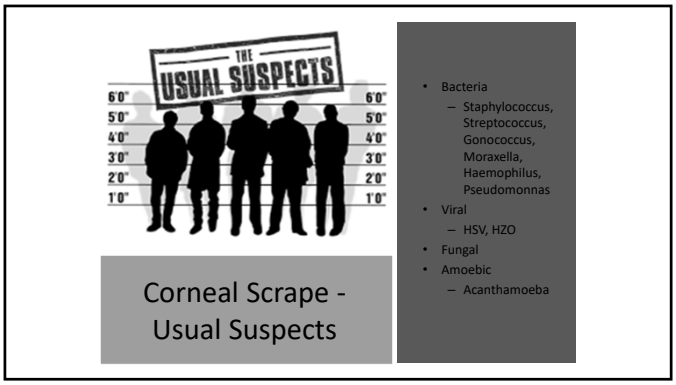


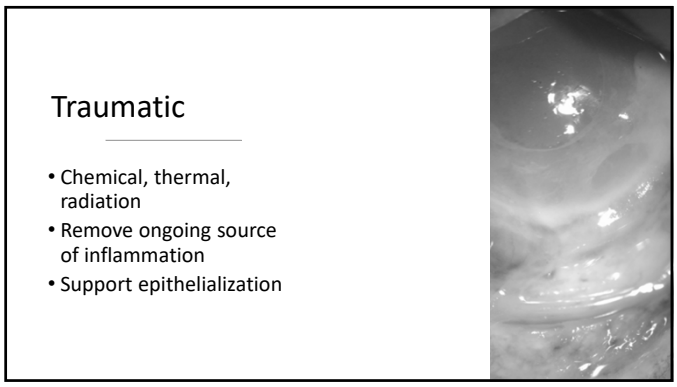


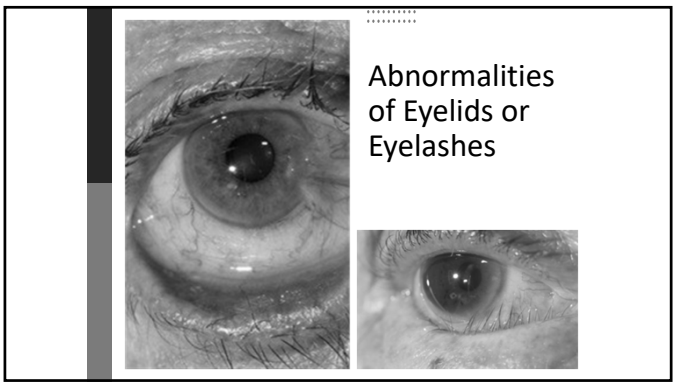

Corneal Stromal Melt
Ocular associations
Systemic associations
Infection
Bacterial, Viral, Amebic, Fungal
Traumatic
Chemical, Thermal, Radiation
Eyelids or lashes
Entropion, cicatricial, exposure, trichiasis
Local, autoimmune
Mooren's ulcer, Allograft rejection,
Neurological
Neurotrophic keratitis
Terriens
Autoimmune
RA, PAN, Collagen vascular disease, ANCA
IBD
Dermatological
Rosacea, OCP, SJS
Malignancy
Infection
Bacterial, Viral Hep C

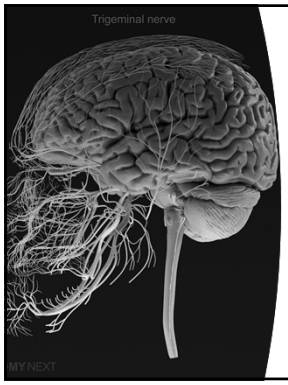

Ocular predisposition to melts


Always Exclude Infection


THE USUAL SUSPECTS
Corneal Scrape - Usual Suspects
Bacteria
Staphylococcus, Streptococcus, Gonococcus, Moraxella, Haemophilus, Pseudomonnas
Viral
HSV, HZO
Fungal
Amoebic
Acanthamoeba


Traumatic
Chemical, thermal, radiation
Remove ongoing source of inflammation
Support epithelialization


Abnormalities of Eyelids or Eyelashes

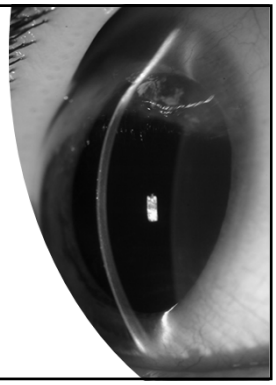


Neurotrophic Keratitis

- HSV/HZO
- Topical anesthetic abuse
- Chemical and thermal burns
- Contact lens abuse
- Topical drug toxicity
- Irradiation to eye or adnexa
- Corneal surgery
- Non-ocular causes include
  - Trauma
  - Stroke
  - Aneurysm
  - Diabetes
  - Intracranial masses

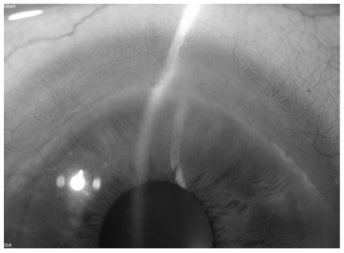
Terrien's Marginal Degeneration

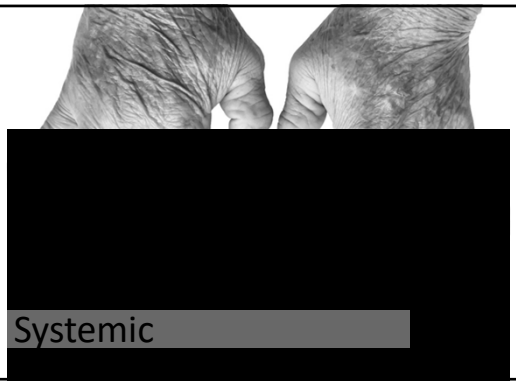
- Slowly progressive non-inflammatory, peripheral corneal thinning
- Unilateral or asymmetrically bilateral
- Associated with corneal neovascularization, opacification and lipid deposition



Terrien's Marginal Degeneration

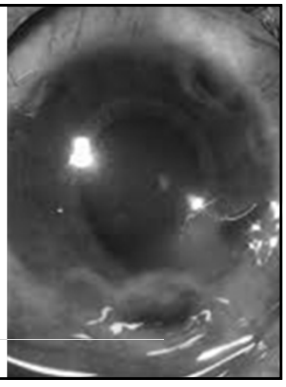
- Inflammation typically absent
- Epithelium intact with fine vascularisation
- Characteristic demarcation of peripheral thinning from central cornea - grey lipid line
- Most patients can be managed conservatively

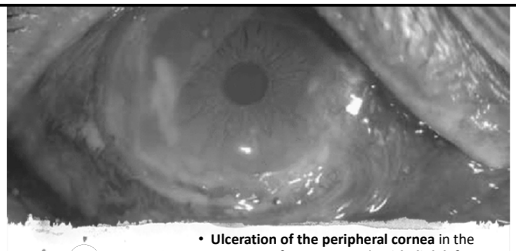




Peripheral Ulcerative Keratitis

- Rare destructive inflammatory corneal disease
- 3 per million per year
- May be associated with numerous ocular and systemic infectious and noninfectious conditions
- Final common pathway is peripheral corneal thinning





Peripheral Ulcerative Keratitis

- **Ulceration of the peripheral cornea** in the presence of an associated **epithelial defect**, with evidence of **inflammatory infiltrates** in the corneal stroma
- **Absence of infection**
- **Crescent-shaped ulcer**, with progression centrally and circumferentially.

Foster CS, Forstot SL, Wilson LA. Mortality rate in rheumatoid arthritis patients developing necrotizing scleritis or peripheral ulcerative keratitis. Effects of systemic immunosuppression. *Ophthalmology*. 1984;91(10):1253-1263.

Presentation

- Patients typically present with pain though may be absent
- Bilateral or unilateral
- Other associated symptoms include
  - Excessive lacrimation
  - Photophobia
  - Change in vision due to astigmatism or corneal opacity

Examination

- Perilimbal corneal opacity due to stromal cellular infiltrates
- Crescent-shaped corneal ulcers develop with breakdown of the overlying epithelium.
- Varying degrees of vascularization and corneal thinning
- May progress to perforation
- Adjacent conjunctival, episcleral, and scleral inflammation
- 36% have an associated scleritis

Complications

- 21% to 25% worse than 6/60
- 50% require emergency corneal surgery
- 50% recurrence
- Up to 10% may require enucleation
- Overall mortality may approach 30%

Knox Cartwright NE, Tole DM, Georgoudis P, Cook SD. Peripheral ulcerative keratitis and corneal melt: a 10-year single center review with historical comparison. *Cornea*. 2014;33(1):27-31

Systemic Associations

- Rheumatoid arthritis (32 – 42%)
- Polyarteritis nodosa
- Inflammatory bowel disease
- Collagen vascular diseases
  - Systemic Lupus erythematosus (SLE)
  - Relapsing polychondritis
  - Progressive systemic fibrosis,
- ANCA vasculitides
  - Granulomatosis with polyangiitis (GPA; formerly Wegener's)
  - Churg–Strauss syndrome
  - Microscopic polyangiitis
- Systemic infectious conditions
  - Syphillis
  - Hepatitis C

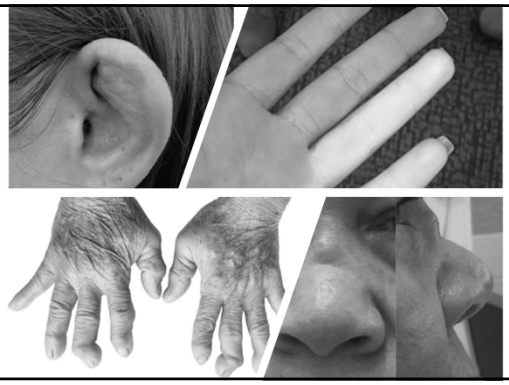
Systemic Associations

- May precede the systemic disease, but there is a tendency for it to occur following observation of systemic manifestations.
- Tauber et al reported that PUK was the initial manifestation of collagen vascular disease in 50% of cases.

Tauber J, Sainz de la Maza M, Hoang-Xuan T, Foster CS. An analysis of therapeutic decision making regarding immunosuppressive chemotherapy for peripheral ulcerative keratitis. *Cornea*. 1990;9(1):66-73.

Work up

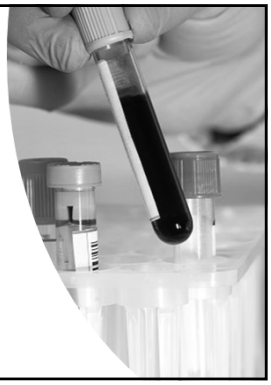
- Detailed personal and family history
- Specific attention given to collagen ascular and other autoimmune diseases
- Complete ocular and systemic examination



Investigations

As directed by the systemic review

- Corneal scrape
- FBC
- ESR
- CRP
- U&Es
- Vasculitis screen
  - RF, ANA, ANCA, dsDNA, anti-CCP
- Cryoglobulins
- VDRL
- Hepatitis C
- Urinalysis with microscopic analysis



Management

- Based on the severity of findings within the cornea and the extent of extraocular disease
- Treatments initiated for systemic autoimmune disease have beneficial effects on ocular manifestations
- Treatment of the systemic disease must be taken into consideration
- Outcome influenced by the accompanying disease, and timely diagnosis and treatment
- Requires a multidisciplinary approach

Local Treatment

- Ensure adequate tear film
  - Preservative free lubricants
- Topical antibiotics to prevent secondary infection
  - Chloramphenicol minims qid
- Cycloplegic for pain and anterior chamber activity

Topical Corticosteroids

Topical corticosteroids inhibit collagen synthesis and thereby increase the risk of perforation.

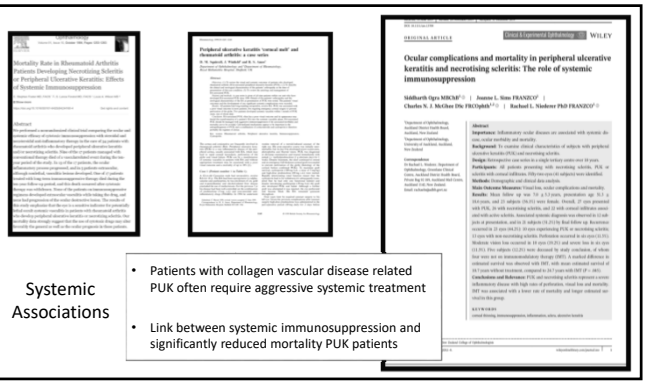
Yagci A. Update on peripheral ulcerative keratitis. *Clin Ophthalmol.* 2012;6:747-754

Systemic Treatment

- Systemic corticosteroids are the traditional first-line therapy
- In isolation, are often unable to inhibit disease progression or overcome the autoimmune disease.
- The usual starting dose is 1 mg/kg/day (maximum 60 mg/day), followed by a tapering schedule based on clinical response.
- Pulsed methylprednisolone 1 g/day for 3 consecutive days, followed by oral therapy, might be initiated in patients with imminent danger of vision loss

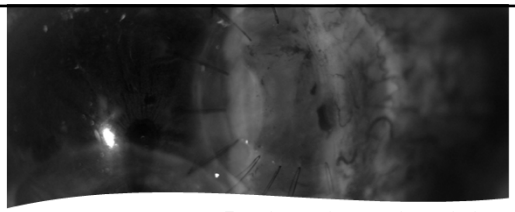
Systemic Treatment

- No universal agreement about which immunosuppressant or modulator should be used for specific cases
- Immunosuppressives avalable for use in these cases include:
  - Anti-metabolites,
    - Methotrexate, azathioprine, mycophenolate mofetil, and leflunomide
  - Alkylating agents
    - cyclophosphamide and chlorambucil,
  - T cell inhibitors
    - Ciclosporin, Tacrolimus
  - Biologic agents
    - Infliximab, etanercept, rituximab



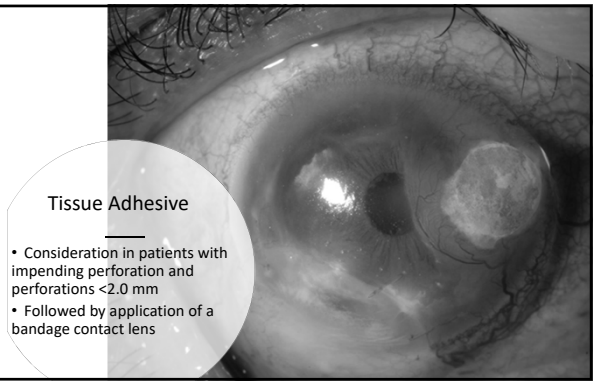
Systemic Associations

- Patients with collagen vascular disease related PUK often require aggressive systemic treatment
- Link between systemic immunosuppression and significantly reduced mortality PUK patients



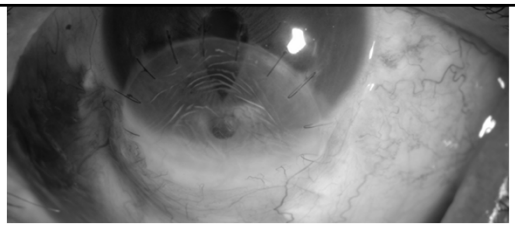
Surgical Treatment

- Tectonic procedures may be required to maintain the integrity of the globe
- Options include:
  - Tissue adhesive
  - Bandage contact lens
  - Lamellar graft
  - Tectonic corneal grafting
  - Amniotic membrane transplantation.



Tissue Adhesive

- Consideration in patients with impending perforation and perforations <2.0 mm
- Followed by application of a bandage contact lens



Corneal Transplantation

- Corneal perforations may require a patch graft
- High risk of graft failure despite systemic immunosuppresion

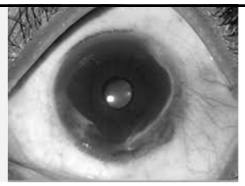
Amniotic Membrane Graft

- Amniotic membrane can be used as a patch or graft to reduce inflammation and to promote re-epithelization.

Resection of Perilimbal Conjunctiva

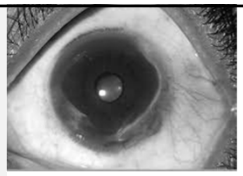
- Resection of the perilimbal conjunctiva associated with PUK
  - ➔ removes immune complexes
  - ➔ decreases production of collagenases and proteinases
    - ➔ consequently promotes resolution of inflammation
- Controversial, as it is thought that PUK may recur once the conjunctiva grows back to the limbus

Mooren's Ulcer



- Mooren's ulcer is an form of PUK develops in the absence of any associated/causative systemic disease
- It is a diagnosis of exclusion
- It is not associated with scleritis
- Occurs at any age, vast majority of patients are ~ 40 years

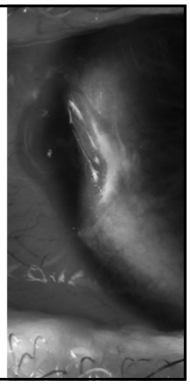
Mooren's Ulcer

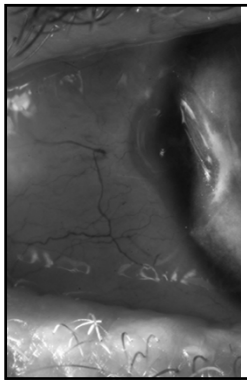


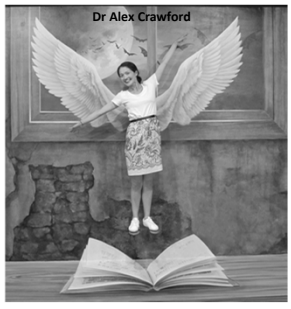
- Begins in the peripheral cornea, spreads circumferentially and centrally.
- The main difference from PUK is the severity of pain, which is more intolerable in Mooren's ulcer.
- It may involve one or both eyes.
- The central border exhibits an overhanging edge
- The sclera is rarely involved
- No perilimbal clear zone

Conclusions

- Peripheral corneal melt includes a group of corneal infectious and inflammatory diseases
- Inflammatory causes are usually associated with life-threatening autoimmune collagen vascular diseases
- PUK might be the initial sign of a systemic disease
- Treatment involves controlling both the ocular inflammation and the underlying systemic vasculitic disease
- Initiation of appropriate immunosuppressive therapy can be life-saving







Thank you