

### MENINGITIS

#### Epidemiology/Facts

- 1.2 million cases every year worldwide
- 30% to 50% of survivors develop neurologic disabilities

#### Risk Factors

- passive and active exposure to cigarette smoke
- children with cholera implants
- sickle cell disease
- URI, otitis media
- alcoholism
- immunosuppression

#### Organisms

- Strep pneumoniae (available vaccine)
- Neisseria meningitidis (vaccine available)
- Haemophilus influenzae (vaccine available)
- Listeria monocytogenes (between 1 month and 60 years)
- Herpes Simplex Virus
- West Nile Virus

**Infection process originates with nasopharyngeal colonizations and translocation**

#### Signs/Symptoms

- fever, chills, vomiting
- headache, photophobia
- nuchal rigidity
- Brudzinkski sign
- Kernig sign
- altered mental status, seizure
- lethargy, drowsiness

#### Diagnostics

- abnormal CSF chemistries
  - a.) elevated WBC count (> 100 cells/mm<sup>3</sup>)
  - b.) elevated protein (> 50 mg/dL)
  - c.) decreased glucose levels (< 40 mg/dL)
- CSF gram stain & cultures

### LOWER RESPIRATORY TRACT

#### Etiology

- most common reason patients seek medical attention
- pneumonia most common infectious cause of death in the US
- usually follows colonization of the upper respiratory tract with potential pathogens

#### Pathophysiology

- inhaled aerosolized particles
- enter lung via bloodstream from extra pulmonary infection
- aspiration of oropharyngeal contents

#### Organisms & Risk Factors

**Acute Bronchitis**                      viral, self-limiting

**Chronic Bronchitis**                      environmental, bacterial

#### Influenza

**Respiratory Syncytial Virus (RSV):** newborns (baseline health status)

**CAP**    S.pneumonia  
     H. flu  
     N. Menin  
     M. cattar

**HAP/HCAP**                                      S. aureus  
     GNR  
     resistance

**Aspiration PNA**                                      oropharyngeal (CAP) + anaerobes



By **heatherisawesome**

(x0xheather\_)

[cheatography.com/x0xheather/](http://cheatography.com/x0xheather/)

Published 2nd September, 2017.

Last updated 12th September, 2017.

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### LOWER RESPIRATORY TRACT (cont)

#### Signs & Symptoms

- cough
- coryza
- rhinitis
- sore throat
- malaise
- fatigue
- headache
- fever
- fever rhonchi
- coarse bilateral rales
- wheezing purulent sputum
- hemoptysis
- chest pain
- dense infiltrate on CXR (pneumonia only)
- increased WBC
- WBC
- decreased O2 saturation
- labored breathing
- tachycardia
- tachypnea

#### Diagnostics

- sputum gram stain & cultures
- rapid flu swabs
- CXR

### BONE AND JOINT INFECTION

#### Organisms

Osteomyelitis & infectious arthritis	Staphylococcus aureus (usually) Pseudomonas aeruginosa streptococcus e. coli staphylococcus epidermis anaerobes all can be isolated
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Hematogenous vs. contiguous spread

#### Signs & Symptoms

- significant tenderness, pain, swelling, fever, chills, decreased motion, and malaise

### BONE AND JOINT INFECTION (cont)

- elevated erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC) count, positive blood cultures, synovial fluid analysis (increased WBC, cultures)

- bone changes observed on radiographs 10-14 days after the onset of infection

- contrasted CT scans positive even sooner

### INTRA-ABDOMINAL INFECTION

#### Pathophysiology

- Defect in the GI tract (polymicrobial)
- Necrotizing pancreatitis (polymicrobial)
- Perforated ulcer (polymicrobial)
- Appendicitis (polymicrobial)
- Penetrating trauma (polymicrobial)
- IBD (polymicrobial)
- Peritoneal dialysis (eg: staphylococcus aureus)
- Cirrhosis (eg: e. coli)

#### Signs & Symptoms

- Fever
- Hypoactive bowel sounds
- Abdominal distension/tenderness
- Nausea/vomiting
- Elevated WBC
- Hypovolemic shock
- Ascites fluid (eg: high WBC, high protein, gram stain)



### URINARY TRACT INFECTION

#### Patho & Organisms

- E. coli (85%)
- Staph saprophyticus
- Proteus spp.
- Klebsiella spp.
- pseudomonas aeruginosa
- enterococcus

- Recurrent UTIs (reinfection more than two weeks apart)
- Relapse less than two weeks (due to unsuccessful treatment, resistant organisms, anatomical abnormalities)

#### Risk Factors

**Uncomplicated** Often post-coital; healthy adult female

**Complicated** Male, kids  
Diabetes  
Immunocompromised  
Pregnancy  
Device-related (foley catheter)  
Menopause

#### Lower UTI Signs/Symptoms (Cystic)

- Dysuria
- Urgency
- Frequency
- Nocturia
- Suprapubic heaviness
- Hematuria

#### Upper UTI Signs/Symptoms (Pyelonephritis)

- Systemic symptoms
- Fever
- Nausea
- Vomiting
- Flank pain

#### Diagnostics (Urinalysis)

- Significant bacteriuria
- > 100,000 (10<sup>5</sup>)/mL
- > 10<sup>2</sup>/mL + symptoms
- RBCs
- WBCs
- Nitrites

### UPPER RESPIRATORY TRACT INFECTIONS

#### Epidemiology

- most URI's have a viral etiology and resolved spontaneously
- a.) sinusitis, pharyngitis, otitis
- b.) symptoms lasting more than 7 days = bacterial?
- antibiotic use puts recipient at increased risk of selection/carriage of resistant organisms and future antibiotic failure
- bacterial infection may follow viral infection

#### Otitis

- day-care attendance
- recent antibiotic exposure
- age younger than 2 years
- frequent bouts of otitis media
- often follows viral nasopharyngeal infection that causes eustachian tub dysfunction
- otalgia, fever, irritability, tugging ears, discolored (grey), thickened, bulging eardrum
- S. pneumoniae
- H. influenzae
- M. catarrhalis
- S. aureus
- S. progenies
- P. aeruginosa

#### Sinusitis

- nasal discharge/congestion
- maxillary tooth pain
- facial or sinus pain that may radiate
- cough
- nasal discharge
- often follows viral URI that leads to inflamed nasal passages, trapping bacterial in sinuses
- chronic/recurrent infections occur three to four times a year
- S. pneumoniae and H. influenza

#### Pharyngitis

### UPPER RESPIRATORY TRACT INFECTIONS (cont)

- viruses, group A strep, S. pyogenes
- seasonal outbreaks occur in winter and early spring, spread via direct contact with droplets
- sore throat, odynophagia, fever, headache
- erythema/inflammation of the tonsils and pharynx with or without patch exudates
- enlarged, tender lymph nodes
- red swollen uvula
- petechiae on the soft palate
- rapid antigen test for GAS

### ENDOCARDITIS

#### Organisms & Risk Factors

- Cardia valve abnormalities: regurgitation, prosthetic heart valves
- intravenous drug abuse

- viridian's streptococci
- Streptococcus bovis
- Staphylococcus aureus
- fungal
- HACEK: haemophilus, aggregatibacter, cardiobacterium, eikenella, corrodens, kingella

#### Diagnostics

- persistent bacteremia/fungemia
- echocardiography: valvular vegetation

#### Signs/Symptoms

- fever & murmur
- osler nodes
- infective emboli: renal, pulmonary, CNS

### SKIN & SOFT TISSUE INFECTION

#### Organisms

<b>Folliculitis, furnucles (boils), and carbuncles*</b>	Staphylococcus aureus (MRSA)
<b>Erysipelas</b>	Streptococcus pyogenes
<b>Impetigo*</b>	Staphylococcus aureus
<b>Lymphangitis</b>	S. pyogenes
<b>Cellulitis</b>	S. pyogenes and S. aureus
<b>Necrotizing Faciitis</b>	S. progenes
<b>Diabetic Foot Infections, Decubitus Ulcers</b>	Staphylococci, streptococci, enteric gram negative bacilli, and anaerobes
<b>HUman/Animal Bite Wounds</b>	Pasteurella multocida, eikenella, corrodens, S. aureus, and anaerobes

\* Highly Contagious \*

#### Notes

- use caution with "spider bites"
- many of these infections originate as minor trauma, scratches (soap and water)
- predisposing factors: diabetes mellitus, local trauma or infection, recent surgery
- MRSA tips: transmission on fomites

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By **heatherisawesome**  
(x0xheather\_)  
[cheatography.com/x0xheather/](http://cheatography.com/x0xheather/)

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Last updated 12th September, 2017.  
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### GASTROINTESTINAL INFECTION

#### Key Facts

<b>Diarrhea is</b>	eg: E. coli
<b>Usually Viral</b>	eg: Shigella
	eg: campylobacter
	eg: salmonella
	eg: clostridium

Patient education & prevention strategies are key  
 eg: traveller's diarrhea  
 eg: food poisoning  
 eg: vaccination

Pathophysiology: inflammatory secretion

#### Signs/Symptoms

- nausea
- abdominal pain
- cramping
- bloating
- dehydration
- fever
- frequent urge to evacuate
- fever blood & severe dehydration

#### Risk Factors

- ingestion of raw or undercooked seafood (eg: vibrio cholera or noroviruses)
- use of antibiotics (eg: c. diff)
- use of PPI
- travel to tropical areas(eg: parasitic infections like guard, entamoeba, strongyloides, and cryptosporidium)
- travel to endemic areas (eg: vibrio cholera)

### SEPSIS

**Definition:** life-threatening organ dysfunction due to a dysregulated host response to infection; it arises when the body's response to an infection injures its own tissues and organs

#### Infection + Quick Sepsis Organ Failure Assessment

Altered Mental Status	GSC < 15
Fast Respiratory Rate	> 22 BPM
Low Blood Pressure	< 100 SBP
Increased O2 Consumption	
Decreased O2 Delivery	

#### Procalcitonin Levels

Healthy	0.01
Local Infection	0.1 - 0.5
Systemic Infection	0.5 - 2.0
Severe Sepsis	2.0 - 10
Septic Shock	> 10

#### C-Reactive Protein (mg/L)

Minor Infection	10 - 20
Moderate Infection	20- 50
Severe Infection	> 50

