CONTENTS

1) CONJUNCTIVA

Ddx of acute follicular conjunctivitis (< 4 weeks):
"IN HEAT PM"

A) Viral
1) **A**denovirus
2) **H**SV
3) molluscum (Toxic)
4) verruca (HPV) (Toxic)
5) **E**nterovirus
6) **N**ewcastles' (birds; RNA virus)
7) EBV

B) **Chlamydia**
1) **I**nclusion - types D-K
2) trachoma - types A-C

C) **Toxic**
1) miotics
2) antivirals (IdU)
3) adrenergics
4) atropine
5) sulfas

D) **Bacterial** (chronic?)
1) **P**neumococcus ?
2) **M**oraxella
3) Burrelia Burgdoferi (Lyme)

DDx of chronic follicular conjunctivitis (> 4 weeks):
("MAPFITT")
A) **Viral** (Toxic)
1) **M**olluscum
2) verruca

B) **Chlamydia**
1) **I**nclusion
2) Trachoma

C) **Toxic**
1) same meds as acute

D) **Bacterial**
1) strep **P**neumococcus ?
2) Burrelia Burgdoferi (Lyme)

E) **Protozoal**
1) Phtyriasis Pubis (pubic lice)

F) **Neoplastic**
1) benign lymphoid **F**olliculosis (99%)
2) lymphoma (1%)

G) **Other**
1) **A**xenfeld
2) **T**hygeson (Merryl Thygeson's)
3) canaliculitis

DDx of chronic conjunctivitis

A) Infectious
1) chlamydia
2) bacterial: staph, G-
3) canaliculitis
4) viral - HSV, HZV

B) Lids
1) blepharitis
2) acne rosacea
3) trichiasis
4) lagophthalmos (CN 7)
5) ectrorion
6) entropion
7) sebaceous cell carcinoma
8) floppy lids

C) external irritants
1) allergic
2) hay fever
3) environmental irritant
4) CL related - GPC
5) toxic - drops
6) suture – GPC

D) Other
1) dry eyes
2) OCP
3) vernal/ atopic

DDx of giant papillae: (>1 mm in size)
"Extended wear Soft Contacts Are Viscious Papilla producers"
1) **v**ernal
2) **a**topic KC
3) **C**L wearer
4) **p**rosthesis
5) **s**uture
6) **e**xtruded scleral buckle

Other: (smaller): SLK, trachoma

DDx of Viral conjunctivitis
A) DNA Viruses
1) HSV (Herpes)
2) HZV (Herpes)

B) RNA Viruses
1) enterovirus (picorna)
2) coxsackievirus (picorna)
3) influenze (myxovirus)
4) parainfluenza (myxovirus)
5) mumps (myxovirus)
6) measles (myxovirus)
7) Newcastles' (myxovirus)

Drugs causing contact blepharoconjunctivitis
1) atropine/ homatropine
2) aminoglycosides (genta, tobra, neomycin)
3) antivirals
4) natamycin
5) EDTA
6) thimerosol

Conjunctival Ulceration
1) Stevens Johnson
2) HSV
3) factitious conjunctiviti
4) toxic (meds)

DDx of Parinaud's OGS: (mainly granulomatous diseases)
- "conjuctivitis with *visible* node"
A) bacterial
1) cat scratch (Rochalimae Henselae > Afipia Felis; both G- rods)
2) syphilis
3) TB
4) tularemia
5) Listeria
6) Pasteurella (dogs)
7) Actinomyces israeli
8) Lepidoptera (from caterpillars)

B) Fungal
1) cocciodiomycosis
2) sporotrichosis

C) Viral
1) mono (EBV)

D) Other
1) sarcoid
2) f.b. granuloma

Bugs which cause cat scratch disease
1) Rochalimaea henselae
2) Afipia felis

DDX of granuloma of conj:
1) cat-scratch
2) sarcoid
3) TB
4) f.b.
5) EBV (mono) conjunctivitis
6) actinic granuloma
7) leishmaniasis
8) insect hair

DDX of pre-auric. node + conjunctivitis
1) Parinaud's ddx (visible)
2) viral (adeno, entero)
3) neisseria (painful node?)
4) moraxella
5) chlamydia
6) dacyoadenitis

DDx of membranous/pseudomembranous conjuctivitis:
"Very Light Crunchy SAND CHiPS"
A) Bacterial
1) **S**trep pyogenes (pus)
2) **N**eisseria (pus)
3) **D**iphteria (mb everywhere)
4) Strep pneumo
5) *any* severe bacterial conjunctivitis

B) Viral
1) **A**denovirus (type 8)
2) **H**SV

C) Chlamydia
1) **I**nclusion of newborns

D) Autoimmune
1) **P**emphigoid
2) **V**ernal

3) **S**teven Johnson
4) **L**igneous conjuctivitis

E) Trauma
1) **C**hemical burns

Ddx of cicatricial conjunctivitis
membranes + "RRATS"
1) *any* membranous conjunctivitis (OCP, Adeno, Inclusion)

A) Infectious
1) **T**rachoma
2) Lyell's syndrome (staph scalded skin syndrome - SSSS)

B) Immune
1) **A**topic KC
2) dermatitis herpetiformis (like OCP - sub epith. IgA's)
3) sarcoid
4) scleroderma
5) rosacea
6) lichen planus
7) epidermolysis bullosa
8) **R**osacea

C) Enzyme problem
1) porphyria

D) Trauma
1) **R**adiation
2) **S**urgery

E) Other
1) linear IgA dermatosis (mimcs OCP)

DDx of hemorrhagic conjuctivitis
A) Viral
1) adenovirus
2) enterovirus
3) coxsackie
4) picornavirus

B) Bacterial
1) pneumococcal
2) H. Egyptius (H. Influenza type III)
3) H. Influenza

C) Chlamydia
1) Inclusion in newborn

Ddx of Epithelial Parasitism
"**D**ive **N**ow **H**ang **L**ater"
1) Neisseria
2) Diphtheria
3) Listeria monocytogenes
4) H. Egyptius (not H. flu)
5) Pseudomonas ?
6) fungi?
7) ameba?

These bugs can appear in any of the following 3 presentations of conjunctivitis
1) staph
2) G- rods
3) H. Egyptius

Ddx of acute (hyperacute) purulent conjunctivitis
1) Neisseria
2) strep pyogenes

Ddx of acute mucopurulent conjunctivitis ("catarrhal")
1) "pink eye" - adeno
2) strep pneumonia
3) H. flu

Ddx of chronic mucopurulent conjunctivitis (catarrhal)
1) moraxella lacunata
2) branhamella cattarhalis
3) neisseria sicca
4) Parinaud's OGS

Ddx of severe bacterial conjuctivitis
1) neisseria
2) H. Flu (< 5 y.o.)
3) strep pyogenes

Ddx of Non-severe bact. conjunctivitis
1) staph
2) moraxella
3) H.Flu (> 5 y.o.)
4) strep pneumonia

Most common bugs:
canaliculitis: actinomyces disraeli

angular blepharitis: Staph; Moraxella
Bitot's: corynebacterium xerosis

Normal conj flora
1) S. epi
2) S. Aureus
3) P. acnes
4) diphtheroids

Ddx of phlyctenular conjunctivitis
1) Candida
2) Staph
3) TB
4) sarcoidosis
5) rosacea (Staph)
6) LGV
7) coccidiomycoses imites

Neonatal Conjunctivitis
1) Within 24 hours: silver nitrate
2) 2-4 days: gono
3) 4-10 days: chlamydia
4) 4-7 days: staph or strep
5) 6-14 days: HSV

Prophylaxis of neonatal conjunctivitis
1) proviodine (providone-iodine 10%)
2) erythromycin ointment
3) silver nitrate

Order of frequency of neonatal conjunctivitis
1) Chlamydia
2) Strep viridans
3) S. Aureus
4) H. influenza
5) group D strep
6) Moraxella
7) Gono

EKC: 8,11,19
PCF: 3,4,7

Neonatal conjunctivitis
1) no follicles
2) more PMN's
3) more pus
4) can become membraneous
5) more inclusions on slide
6) does well with topical (but needs systemic)

Recurrent conjunctival hemorrhages
1) bleeding diasthesis
2) HTN
3) diabetes

Causes of decreased mucin layer
1) Vit A defic
2) trachoma
3) post diphtheria
4) *mucocutaneous disorders*: ichthyosis, OCP, Stevens Johnson, scleroderma
5) burns: chemical, thermal
6) Meds: PI, sulfas

Causes of decreased lipid layer
1) blepharitis
2) rosacea
3) Acutane

Drugs which cause dry eyes (anti-cholinergic)
1) anti-muscarinics: atropine, scopolamine
2) antihistamines
3) benzodiazepines
4) antipsychotics
5) BCP
6) beta blockers

Triad of OCP
1) trichiasis
2) dry eye
3) fornix shortening due to scarring

Medication causes of pseudopemphigoid
- improves when meds stopped
1) adrenergics: epinephrine
2) antivirals: idoxiuridine
3) miotics: pilocarpine, Phospholine Iodide
4) timolol

Drugs which cause punctal occlusion
1) antivirals (all 3)
2) Phospholine Iodide

Risk factors for CIN (conj.)
1) smoker
2) light skin
3) soft CL wear
4) use of petroleum products

DDx of SCC of conjunctiva
A) Benign
1) papilloma
2) pterygium
3) HBID (Hered. Benign Intraepith. Dyskeratoses)
4) Pinguecula
5) keratoacanthoma of conjunctiva

B) Malignant
1) SCC (HPV 6, 11,16, 18)
2) CIN (in situ)
3) sebaceous carcinoma
4) mucoepidermoid carcinoma (goblet cell CA)
5) amelanotic melanoma

WHO grading of trachoma
1) follicles
2) diffuse conjunctivitis
3) tarsal scarring
4) trichiasis
5) corneal opacification

Diagnosis of Trachoma
Need 2 of:
1) follicles on upper tarsus
2) limbal follicles or Herbert's pits
3) tarsus scarring
4) vascular pannus of superior limbus

DDx of conjunctiva cysts
"Conjunctival Cysts May Split"
1) congenital cyst
2) trauma (inclusion)
3) chronic conjunctivitis
4) compound nevus
5) melanoma from compound nevus
6) subepithelial nevus

conjunctival melanoma
1) 33% nevi - 20% die
2) 33% PAM - 40% die
3) 33% de novo - 40% die

1) Causes of congenital pigment of conj:
1) nevus
2) ephelis (freckle)
3) lentigo (large freckle)
4) racial pigmentation
5) ocular and oculodermal melanosis
6) blue nevus

Causes of acquired melanosis of conj:
A) Local
1) nevus (junctional, compound or subepithelial)
2) postinfl. melanosis (including radiation)
3) PAM without atypia
4) PAM with atypia
5) melanoma

B) Systemic
1) Addison's
2) NF
3) Peutz-Jehgers
4) pregnancy

Lesions which simulate melanocytic lesions of conj.
A) visible choroid
1) scleromalacia
2) anterior staphyloma

B) scleral
1) blue sclera
2) scleral blue nevus
3) Axenfeld loop

C) metabolic
1) ochronosis (alkaptonuria)
2) Gaucher's

D) endogenous products
1) blood
2) bile (scleral icterus)

E) exogenous products
1) epinephrine drops
2) argyrosis (silver)
3) foreign body
4) mascara
5) iron
6) tetracycline ointment

F) neoplastic lesions
1) pigmented papilloma
2) pigmented carcinoma
3) JXG
4) neurofibroma of conj.
5) pinguecula
6) pterygium

Blue Sclera

A) Systemic causes

i) *Metabolic*

1) Ehlers Danlos syndrome (also angioid streaks)
2) PXE (also angioid streaks)
3) Paget's Disease (also angioid streaks)
4) osteogenesis imperfecta
5) Marfan's (fibrillin)

ii) *Chromosomal*

1) Turner's (45X0)
2) Trisomy 18

iii) *Other*

1) Lowe's O-C syndrome
2) relapsing polychondritis
3) hypoparathyroidism

B) Ocular causes

i) *Stretched sclera*

1) myopia
2) buphthalmos
3) anterior staphyloma

ii) *Degenerated sclera*

1) senile degenerative anterior to EOM
2) dysgenesis of the anterior segment
3) any uveal pigmented lesion showing through
4) resolved scleritis
5) scleromalacia perforans in RA

iii) *Other*

1) congenital ocular melanosis (blue nevus)
2) hemangiopericytoma

Color changes in conj.:

1) *brown*

a) chromic acid burn
b) adrenochrome
c) melanocytic lesions

2) *yellow*

a) spheroidal degeneration
b) scleral icterus
c) HNO3 (nitrics) acid burn

3) *blue*

see above

4) *red*

a) Kaposi's
b) subconj. hemorrhage
c) Merkel cell tumor
d) hemangioma

Diseases with episcleritis

A) *HLA-B27 diseases*

1) psoriasis
2) Reiter's
3) IBD
4) ankylosing spondylitis

B) *Other Autoimmune*

1) SLE
2) RA (.5% of cases)
3) Behcet's
4) Atopy
5) Rosacea
6) Cogan's ?

C) *Infectious*

1) HSV
2) HZV
3) syphilis
4) mono ?
5) mumps

D) *Other*

1) gout

Features of episcleritis

- acute onset
- vessels blanch with phenylephrine
- swelling of episclera only
- mobile vessels, nodule (with Q tip)
- superficial vessels (salmon pink)
- vessels **radial**
- minimal pain
- younger age
- simple (sectoral - 70%; diffuse - 30%) or nodular

Features of scleritis

- pain +
- insidious onset (episcleritis:acute)
- older age
- women
- 20-60 y.o.
- fixed vessels
- deep vessels
- **criss-cross** of vessels (in Tenon's)
- vessels don't move or blanch
- assoc. with keratitis or uveitis

- fixed vessels, nodules
- chemosis of sclera

- types:
A) Anterior
- diffuse (40%)
- nodular (44%)
- necrotizing with inflammation (10%)
- necrototizing without inflammation (4%) (scleromalacia perforans)
B) Posterior (2%)

DDx of Diseases with scleritis
A) HLA-B27 diseases
1) psoriasis
2) IBD
3) ank. spond.
4) Reiter's

B) CVD with Arthritis
1) SLE
2) relapsing polychondritis
3) RA (.5% of cases)

C) Vasculitic
1) Behcet's
2) GCA
3) Wegener's (25%)
4) PAN
5) Cogan's

D) Granulomatous diseases/ Infectious
1) TB
2) sarcoid
3) Leprosy
4) syphilis
5) HZV
6) acanthameba
7) toxo ?

E) Other
1) gout

DDx of Scleral Nodules
A) *HLA-B27 diseases*
1) Reiter's
2) IBD
3) psoriasis
4) ank. spond.

B) CVD with arthritis
1) SLE
2) RA (.5% of cases)
3) relapsing polychondritis

C) Vasculitic
1) Behcet's
2) GCA
3) Wegener's (25%)
4) PAN

D) Granulomatous diseases/ Infectious
1) TB
2) sarcoid
3) syphilis
4) Leprosy
5) acanthameba
6) HZV

E) Other
1) gout
2) rheumatic fever
3) thyrotoxicosis
4) e. nodosum
5) acne rosacea

Dilated episcleral or conj. vessels
A) Local problem
1) uveal melanoma (beneath)
2) C-C fistula
3) cavernous sinus thrombosis
4) ophthalmic vein thrombosis
5) episcleritis
6) conjunctival hemangioma
7) severe chronic conjunctivitis (fusiform and saccular aneurysms)

B) Systemic Illness
1) Louis Bar syndrome
2) hereditary hemorrhagic telangiectasias (Osler-Rendu-Weber)
3) Fabry's
4) polycythemia vera
5) leukemia
6) sickle cell anemia (commas)
7) DM
8) Degas'
9) fucosidosis
10) gangliosidosis

2) CORNEA

Ddx of limbal "bumps"
1) follicles - trachoma (become Herbert's pits)
2) Trantas dots (collections of eosinophils) - vernal, atopic
3) Salzmann's nodular degen.
4) phlyctenule

DDx of Micropannus (1-2 mm)
- manual: < 4mm; "RVC, IT'S Bad"

A) Infectious
1) **I**nclusion (chlamydia)
2) **T**rachoma
3) staph **B**lepharitis

B) Immune
1) **S**LK (micro only)
2) **R**heumatoid KC
3) **V**ernal
4) Reiter's (rare)

C) Other
1) **C**L wear
2) medicamentosa

Ddx of Macropannus (>2mm)
"CHARTS"

A) Infectious
1) **T**rachoma
2) **S**taph blepharitis
3) **H**SV keratitis

B) Immune
1) **A**topic KC
2) **R**osacea

C) Other
1) **C**hemical

DDx of Pannus (all)
"SHIT, PROSAC Very Much Crummy"

A) Infectious
1) **T**rachoma
2) **I**nclusion (chlamydia)
3) **S**taph blepharitis
4) **H**SV keratitis

B) Immune
1) **S**LK
2) **R**A
3) **V**ernal
4) **A**topic
5) **P**hlyctenule
6) **A**cne Rosacea
7) **O**CP

C) Toxic
1) **M**eds
2) **C**L
3) **C**hemical

DDx of corneal filaments
"5P, 3S, 3 viruses"

5 P
1) post trauma
2) ptosis
3) patching
4) post-op
5) neuroParalytic (CN VII) (& neurotrophic(CN V)

3 S
1) SLK
2) Sicca
3) sick epithelium
    a) bullous keratopathy
    b) recurrent erosions
    c) meds toxicity

3 viruses
1) HSV
2) HZV
3) adenovirus

DDx of (peripheral) marginal infiltrates:
- may or may not have overlying epith defect
- may lead to pannus
- may be due to ischemic vasculitis (c.t. diseases)

A) Infectious
1) staph (blepharitis) - classic
2) H. Egyptius
3) moraxella
4) chlamydia
5) gono conjunctivitis
6) bacterial keratitis

B) Immune
1) collagen vascular diseases (RA) - classic
2) Mooren's ulcer
3) toxic rxn to drops
4) meibomitis

Ddx Peripheral thinning (Rosen)
1) Mooren's: 3:00 and 9:00
2) RA (or other CT disease): 6:00
3) Terrien's: 12:00

Causes of peripheral marginal thinning
A) Ocular
1) Mooren's
2) Therriens
3) furrow degeneration
4) staph hypersensitivity
5) rosacea
6) exposure keratopathy
7) sclerokeratitis
8) vernal
9) dry eye syndrome (common post op)
10) post cataract surgery

B) Collagen vascular diseases
1) RA
2) SLE
3) Wegener's
4) PAN
5) IBD
6) relapsing polychondritis

DDx of dendrifrom lesions ("pseudodendrites")
A) Infectious
1) HZV
2) EBV (mono)
3) early acanthameba

B) Traumatic
1) healed abrasion
2) CL wear

C) Other
1) tyrosenemia
2) dendritic epithelial keratitis ?

HSV dendrite
1) stains in center with fluor. (ulcer)
2) edges stain wiith RB
3) terminal bulbs
4) longer dendrites

HZV dendrite
1) fluorescein pools around dendrite
2) dendrite center stains with RB
3) no terminal bulbs
4) shorter

DDx of severe bact. keratitis
1) neisseria
2) strep pyogenes (ß-hemol)
3) pseudomonas

DDx of punctate epithelial keratopathy
- *any* mucopurulent conjunctivitis

A) Infectious
1) adeno (diffuse)
2) staph (inferior)
3) trachoma (superior)
4) measles
5) molluscum (toxic)
6) HPV (toxic)
7) early acanthameba

B) Dry eye
1) exposure (inferior)
2) sicca (middle-inferior)
3) vit A def. (middle)
4) meibomitis (inferior)

C) Extrinsic
1) CL wear (diffuse)
2) medicamentosa (diffuse)
3) radiation (diffuse)
4) trichiasis (inferior)
5) UV burn (or welding arc) (middle)

D) Immune
1) SLK (superior)
2) vernal (superior)
3) Thygeson's SPK (diffuse)

E) Other
1) neurotrophic

Punctate epithelial erosions
- depressed spots due to loss of epithelial cells
- stains with fluor. and Rose B (pooling)
- all have abnormal tear layer/ epithelium

- similar to PEK without infections

A) tear dysfunction

1) sicca
2) exposure
3) blepharitis
4) corneal edema

B) toxicity

1) medicamentosa
2) HPV ?
3) molluscum ?

C) Other

1) vernal
2) Reiter's (rare)

Punctate Epithelial Keratitis

- swollen epithelial cells
- *stains poorly* with fluor.
- see grey-white opacities

A) Infectious

1) Adeno
2) HSV
3) measles

B) Immune

1) Thygeson's

Corneal dystrophies with recurrent erosions

1) M-D-F
2) Reis-Buckler's
3) lattice (often)
4) macular (pretty rare)
5) granular dystrophy (rare)

Recurrence in graft

1) Reis-Buckler's
2) lattice (2-12 years)
3) granular (later than lattice)
4) macular (later than lattice)

Types of keratitis

1) *Suppurative*
- neutrophils
- yellowish
- seen in bacterial keratitis

2) *Non-suppurative*
- monocytes
- grey-white

a) non-necrotizing: eg. disciform (HSV), HZV, syphilis
b) necrotizing: eg. HSV

Ddx of Interstitial keratitis

- similar to disciform and nummular (Dimmer's)
- non-ulcerative stromal infl. leading to vessels and scarring
- caused by any chronic infl. with edema
- mostly granulomatous diseases
-

A) Bacterial

1) congenital syphilis (spirochete)
2) Lyme disease (spirochete)
3) TB (mycobacterium)
4) leprosy (mycobacterium)

B) Viral

1) HSV
2) HZV
3) EBV (mono)
4) mumps
5) rubeola

C) Chamydial

1) LGV (type L)

D) Protozoal

1) onchocerciasis
2) leishmaniasis

E) Immune

1) Cogan's syndrome (vertigo, deafness, I.K.)
2) sarcoid
3) rare: Hodgkin's, mycosis fungoides, Kaposi's

DDx of disciform keratitis

- stromal edema/swelling

A) Bacteria

1) TB
2) Syphilis
3) Leprosy

B) Viral

1) HSV - classic
2) HZV
3) EBV
4) adenovirus - EKC and PCF

C) Chlamydia
1) inclusion
2) trachoma

D) Protozoa
1) Onchocerciasis

E) Immune
1) sarcoid

F) Traumatic
1) hydrops in keratoconus
2) chemical burns
3) bullous keratopathy

DDx of Nummular (ring-like) Keratitis (similar to disciform)
A) Bacteria
1) TB
2) Syphilis
3) Leprosy

B) Viral
1) HSV
2) HZV
3) EBV
4) Adenovirus - EKC and PCF
5) mumps

C) Chlamydia
1) inclusion
2) trachoma

D) Protozoa
1) Acanthameba
2) Onchocerciasis

E) Immune
1) sarcoid
2) Dimmer's (Nummular)

DDX of large corneal nerves
A) Cornea disease
i) Infectious
1) HSV
2) HZV
3) acanthameba
ii) Degenerative
1) keratoconus
2) Fuch's endothelial dystrophy
3) congenital glaucoma
4) failed graft
5) sicca
6) trauma
7) aging

B) systemic disease
1) MEN IIB **
2) leprosy
3) Down's
4) NF
5) ichthyosis
6) Refsum's disease (phytanic acid)
7) normals

Keratoconus associations
A) Connective tissue problem
1) Marfan's
2) Ehlers-Danlos
3) osteogenesis imperfecta

B) Poor vision (oculodigital reflex?)
1) Leber's congenital amaurosis
2) aniridia
3) RP
4) cataract?
5) subluxated lens ?

C) Genetic
1) Down's
2) Turner's

D) Eye irritation
1) atopic KC
2) vernal
3) floppy eyelid

Ddx of Iron in cornea:
1) Coat's ring: secondary to trauma (f.b.)?
2) Fleisher ring: keratoconus
3) Stocker's line: pterygium
4) Hudson-Stahli line: tears
5) Ferry line: bleb
6) Steinberg's line: RK

Cornea Vorticillata
"AFIPCC"
1) Amiodarone
2) Fabry's disease

3) Indomethacin
4) Plaquenil (hydroxychloroquine)
5) Chloroquine
6) Chlorpromazine

Causes of Salzmann's nodular degen.
" I BIT Salzmann's PIe "
- all chronic conditions
1) trachoma
2) phlyctenules
3) chronic blepharitis
4) chronic irritation (floppy lid)
5) IK
6) idiopathic

Causes of band keratopathy
A) Chronic ocular diseases
1) chronic glaucoma
2) chronic uveitis (esp. JRA)
3) IK
4) phthysis bulbi

B) Disorders of calcium
1) hyper PTH
2) Vit D toxicity
3) sarcoidosis
4) renal disease (increased phophate, normal Ca)

C) corneal degenerations
1) spheroidal degeneration
2) neurotrophic keratopathy
3) lipoidal degeneration

D) Other
1) gout
2) silicone oil in AC
3) hereditary (primary band)
4) idiopathic

Ddx of corneal crystals
A) Hypergammaglobulinemia
1) multiple myeloma
2) Waldenstrom's macroglobulinemia
3) lymphoma

B) Dystrophies
1) Schnyder's corneal dystrophy
2) Bietti's dystrophy

C) Medication deposits
1) chrysiasis (gold treatment for RA)
2) argyrosis (silver)
3) indomethacin
4) chloroquine
5) topical steroid vehicles
6) Ciloxan

D) Metabolic disorders
1) cystinosis (cystine)
2) gout (uric acid)
3) LCAT deficiency (lipids?)
4) Tangier disease
5) tyrosenemia (tyrosine)

E) Other
1) strep viridans infection post PKP
2) band keratopathy (calcium)
3) lipid keratopathy cholesterol)
4) Dieffenbachia plant sap (trauma)

DDX of Corneal Degenerations
1) band keratopathy
2) lipoidal degeneration (primary)
3) lipid keratopathy (secondary)
4) spheroidal degeneration
5) neurotrophic keratopathy
6) exposure keratopathy
7) cornea urica (gout)

Corneal Ulcers
A) *Gram +: strep pneumo. or staph aureus*
1) ulcer shape: oval
2) infiltrate: densely opaque
3) adjacent cornea: clear (sharply demarcated)
4) exudate: pus
5) other: often post-op (staph) or in chronically ill (strep pneumo)

B) *Gram -: pseudomonas*
1) ulcer shape: irregularly sharp margins
2) infiltrate: liquifaction necrosis
3) adjacent cornea: ground glass
4) exudate: "soupy", mucopurulent
5) other: CL wearer

C) *Enterobacteria (E. Coli, serratia)*
1) ulcer shape: shallow
2) infiltrate: gray-white
3) adjacent cornea: <u>diffusely</u> opalescent

4) exudate: gray-white discharge
5) other: ring infiltrates

D) Fungi
i) filamentous fungi
1) ulcer shape: indistint margins
2) infiltrate: feathery, finger-like, grey-white
3) adjacent cornea: clear ?
4) exudate: minimal
5) other: satellite lesions, ring infiltrates

ii) yeast (Candida)
1) ulcer shape: round ?
2) infiltrate: yellow-white
3) adjacent cornea: clear ?
4) exudate: dense color
5) other: often seen in chronically ill

E) Amoeba
a) Pre-ulcer
1) Ulcer shape: no ulcer
2) infiltrate anterior stromal with intact epithelium
3) adjacent cornea: PEE
4) exudate: minimal
5) other: pseudodendrites, multifocal

b) Ulcer stage
1) ulcer: not specific
2) infiltrate: ring
3) adjacent cornea: ?
4) exudate: ?
5) other: satellite lesions, enlarged nerves, pain ++

F) Vernal
1) ulcer shape: oval or shield-like
2) infiltrate: minimal, base of ulcer opaque
3) adjacent cornea: PEE
4) exudate: stringy
5) other: seasonal, pannus

G) Neurotrophic
1) ulcer shape: central, heaped up, gray edges
2) infiltrate: none
3) adjacent cornea: clear
4) exudate: minimal
5) other: minimal pain, decreased corneal sensation; history of HSV, HZV, CN5 problem

Risk factors to develop bacterial keratitis
1) CL wearer
2) dry eye
3) steroid drops
4) diabetes
5) alcoholism (moraxella)
6) chronic infection of ocular adnexa (blepharitis, dacryocystitis)
7) underlying corneal disease
8) neurotrophic/exposure keratitis
9) trauma

Causes of neurotrophic keratopathy (CN 5 damage)
A) Ocular
1) HZV
2) HSV
3) trauma (eg. post-buckle)

B) CNS
1) CVA
2) MS
3) tumors (eg. CPA)
4) hereditary sensory neuropathy

Prognostic factors for chemical burns
1) size of epithelial defect
2) corneal stromal haze
3) limbal ischemia

Types of Graft Rejection
1) epithelial
2) subepithelial
3) stromal
4) endothelial - most important

Factors in graft
1) HLA not important
2) cross-matching not important
3) blood antigens may be important

3) Treatments

Sjogren's workup (or severe dry eyes)

1) parotid biopsy (or labial salivary gland)
2) parotid flow rate
3) tear lysozyme levels (will be low)
4) CBC: anemia, leukopenia
5) serum autoantibodies: hyper IgG, anti SSA, ANA
6) conj impression cytology

Scleritis WorkUp

1) physical (joints, skin, CVS, lungs)
2) CBC
3) ESR
4) circulating immune complexes
5) urinalysis
6) serum autoantibodies: anti-DNA (SLE), ANA (SLE), RF (RA)
7) uric acid (gout)
8) VDRL, FTABS
9) CXR (TB, sarcoid)

Treatment of Rosacea

1) lid hygene
2) topical erythro
3) oral tetracycline or minocycline
4) topical metronidazole

Treatment - OCP

- complement, IgG, IgM in basement mb.

1) treat blepharitis
2) lubrication
3) Dapsone - 100 mg/ day
4) oral and topical steroids for acute exacerbations
5) topical Vit A for keratinization
6) cyclophosphamide (after Dapsone)

Treatment - Episcleritis

1) do nothing
2) topical steroids
3) oral NSAIDs

Treatment of scleritis

1) topical steroids - not very effective (Wills says don't use)
2) oral NSAIDs
3) oral steroids
4) oral immunosuppressants

Treatment of pedunculated conj papilloma

- HPV 6 and 11
- benign
- site: tarsal conj, caruncle, fornix
- single or multiple
- don't grow on cornea

1) observe
2) cryo
3) excision
4) systemic alpha interferon (experimental)

Treatment of sessile papilloma

- HPV 16, rarely 18
- may progress to malignant
- site: limbus
- single lesion
- may grow on cornea

1) observe if small
2) excision
3) cryo

Treatment of chalazion

1) warm compresses
2) massage
3) expression of material
4) I and D followed by antibiotics
5) rarely: steroid injection (1 mg Kenalog (0.1 cc of 10 mg/cc)

Treatment of conj. BRLH

1) topical steroids
2) local excision
3) low dose irradiation

Treatment of conj. lymphoma

1) chemo
2) radiation

Treatment of seasonal allergic ("hayfever") conjunctivitis

1) cold compresses
2) topical antihistamines (Livostin) or antihistamine + vasoconstr. (Vasocon A)
3) topical mast cell stabilizer (Alomide - lodoxamide)
4) topical NSAIDs (Acular - ketorolac)
5) possible systemic antihistamines (Hismanal)
6) desensitization

Treatment - vernal KC and atopic KC

1) cool compresses
2) topical antihistamines (Livostin) or antihistamine + vasoconstr. (Vasocon A)
3) topical mast cell stabilizer (Alomide - lodoxamide)
4) topical NSAIDs (Acular - ketorolac)
5) air conditioning
6) topical steroids (high dose with rapid taper)
7) topical cyclosporin 2% (in olive oil)
8) move to cool climate in severe cases
9) CL for shield ulcer
10) don't excise papillae ! - useless

Treatment - contact lens GPC
1) Improve lens hygene (protein removal, disinfection with hydrogen peroxide)
2) replace lenses
3) change from extended wear to soft CL
4) refit lenses
5) short course topical steroids
6) mast cell stabilizer (Alomide)
7) change to gas permeable
8) D/C lenses (last resort) permanently

Treatment of neurotrophic ulcer (CN 5, HSV)
- Tx for metaherpetic ulcer or CN 5 problem

A) Medical
1) debride devitalised tissue
2) patch (pressure)
3) lubricants - non-preserved
4) bandage CL
5) no steroids unless active disciform keratitis
6) prophylactic (BID) antibiotics
7) cycloplegia if irritated

B) Surgical
1) tarsorraphy
2) tissue glue
3) conjunctival flap (Gundersen flap)
4) scleral patch graft
5) PKP

Treatment of exposure keratopathy (CN 7)
1) lubrication
2) taping lids shut
3) punctal occlusion
4) temporary tarsorraphy
5) gold weights
6) permanent tarsorraphy

Treatment of recurrent erosions - post traumatic
1) pressure patching
2) hypertonic lubrication (muro-128 or 40% glucose ointment)
3) contact lens
4) cycloplegia (pain)
5) stromal puncture (avoiding visual axis)
6) excimer laser

Treatment of recurrent erosions - MDF type
1) pressure patching
2) hypertonic lubrication (muro-128 or 40% glucose ung)
3) CL
4) cycloplegia (pain)
5) complete debridement of epith with Weck
6) excimer debridement – 4 microns

Treatment - dry eyes
- consider RA (arthritis) and Sjogren's (dry mouth)

A) Medical
1) stop meds causing dry eyes
2) non-preserved lubricating drops
3) lubricating ointment
4) Lacriserts
5) humidifier
6) goggles or glasses with wind shields
7) Mucomyst for filaments

B) Surgical
1) punctal occlusion/ ablation
2) tarsoraphy

* Don't forget: treat underlying disorder

Treatment - corneal edema due to endothelial decompensation
1) hypertonic drops/ointment
2) blow dry eyes
3) decrease IOP
4) contact lens for ruptured bullae?

Treatment - SLK
1) chemical cauterization (0.5% silver nitrate in wax ampule; not silver nitate cautery sticks)
2) large bandage CL
3) topical Vit A ointment (like OCP)
4) thermal cautery
5) resection of bulbar conj.

6) TFT's (W/U) **

Treatment - Mooren's (none too effective)

A) Medical

1) topical steroids
2) contact lenses
3) Mucomyst 10% (collagenase inhibitor)
4) topical cyclosporine
5) systemic immunosuppressants (steroids, cyclophosphamide, cyclosporine, MTX)

B) Surgical

1) limbal conj. excision ** (before immunosupression)
2) cyanoacrylate to patch
3) lamellar keratoplasty

C) Protective (give to all)

1) topical antibiotics
2) cycloplegic
3) glasses during the day
4) eye shield at night

Treatment of marginal melt (autoimmune disease)

- RA, Wegener's or other CT disease
- key: get epithelium to heal!

A) Medical

1) debride devitalised tissue
2) patch
3) topical lubricants without preservative
4) topical steroid: medroxyprogesterone (Provera?)
5) collagenase inhibitor: mucomyst 10% (N-acetyl cysteine), Trasylol: 100 mIU
6) therapeutic soft CL
7) collagen shield: collagenases will act on this
8) systemic immunosuppressives (steroids, cyclophosphamide, cyclosporin)

B) Surgical

1) excision of adjacent limbal conjuctiva (before immunosuppressives)
2) cyanoacrylate to patch
3) lamellar keratoplasty
4) scleral patch
5) conj. flap
6) PKP

C) Protective

1) topical antibiotics
2) cycloplegic
3) glasses during the day
4) eye shield at night

** steroids given ONLY if infiltrate present - AAO

- steroids make ulceration worse if no infiltrate present → AAO
- Wills: recommends po steroids only; very controversial - don't use topical steroids on oral exam

Treatment of Rosacea ulcer

- key: get epithelium to heal!

A) Medical

1) debride devitalised tissue
2) tetracycline
3) lid hygene
4) patch
5) lubricants without preservative
6) medroxyprogesterone (decreases inflammation but does not activate collagenases)
7) therapeutic soft CL
8) collagen shield
9) topical mucomyst

B) Surgical

1) cyanoacrylate to patch
2) lamellar keratoplasty
3) conj. flap
4) PKP

C) Protective

1) topical antibiotics
2) cycloplegic
3) glasses during the day
4) eye shield at night

** steroids: only once epithelium is healed; used to decrease new vessels

Treatment for alkali burn acutely (treat ulceration)

A) Mild

1) copious irrigation until pH neutral (up to 24 hours) - after anesthetic *litmus or urine chemstrip)

2) double evert lid to make sure no particles present
3) cycloplegics (atropine)
4) topical antibiotics
5) pressure patch between drops

B) moderate to severe (add these steps)
1) oral Diamox for IOP
2) intense topical steroids (QID to Q3h) for 7 days then taper; can use topical medroxyprogesterone afterwards
3) 2g Vit C po per day
4) tetracycline po (binds calcium to interfere with PMN function) - or citrate?
5) topical Mucomyst QID (inhibits collagenase)
6) consider CL glued to denuded stroma
7) glass rod with antibiotic ointment BID to prevent symblephera (scleral shell if insufficient)

To heal epithelium in alkali burn (days to weeks after)
1) intensive lubrication (non-preserved)
2) tissue glue
3) bandage contact lens (after 2 weeks if epith. not healed; use for 1 month after epithelium is healed)
4) autologous conj transplant
5) tarsorraphy
6) conj. flap (last step)
7) PKP (12-18 months after)

Treatment of hyphema
1) topical steroids
2) topical beta blockers for IOP
3) dilate with homatropine
4) Diamox or Trusopt
5) systemic steroids ? (controversial)
6) aminocaproic acid (Amicar) - antifibrinolysis for rebleeds
7) surgery: earliest sign of blood staining or elevated IOP (> 30 mm Hg) with blood in AC after 5 days

Surgical treatment of hyphema
1) AC paracentesis with saline wash
2) +/- cautery of leaky vessel

Treatment - filaments
1) treat underlying condition
2) lubrication
3) mucomyst
4) debride filaments
5) bandage contact lens

Treatment of Stevens Johnson
1) daily glass rod to break symblephera
2) symblephera ring
3) antibiotic ointment

Diagnosis of cat-scratch disease
1) History of contact with a cat with presence of a scratch
2) Regional lymphadenopathy developing about 2 weeks after contact with a cat
3) Positive cat-scratch disease skin test, usually after a week of lymph node enlargement
4) Characteristic pathology of biopsy of lymph nodes or conjunctival granuloma
5) pleomorphic gram-negative bacilli with the Warthin-Starry silver impregnation

Treatment of cat scratch
A) conjunctivitis
1) warm compresses
2) Broad-spectrum ophthalmic drops or ointment

B) Systemic
1) TMP-Sulfa
2) cipro
3) genta

Infectious Scleritis
- problem: sluggish blood flow