

General Internal Medicine Review Course

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Dr. Tiffany Priester

Staff Cardiologist, VA Loma Linda Healthcare System

Assistant Professor of Medicine, Loma Linda University

Associate Professor of Medicine, University of California at Riverside

- DUE TO TIME CONSTRAINTS content of some slides will be only discussed briefly but is here so you can STUDY it on your OWN
- Each organ system has multi-year subspecialty training
- Expectations: establish a working diagnosis, initiate treatment, know when to refer to a specialist
- Limitations: diagnostic testing, availability of specialists
- Do the best you can (medical ethics)
 - If it's key to the diagnosis, facilitate external testing
 - Give it your best guess and initiate treatment and assess for response
 - Refer to specialist when indicated
 - See them back to coordinate care

Infectious Diseases

Organism
overview

Treatment
overview

Antibiotic
stewardship

- The following slides are selected from a presentation found online

Infectious Diseases

Assoc. Prof. Jan Laco, MD, PhD

Infectious diseases

- 1. Bacteria
- 2. Viruses
- 3. Mycetes
- 4. Parasites

Bacterial infections

- **toxemia** = toxins in blood circulation
- alimentary
 - botulotoxin (*Cl. botulinum*)
 - enterotoxin (*Staphylococci*)
- wound
 - tetanotoxin (*Cl. tetani*)
- other
 - diphtherotoxin (*C. diphtheriae*)
- regressive changes (liver, kidney, heart)

Bacterial infections

- **bacteremia** = bacteria in blood circulation
- time-limited
- elimination by immune system
- e.g.: digestion, tooth extraction, tonsillectomy, catheter, cystoscopy...

!!! heart valves defect → infective endocarditis → ATB cover !!!

Bacterial infections

- **sepsis** = bacteria > immune system
 - fever + splenomegaly + lymphadenopathy
 - *streptococci, staphylococci*
-
- **metastasizing sepsis** (septicemia)
 - nasopharynx → menings (*N. meningitidis*)
 - pulmonary abscess → brain abscess
 - furuncle → bones + kidney (*Staphylococci*)

Bacterial infections

- **pyemia** (septicopyemia) = thrombi + bacteria in blood circulation
- sequela: septic infarction → metastatic abscess
- 1. central – infective endocarditis
→ brain, kidney, skin, ...
- 2. peripheral – purulent thrombophlebitis (p.t.)
→ lungs
- 3. portal – p. t. of portal vein branch
→ liver
- 4. umbilical – p.t. of umbilical vein (newborn)

Staphylococci

- Gram+, common
 - normally on skin + mucosa
 - skin abscesses x sepsis
 - nosocomial infections
 - secondary infections (influenza)
-
- *Staph. aureus* + *Staph. epidermidis*

Staphylococci

- 1. skin lesions (wounds)
 - furuncle → carbuncle (DM)
 - impetigo
 - panaritium
- 2. mastitis (breast feeding woman)
- 3. osteomyelitis + arthritis
- 4. enterocolitis + alimentary enterotoxicosis
- 5. acute infective endocarditis
- 6. toxic shock syndrome

Streptococci

- Gram+, common
- β -hemolytic (A-D, G)
 - *Str. pyogenes* (A)
 - *Str. agalactiae* (B) – mother´s vagina → newborn´s meningitis
- α -viridans (H)
 - subacute infective endocarditis
 - *Str. mutans* – caries, pulpitis
- *anaerobic (Peptostreptococci)* – oral cavity

Streptococci

- *Str. pyogenes* (A)
- 1. local inf. – phlegmone, impetigo, wound inf.
- 2. angina (tonsilitis) → otitis, sinusitis
- 3. scarlet fever (erythrogenic toxin)
 - angina + oral exanthema (raspberry tongue) + skin exanthema (face, trunk)
- 4. erysipelas
 - skin erythema (lower limbs, face) + toxemia
 - lymphatic + blood vein thrombosis → lymphostasis → edema → elephantiasis

Streptococci

- sequelae (*Streptococcus A*)
 - M protein
 - cross reaction (immune)
 - **acute glomerulonephritis**
 - **rheumatic fever**

Pneumococci

- *Str. pneumoniae*
- Gram+ diplococci
- children
 - rhinitis, nasopharyngitis, sinusitis, otitis
- adults
 - lobar pneumonia → meningitis

Neisseria

- Gram- diplococci
- *N. meningitidis*
- sporadic x endemic
- children, young adults, soldiers
- nasopharynx → menings
- !!! rapid course → death (hours) !!!
- meningeal syndrom + skin purpura + DIC
- **Waterhouse-Fridrichsen syndrome**
 - meningococcal sepsis + DIC + bleeding in adrenals (insufficiency)

Neisseria

- *N. gonorrhoeae*
- gonorrhoea – STD
- purulent inflammation + discharge
- M: urethritis → prostate, vesicles
- F: kolpitis, cervicitis → endometritis → salpingo-oophoritis → sterility
- distant complication: arthritis (knee)

Escherichia coli

- Gram- rod
- normal in colon x other location - pathogenic
- *enteropathogenic* – diarrhoea (newborn)
- *enteroinvasive* – diarrhoea (adults)
- *enterotoxigenic* – travellers' diarrhoea
- *enterohemorrhagic* - verotoxin
 - hemorrhagic colitis
 - hemolytic-uremic syndrome (children)

Salmonella

- *S. typhi* – typhoid fever
- food → bowel → liver → gallbladder → bowel
- ileum
- 1. hyperplasia of RES in ileum – typhoid cells
- 2. mucosal necroses upon Peyer patches
- 3. ulcerations
- 4. reparation → scar
- complications
 - bowel perforation/hemorrhage
 - chronic carriage (gallbladder)

Salmonella

- *S. paratyphi* – paratyphoid fever
- *S. enteritidis, S. typhimurium*
- gastroenteritis + enterocolitis
- alimentary
- vomiting + diarrhoea

Shigella

- *S. dysenteriae*, *S. sonnei*, *S. flexneri*
- **bacillary dysentery**
- „dirty hands“ + alimentary
- hemorrhagic colitis + ulcers + pseudomembranes

Campylobacter + Helicobacter

- *Campylobacter jejuni*
- infants
- diarrhoea
- *Helicobacter pylori*
- asymptomatic
- etiology of:
 - chronic gastritis
 - peptic ulcer of stomach and duodenum
 - gastric carcinoma
 - gastric MALT-lymphoma

Vibrio

- *V. cholerae* – cholera
 - water, food, ill man
 - massive watery diarrhoea (15 l) !!!
 - NO inflammation x enterotoxin
 - dehydration → collapse
-
- **cholera nostras** - enterotoxins

Klebsiella

- *K. pneumoniae*
 - pneumonia
 - lung + liver abscesses
-
- *K. rhinoscleromatis*
 - ulcerations of upper airways

Haemophilus

- *H. influenzae*
 - superinfection of viral infections
 - children – **epiglottitis, meningitis, pneumonia**
 - adults - otitis, sinusitis, bronchitis
-
- *H. ducreyi*
 - **ulcus molle (chancroid, soft chancre)** - STD

Corynebacterium

- *C. diphtheriae* – diphtheria
- children
- pseudomembranous tonsilitis + laryngitis
- airway obstruction
- diphther toxin - myocarditis

Bordetella

- *B. pertussis* – whooping cough
- children
- acute inflammation of upper airways
- cough + vomiting + face edema

Pseudomonas

- *P. aeruginosa*
- colonization of respiratory and urinary tract
- immunocompromised patients
- plastic, catheters
- serious nosocomial infection
- pneumonia, enterocolitis, meningitis, sepsis

Listeria

- *L. monocytogenes*
- milk, cheese, meal
- necrotising granulomatous inflammation
- transplacental
 - abortion
 - **granulomatosis infantiseptica**
- newborn
 - meningitis
- adults
 - meningitis

Bacillus

- *B. anthracis* – anthrax
- animal products + dust
- hemorrhagic necrotising lesions
- skin – *pustula maligna*
- lungs, GIT, ...

Yersinia

- *Y. pestis* - plague
- rodents → rats → flea (*Xenopsylla cheopis*) → man
- *bubonic plague*
 - skin bite → LN (groin) → hemorrhagic necrosis (black color) + fistulas
- *pneumonic plague*
 - lung abscesses
- ↑ mortality
- WHO report

Yersinia

- *Y. pseudotuberculosis, Y. enterocolitica – lymphadenitis mesenterialis*
- children, ~ appendicitis
- alimentary
- bowel → mesenteric LN
- operation: normal app. + enlarged LN
- purulent granulomatous inflammation

Francisella

- *F. tularensis* - **tularemia** (hare disease)
- rodents → man
- regional LN – hemorrhagic necrosis + granulomatous inflammation
- ulceroglandular – most common, skin wound
- oculoglandular - conjunctiva
- typhoid – sepsis
- pneumonic

Legionella

- *L. pneumophila*
- water
- flu-like x pneumonia
- complications
 - pancarditis
 - skin + liver abscesses

Clostridium

- *Cl. tetani* – tetanus
- wound → toxins (blood, nerves) → spinal cord → spasms of striated muscles (necroses)
- risus sardonicus + opisthotonus
- 10-50% mortality
- *Cl. botulinum* - botulism
- meal from tins (toxin)
- visual disturbances, muscle paralysis → respiratory insufficiency + arrhythmias → **death**

Clostridium

- *Cl. perfringens*
- wound → emphysematous gangrene

- *Cl. difficile*
- pseudomembranous enterocolitis
- after ATB treatment

Leptospira

- *L. icterohaemorrhagica* – Weil´s disease
- rodents' urine + skin wound
- fever + jaundice + anuria
- liver - necroses + nephritis
- muscle necroses + myocarditis

Spirochetes

- *Treponema pallidum* – syphilis (lues)

Borrelia

- ***B. recurrentis* – febris recurrens**
 - ill man → louse → infection
 - mucosal hemorrhages + microabscesses
 - liver + spleen necroses
-
- ***B. burgdorferi* – Lyme disease**
 - rodents → tick (*Ixodes*) → man
 - 1. erythema migrans (skin)
 - 2. multiple EM + CNS + heart + joints
 - 3. acrodermatitis chronica atrophicans + CNS

Mycobacterium

- *M. tuberculosis* – TBC
- *M. leprae* – leprosy
- atypical mycobacteria
- *M. kansasi*, *M. xenopi*, *M. intracellulare*-*avium*
- TBC ~ pneumonia
- in AIDS patients

Actinomyces

- *A. izraelii* – actinomycosis
- normal in oral cavity
- firm infl. infiltrate → fibrosis (scar) → fistulas
- 1. cervicofacial – most common
- 2. thoracic – lung abscesses
- 3. abdominal – IUD → salphingo-oophoritis
- Mi: pus + act. colonies + Hoeppli-Splendore phenomenon

Mycoplasma

- NO cellular wall
- children + young adults
- *M. pneumoniae*
 - pneumonia, otitis, sinusitis
- *M. hominis*
 - non-gonococcal urethritis
- *Ureaplasma urealyticum*
 - non-gonococcal urethritis

Rickettsia

- intracellular
- ***R. prowazekii* – spotted fever** (typhus exanthematicus)
- ill man → louse (*Pediculus h. corporis*) → skin wound
- endothelium (+ vasculitis) → blood circulation
- skin exanthema + petechiae
- encephalitis + myocarditis
- ↑ mortality (20-70%)
- recurrence (20 years) – **Brill-Zinser disease (LN)**

Rickettsia

- *R. rickettsii* – Rocky Mountain fever
- tick (*Dermacentor*)

- *Coxiella burnetii* - Q fever
- Australia
- animal milk, dust inbreathing
- atypical pneumonia
- liver + bone granulomas

Bartonella

- *B. quintana* – trench fever
- eastern Europe
- *B. henselae*
- bacillary angiomatosis + peliosis hepatitis
- cat scratch disease
 - regional LN – purulent granulomatous infl.

Chlamydia

- intracellular
 - *Chl. psittaci* – ornithosis (psittacosis, parrot disease)
 - poultry
 - dust inhealing - interstitial pneumonia
-
- *Chl. trachomatis (L1-3)* – veneric lymphogranuloma
 - STD (Africa, Asia)
 - skin + mucosal painless ulcers (M: penis x F: cervix)
 - LN: abscesses + necrosis + epithelioid cells

Chlamydia

- *Chl. trachomatis (A, B, C)* - trachoma
- contagious keratoconjunctivitis
- hypertrophic conjunctivitis → pannus over cornea → blindness
- *Chl. trachomatis (D-K)* - urethritis
- Reiter syndrome: urethritis + arthritis + conjunctivitis
- *Chl. pneumoniae (TWAR)* – atypical pneumonia

Infectious diseases

- 1. Bacteria
- 2. Viruses
- 3. Mycetes
- 4. Parasites

Viruses

- intracellular
- DNA or RNA
- cytopathogenic effect
- inclusions
 - intranuclear (IN)
 - intracytoplasmic (IC)

DNA viruses

- 1. *Poxvirus*
- 2. *Herpesvirus*
- 3. *Adenovirus* – pneumonia, ep. keratoconjunctivitis
- 4. *Papovavirus*
- 5. *Parvovirus* – erythema infectiosum
- 6. *Hepadnavirus* – HBV (Dane´s part.) - hepatitis B

Poxviridae

- 1. Variola (smallpox)
- E. Jenner - vaccination
- world-wide eradication
- ill man → air droplets
- skin: macula → papula → pustula → scar (face)
- IC - Guarnieri bodies
- generalization → necroses (liver, spleen, kidney..)
- ↑ mortality

Poxviridae

- 2. Vaccinia (cows)
- 3. Molluscum contagiosum
- common
- children
- skin firm papules + central pit
- IC mollusca bodies

Herpesviridae

- 1. *Herpes simplex virus* - HSV1, HSV2
- 2. *Varicella-zoster virus* - VZV
- 3. *Epstein-Barr virus* - EBV
- 4. *Cytomegalovirus* - CMV

- 5. *HHV8 (KSV)* – Kaposi sarcoma

Herpes simplex virus

- epidermotropism + neurotropism
- intraepithelial blister + IN eos. inclusions (Lipschutz)
- *HSV1* – oral (kissing)
 - primary – h. gingivostomatitis (lips, vestibulum)
 - reactivation – h. labialis
- *HSV2* – genital, perianal (STD)
 - M: balanoposthitis, proctitis
 - F: vulvitis, cervicitis, proctitis
 - newborn infection (delivery)
- complications: esophagitis, hepatitis, encephalitis

Varicella-zoster virus

- **1. Varicella (chickenpox)**
- contagious febrile disease
- children
- skin + mucosa: small blisters → ulcers
- complication
 - interstitial pneumonia
 - encephalitis

Varicella-zoster virus

- 2. Herpes zoster (shingles)
- adults
- reactivation from sensitive nerve ganglia
- unilateral !!!
- painfull blisters in dermatoma of one nerve
 - trunk - intercostal nn.
 - face – n. V – h.z. ophthalmicus – keratitis
- complication: paresthesias

Epstein-Barr virus

- **1. Infectious mononucleosis**
 - kissing disease, children
 - acute fever + RES
 - tonsils (pseudomembranous a.) + LN + splenomegaly (rupture!) + liver (hepatitis)
 - blood: lymphocytosis + atypical lymphocytes
- **2. Burkitt lymphoma** (Africa – jaws)
- **3. Extranodal NK/T-cell lymphoma, nasal type**
- **4. Hodgkin´s lymphoma** (probably)
- **5. Lymphoepithelial carcinoma** (nasopharynx)

Cytomegalovirus

- infectious saliva, blood, urine, milk, STD
- IN bas. inclusions („owl eye“)
- asymptomatic
- fetus
 - brain (microcephaly, hydrocephalus, calcifications)
 - ear, eye, liver, blood marrow, kidney, salivary glands
- adults – AIDS, immunosupresion

Papovaviridae

– Human Papilloma Viruses (HPV)

- affinity to squamous epithelium
- oncogenic effect
- koilocytes (perinuclear halo)
- low risk – 6, 11
 - warts, condyloma acuminatum (STD)
 - oral + laryngeal papillomas
- high risk – 16, 18, 31
 - **cervical**, vaginal, vulvar, perianal carcinomas !!! – STD
 - squamous cell carcinoma of oropharynx

RNA viruses

- 1. *Orthomyxovirus*
- 2. *Paramyxovirus*
- 3. *Rhabdovirus*
- 4. *Retrovirus* – HIV - AIDS
- 5. *Arenavirus*
- 6. *Coronavirus*
- 7. *Bunyavirus*
- 8. *Reovirus*
- 9. *Togavirus*
- 10. *Picornavirus*

Orthomyxoviridae

- **influenza (flu)**
- ↑ infectious febrile d.
- epidemic
- acute onset, fever, general symptoms
- pharyngitis + hemorrhagic tracheitis
- complications
 - atypical pneumonia
 - bacterial superinfections (*H. influenzae*)

Paramyxoviridae

- *respiratory syncytial virus*
- infants
 - atypical pneumonia (Adams p.)
 - bronchiolitis obliterans
- adults
 - upper airways infection

Paramyxoviridae

- **morbilli (measles)**
- ↑ infectious exanthematous d., children
- 1st stage – flu-like, Koplik´s spots (cheek)
- 2nd stage – skin exanthema
- + RES (LN, tonsils, spleen, appendix)
- **Warthin-Finkelday** giant multinucleated **cells**
- complications
 - atypical pneumonia
 - encephalitis
 - acute postinfective
 - subacute sclerosing panencephalitis (late)

Paramyxoviridae

- **parotitis epidemica (mumps)**
- acute flu-like d. + SG swelling, children
- unilateral x bilateral, painful
- ↑ parotis + ..
- complications
 - orchitis + oophoritis (sterility)
 - pancreatitis
 - meningoencephalitis

Togaviridae

- rubeola (German measles, rubella)
- ~ measles
- skin exanthema + nuchal LN
- transplacental → fetus malformations
 - Gregg´s syndrome (eye, ear, brain, heart)

Rhabdoviridae

- lyssa (rabies)
- animal (dog, fox) saliva → bite → along nerves → CNS
- neurons (cornu Amonis) – IC Negri bodies
- hydrophobia, muscle spasms, furyosity, psychic alterations
- !!! always lethal !!!

Arboviridae

- = ARthropode BOrn
- **1. encephalitis**
- transmission by insects (mosquito, tick (*Ixodes ricinus*))
- geographic distribution
- blood → CNS (basal ganglia, cerebellum)
- perivascular lymphocytic infl.
- flu-like → CNS disorders
- **2. febris flava (yellow fever)** – America, Africa
- liver necroses

Picornaviridae

- 1. *Enteroviruses*
 - *Polioviruses*
 - *Coxsackie-viruses*
 - *Echoviruses* – flu-like d.
- 2. *Rhinoviruses*
- **coryza (common cold)** – purulent rhinitis
- **stomatitis epizootica (foot and mouth disease)**
 - stomatitis + small blisters and ulcers

Polioviruses

- **poliomyelitis anterior acuta**
- acute febrile d., children
- direct contact, water
- CNS - necrosis of motoneurons of anterior horns of spinal cord
- muscle paresis, paralyses (lower limbs)
- neurogenic atrophy

Coxsackie - viruses

- epidemic d., children
- herpangina – pharyngitis
- myocarditis
- meningitis
- polymyositis

Viral hepatitis

Hepatitis	Virus	Transmission	Chronicity	Carriage	Fulminant
A	RNA	fecal-oral	NO	NO	0.4%
B	DNA	parenteral	5-10%	1%	1%
C	RNA	parenteral	80%	1%	rare
D	RNA	parenteral	5% co 80% super	10%	4% co-i.
E	RNA	fecal-oral	NO	NO	20% pregnant

Infectious diseases

- 1. Bacteria
- 2. Viruses
- 3. Mycetes
- 4. Parasites

Mycetes

- **1. Mycoses**
 - true infectious diseases
- **2. Mycotoxicoses**
 - poisoning by fungal toxins – liver necroses
- **3. Mycoallergoses**
 - allergic reaction to fungal products
- **4. Mycetism**
 - local inflammation by fungi

Mycoses

- normal saprophytes in man
- immunosuppression – opportunistic infection
- endogenous
- purulent, granulomatous infl.
- superficial m.
 - skin + mucosa
- deep m.
 - organ involvement + systemic infection

Superficial mycoses

- = dermatophytoses
- *Trichophyton, Microsporum, Epidermophyton*
- limited to epidermis (scales) + skin adnexa
- **Tinea capitis, T. barbae, T. corporis, T. pedis et manus, T. unguium** (nails)
- **Pityriasis versicolor** (*Malassezia furfur*)

Deep mycoses

- *candidosis*
- *aspergillosis*
- *cryptococcosis*
- *pneumocystosis*
- *mucormycosis* – *pneumonias, rhinocerebral inf.*
- *histoplasmosis* – *H. capsulatum* - ~ *TBC*
- *blastomycosis, coccidioidomycosis*

Candidosis

- *C. albicans* – normal in oral cavity
- hyphae (non-branching) + blastospores
- **soor (moniliasis, trush)**
- pseudomembranous inflammation
- stomatitis, esophagitis, vulvitis, colpitis
- hematogenous dissemination

Aspergillosis

- *A. niger, A. flavus, A. fumigatus*
- branching hyphae (“Y“)
- aflatoxins (hepatotoxic, carcinogenic)
- angiotropism
- necrotising pneumonia
- aspergilloma - in bronchiectasias, TBC cavernae
- paranasal sinuses → brain

Cryptococcosis

- *C. neoformans*
- gelatinous capsule
- birds (pigeons) → dust → inhale
- granulomatous pneumonia
- granulomatous meningoencephalitis

Pneumocystosis

- *P. carinii/jiroveci*
- infants + AIDS patients
- interstitial pneumonia + alveoli fulfilled by grayish foamy mass

Infectious diseases

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Parasites

- *1. Protozoa*
- *2. Helminths*
- *3. Arthropodes*

Trichomoniasis

- *T. vaginalis*
- STD
- urogenital tract
- F: colpitis - purulent discharge
- M: asymptomatic

Toxoplasmosis

- *T. gondii*
- contact with infected animal (cat) + a. products
- transplacentally
- 1. congenital form
 - abortus
 - hydrocephalus, microophthalmia, chorioretinitis, brain cysts, calcifications (Sabin triad)
- 2. acquired form
 - lymphadenitis (Piringer-Kuchynka)
 - B- and T- zone hyperplasia + tiny epithelioid granulomas

Trypanosomiasis

- *T. brucei gambiensae, T. b. rhodesiense* – sleeping sickness
- Africa
- transmission - fly *Tse-tse* (*Glossina*)
- chronic meningoencephalitis – coma – death
- *T. cruzi* – Chagas disease
- America
- transmission – flatworm (*Triatoma*)
- myocarditis

Leishmaniasis

- transmission by sandfly
- *L. tropica* - skin f.
- „tropical sore“ – spontaneous regress
- *L. donovani* - visceral f.
- „kala-azar“ (black fever)
- RES – LN + hepatosplenomegaly

Amoebiasis

- *Entamoeba histolytica*
- food + water
- **amoebic dysentery**
- blood stools + diarrhoea + fever
- ulcers (~ bottle) in colon (caecum)
- complication
 - portal v. → liver - abscesses

Lambliasis

- *L. (Giardia) intestinalis*
- food + water
- chronic enteritis (small bowel) – diarrhoea
- anemia

Malaria

- !!! most important and serious tropics d.!!!
- *Plasmodium*
- **M. tertiana** (*P. vivax*, *P. ovale*)
- **M. quartana** (*P. malariae*)
- **M. tropica** (jungle fever) (*P. falciparum*)
- 1 mil death annually
- transmission – *Anopheles*

Malaria

- hepatocytes → erythrocytes → breakdown
- fever attack + shivering
- hemolytic anemia
- RES: hepatosplenomegaly + brownblack malaric pigmentum

Parasites

- 1. *Protozoa*
- 2. *Helminths*
- 3. *Arthropodes*

Enterobiasis

- *E. vermicularis* (pinworm, seatworm)
- most common, children
- small bowel → large bowel → anus (eggs)
- pruritus
- *appendicopathia oxyurica*
- complication
 - infection of genitals in girls (scribbling)

Trichinosis (Trichinellosis)

- *T. spiralis*
- pork → bowel wall → blood → striated muscles → bot encapsulation
- eye-moving, masticatory, tongue, diaphragm, heart, ...
- surrounding inflammation

Ascariasis

- *A. lumbricoides*
- common, children
- food → bowel wall → blood → lungs → cough → pharynx
→ bowel
- complication
 - ileus, pneumonia

Taeniasis + Echinococcosis

- tapeworms
 - *T. saginata, T. solium* (cysticercosis)
 - food → bowel → muscles, CNS (rare)
-
- *E. granulosus*
 - dogs
 - bowel wall → liver → cysts – calcification + rupture

Schistosomiasis (Bilharziasis)

- flukes (trematodes)
 - *Sch. mansoni*
 - water (bathing)
 - liver granulomas, liver fibrosis → cirrhosis
-
- *Sch. haematobium*
 - urinary bladder → chronic cystitis → carcinoma ?
 - haematuria

Parasites

- 1. *Protozoa*
- 2. *Helminths*
- 3. *Arthropodes*

Scabies

- *Sarcoptes scabiei* (mite)
- wars
- clothes, STD
- skin corridors → eggs
- interdigital spaces, genitals
- pruritus → scribbling → secondary infection

Sexually transmitted diseases (STD)

- **1. Bacteria**

- *Neisseria gonorrhoeae* - gonorrhoea
- *Treponema pallidum* - syphilis
- *Haemophilus ducreyi* – chancroid
- *Chlamydia trachomatis* – lymphogranuloma venereum
- *Calymmatobacterium granulomatis* – granuloma inguinale

- **2. Viruses**

- *HSV* - herpes
- *HBV* – hepatitis B
- *HPV* – condyloma acuminatum + cervical cancer
- *HIV* - AIDS

- **3. Parasites**

- *Trichomonas vaginalis* – kolpitis (vaginitis)
- *Sarcoptes scabiei* - scabies

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Infectious Diseases

Organism
overview

Treatment
overview

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stewardship

Treatment Overview and Pearls

- “Bug – drug”
 - Antibiotic must match organisms sensitivity to work
 - What if the antibiotic is fake?
 - What if the organism is resistant?
 - If you guess wrong, patient may not improve or may improve any way
 - Viruses
 - Sinusitis, acute otitis media
- Source control
 - Blood flow (carrying the IV antibiotic) does not enter pockets of fluid/pus or foreign objects
 - Some antibiotics don’t cross the blood-brain barrier
- USE AN ESTABLISHED GUIDE to help you select empiric treatment
- RE-EVALUATE every 24 hours AND if clinical situation changes
- Empiric escalation in obtunded, immunocompromised patients

The “itis”

- Before prescribing an antibiotic, give a name to the infection
Meningitis, encephalitis, orbital cellulitis, uveitis, vasculitis, sinusitis, pharyngitis, bronchitis, pneumonia, myocarditis, endocarditis, empyema, pericarditis, esophagitis, cellulitis, teflitis, enterocolitis, gastroenteritis, appendicitis, UTI/urosepsis, pelvic inflammatory disease, urythritis, epididymitis, osteomyelitis

Make a local antibiotic guide based on your availability

No source: sepsis of unknown source

BROAD, EARLY cover in immunocompromised patients

Treatment overview

- Use a guide if you can (local antibiotic-gram, Sanford guide)
- Know local resistance patterns
- Create an early sepsis template
- Curious about your antibiotic? Put a drop of the antibiotic onto the culture plate and see if it inhibits growth in vitro
- Always follow urine output, renal function, vital signs during treatment
- Use established risk models to guide inpatient vs outpatient treatment
- Use IV fluids liberally in unstable patients to help maintain organ perfusion while you figure it out
- DO NOT leave the bedside of an unstable patient
- DO NOT mistake obtundation for improvement



THE SANFORD GUIDE

To Antimicrobial Therapy

2020

David N. Gilbert, M.D.
Henry F. Chambers, M.D.
Michael S. Saag, M.D.
Andrew T. Pavia, M.D.

Douglas Black, Pharm.D.
Helen W. Boucher, M.D.
David O. Freedman, M.D.
Kami Kim, M.D.
Brian S. Schwartz, M.D.



50th Edition

Infectious Diseases

Organism
overview

Treatment
overview

Antibiotic
stewardship

Antibiotic stewardship

- Organisms are developing resistance at an alarming rate
- Balance of normal gut flora is more important than we realized
- Goal: narrowest spectrum antibiotic for shortest needed duration
 - De-escalate therapy when you can
 - Look up recommended treatment duration – MANY have shortened!!!
- **REQUIRES** education
 - Health care providers
 - Patients / the general public
 - Pharmacies