Updates in Patient Management of Common Infectious Diseases

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Learning Objectives

At the conclusion of this session, participants should be able to:

- **Describe the clinical presentation of common infectious diseases seen in primary care settings**
- **Discuss the management of common infectious diseases seen in primary care settings**
- **Recognize life threatening infections and appropriately refer patients to specialized care**

Conjunctivitis

Etiology: Can be viral, bacterial, or allergic in origin. Adenoviruses are the most likely pathogens in viral conjunctivitis. *S. aureus* and other staphylococcal pathogens are the most common causes of bacterial conjunctivitis as well as *S. pneumoniae, H. influenzae, M. catarrhalis*.

Presentation: Viral conjunctivitis presents with conjunctival injection, clear, watery discharge, URI syndromes, may begin unilaterally and progress to bilateral involvement over a few days; may have mild itching, preauricular adenopathy.

Features suggestive of bacterial conjunctivitis: purulent or mucopurulent discharge, and the patient may report mattering of the eyes upon waking in the morning. Allergic conjunctivitis: predominant symptoms of redness, itching, and tearing of the eyes. It is painless and may have watery discharge, although some patients report a gritty sensation.

Conjunctivitis

Diagnosis: Clinical diagnosis through history and physical examination.

Cultures indicated for conjunctivitis in neonates, when suspecting gonococcal or chlamydial causes

Management:

*Viral conjunctivitis : Symptomatic care; cold compresses, saline drops/artificial tears

*Allergic conjunctivitis: Avoid known allergens if possible, Antihistamine eye drops

*Bacterial conjunctivitis : Topical antibiotics such as ciprofloxacin, gentamicin, tobomycin, trimethoprim/polymyxin B, sulfacetamide

Sinusitis

Etiology: Majority of cases are viral

Most common bacterial pathogens are *S. pneumoniae*, *M. catarrhalis*, and *H. influenzae*.

Presentation: Nasal congestion, rhinorrhea, sinus congestion/pressure/pain. Features suggestive of bacterial sinusitis high fever, facial pain, purulent nasal discharge, longer persistent and worsening

Diagnosis: Usually clinical based on history and physical examination.

Management: Supportive therapy for viral sinusitis

*Antibiotic therapy is recommended for bacterial sinusitis: Treat for 5 -7 days, and children for 10 – 14 days

*Recommended empiric first line: Amoxicillin/Clavulanate (2 g PO BID adults) & up to 90 mg/kg/day PO in kids

*In PCN allergy: Alternatives are doxycycline, levofloxacin, moxifloxacin

Sore Throat –Pharyngitis

Etiology: 60-90% Viral Pharyngitis e.g. adenovirus & rhinovirus
5% -30% Bacterial Pharyngitis e.g. Group A Streptococcus (GABS)

Presentation: Features suggestive of viral pharyngitis include: cough, coryza, conjunctivitis, diarrhea, hoarseness. Features suggestive of bacterial pharyngitis include: Fever, absence of cough, age (5-15 years), adenopathy, tonsillar exudates (Centor criteria).

Diagnostics: Rapid antigen detection testing and throat culture (Gold standard)

Management: Supportive therapy for viral sore throats

For GABS : PCN V 500 mg po twice each day for 10 days. Amoxicillin 500 mg po twice each day for 10 days
Azithromycin 500 mg po each day for 5 days, Erythromycin 500 mg twice each day for 10 days
Clindamycin 150 mg (300) mg three times daily for 10 days, are reasonable alternatives for PCN allergies

Otitis Externa

Etiology: An inflammation of the auditory canal. Commonly bacterial e.g. *P. aeruginosa* or *S. aureus.* Otitis externa can also be more chronic, e.g. fungal causes

Presentation: Otalgia, sudden onset of symptoms, itching, erythema and edema of the ear canal may also be reported. Palpation of the auricle and tragus will cause pain.

Diagnosis: Clinically through history and physical examination. It is important to rule out other causes of symptoms such as otitis media with a ruptured tympanic membrane.

Otitis Externa

Management:

Topical therapy is the initial treatment of uncomplicated otitis externa which is localized to the ear canal

Drug Name	Common Dose
Acetic acid (otic) 2% solution	3 – 5 drops into affected ear(s) 3-4 times per day
Ciprofloxacin 0.2%, hydrocortisone 1%	3 drops into affected ear(s) twice daily
Ciprofloxacin 0.2%, dexamethasone 0.1%	4 drops into affected ear(s) twice daily
Neomycin, polymyxin B, hydrocortisone	4 drops into affected ear(s) every 6 – 8 hours
Ofloxacin 0.3%	10 drops into affected ear(s) once daily

Acute Otitis Media (AOM)

Etiology: Infection and inflammation of the middle ear. Most often bacterial in origin.
The most common bacterial pathogens are *S.pneumoniae*, M.catarrhalis, and *H.influenzae*

Presentation: Fever, otalgia, pulling, tugging or rubbing the ear; fussiness; or a change in sleep habits; bulging and erythema of the tympanic membrane

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Diagnosis: Clinically through history and physical examination.
The presence of a bulging tympanic membrane is highly correlated with a bacterial cause of AOM.
The use of pneumatic otoscopy is essential in aiding the diagnosis.

Acute Otitis Media (AOM)

Management:

*Antibiotics are recommended for AOM especially when severe otalgia for at least 48 hours or temperature of 102.2° F.

*Initial antibiotic therapy: amoxicillin or amoxicillin-clavulanate 80-90 mg/kg/day; 2 divided doses for 10 days.

*Alternative antibiotics may include: cefdinir, Cefuroxime, cefpodoxime; ceftriaxone, azithromycin

Age	Presentation	Recommended Treatment
Children ≥6 months	Bilateral or unilateral AOM Severe signs and symptoms	Antibiotic therapy
Children <24 months	Bilateral AOM Non-severe signs and symptoms	Antibiotic therapy
Children 6 – 23 months	Unilateral AOM Non-severe signs and symptoms	Antibiotic therapy or observation
Children ≥24 months	Bilateral or unilateral Non-severe signs and symptoms	Antibiotic therapy or observation

Community-Acquired Pneumonia (CAP)

Etiology: Frequently seen viruses are *rhinovirus* and *influenza*.
Bacteria frequently associated with CAP are: *Streptococcus pneumoniae, Haemophilus influenza, Moraxella, Chlamydophila pneumoniae, & Mycoplasma pneumoniae*.
Other causes include *Staphylococcus aureus, Enterobacteriaceae, Mycobacterium tuberculosis, Legionella sp., & Pseudomonas aeruginosa*.

Presentation: acute onset of chills or fever, cough. Other features may include: fatigue, anorexia, weight loss, and pleuritic chest pain. Tachypnea and hypotension may occur. Reduced breath sounds with positive rales or crackles, rhonchi, tactile fremitus, or egophony.

Community-Acquired Pneumonia (CAP)

Management: based on both clinical presentation and chest radiographic studies. X-ray will show infiltrations. Sputum and blood cultures may be obtained prior to the start of treatment to aid in sensitivity analysis

Predicting severity: Frequently used tool in pneumonia assessment is CURB65 (confusion, blood urea, respiratory rate, blood pressure, and age > 65). One point is assigned to each of these variables.

*A score of 0-1 indicates low risk of mortality; therefore, they may be managed in the outpatient settings.

*For patients with a CURB65 score of 2 or greater, they must be admitted and be managed in the hospital

Criteria	Point assigned
Age ≥ 65y.o	1
Confusion	1
Uremia (BUN >19mg/dL)	1
RR> 30/min	1
BP < 90/60	1
Total Score	= 1 treat outpatient > 1 hospitalize (higher score, higher mortality)

Community-Acquired Pneumonia (CAP)

Management:

High-risk patients need to be hospitalized.

Low risk patient (CURB65 score 0-1), manage as out patient with oral antibiotics

The first line agents are macrolide antibiotics e.g. azithromycin, clarithromycin, or erythromycin.

Alternatives include tetracycline such as doxycycline may be considered.

When the risk for resistant *S. pneumoniae* is high; manage with fluoroquinolone e.g. levofloxacin, moxifloxacin, or gemifloxacin.

Alternatives: Dual therapy of a macrolide or doxycycline together with:

a beta-lactam such as high dose amoxicillin or amoxicillin/clavulanate (i.e. augmentin)

or second generation cephalosporin such as cefuroxime

or a third generation, cefdinir or cefpodoxime.

The duration of antibiotic therapy >5 days or until resolution of symptoms

Genitourinary Infections-Uncomplicated Cystitis

Etiology: Common cause of bladder infections is *E.coli:* Other common pathogens include *Klebsiella pneumoniae*, *S. saprophyticus*, *E. faecalis*, and Group B streptococcus.

Presentation: Dysuria is the hallmark symptom of cystitis. Other features may include: urinary frequency, urinary urgency, suprapubic pain and gross hematuria. can occur. Presence of fever, flank pain, nausea, and malaise may signal complicated cystitis/pylonephritis.

Diagnosis

Office dipstick urinalysis, looking for positive leukocyte esterase and nitrites

A urine culture and sensitivity can help confirm the diagnosis of cystitis

Urine culture is inducted when there is a concern for a complicated urinary tract infection, recurrent cystitis, a history of resistant pathogens.

Genitourinary Infections-Uncomplicated Cystitis

Management

Uncomplicated cystitis managed in the ambulatory care setting

Choosing among first-line options depends on: patient allergy, compliance history, availability, cost, local practice patterns, local community resistance.

***Avoid fluoroquinolones as first-line therapy to minimize antimicrobial resistance & side effects**

***Also amoxicillin is not recommended by the IDSA for empiric therapy.**

***Urinary analgesics such as phenazopyridine (2-3 days) can be used to mitigate irritative voiding symptoms.**

***Routine urine cultures after treatment are not recommended if a patient is non-pregnant, symptoms resolve with treatment, and do not recur within 2 weeks.**

Drug Name	Common Dose	Recommendation
trimethoprim-sulfamethoxazole DS	160/800mg BID x 3 days *Avoid if patient has taken it in the last 3 months for cystitis*	First-line option
nitrofurantoin	100 mg BID x 5 days	First-line option
fluoroquinolones	ciprofloxacin 250mg BID x 3 days levofloxacin 250 – 500mg QD x 3 days	Second-line option
Beta-lactams	amoxicillin-clavulanate, cefdinir, cefaclor treat for 3-7 days	Second-line option

Genitourinary Infections-Pyelonephritis

Etiology: Infection and inflammation of the kidney usually secondary to an ascending urinary tract infection. *E. coli* is the most common pathogen,. Other pathogens include Enterobacteriaceae and enterococci.

Presentation: Fever and flank pain are the hallmark symptoms. Other features may include: malaise, nausea, dysuria urinary frequency. Costovertebral angle tenderness, suprapubic tenderness may be notable during exam.

Diagnosis: Urinalysis show pyuria and leukocyte esterase. A positive urine culture confirms the diagnosis. CBC with differential, electrolytes, renal function, hepatic panel, blood cultures, may help in assessing complications of pyelonephritis and ruling out other etiologies of flank pain and fever.

Consider imaging (ultrasound or CT scan) in patients with severe illness such as renal stone, immunocompromised, or there is suspicion of abnormal anatomy or abscess formation.

Management of Pyelonephritis

Can manage as outpatient if hemodynamically stable, can hydrate and tolerate oral medications

Monitor frequently for complications such as bacteremia and renal abscess

Consider inpatient management if cannot take oral medications, co-morbidities or immunosuppressed, abnormal electrolytes, or concern for obstruction or abscess, have high fevers, or potentially septic

Drug Name	Common dose	Comments
ciprofloxacin	500mg twice daily x 7 days	Review FDA box warning
levofloxacin	750mg once daily x 7 days	Review FDA box warning
trimethoprim-sulfamethoxazole DS	160/800mg twice daily x 14 days	Check local resistance patterns

Common Skin Infections- Impetigo

Most common etiology: *Staph aureus* & *Strep pyogenes*

Presentation: Red papules to honey- crusted erosions. The golden yellow crusts are arranged as scattered discrete lesions that may become confluent over time

Management: Based on severity, location, comorbidity

*Topical: mupirocin (Bactroban): For mild, localized infection without systemic involvement

*Oral: cephalexin, dicloxacillin x 7-14 days

Common Skin Infections- Cellulitis

Most common etiology: *Strep, Staph, H. influ* (face) lead to acute inflammation of skin & subcutaneous tissue

Presentation: Erythema, warm, tender patches or plaques

Management: Based on severity, location, comorbidity which dictates P.O. or I.V. 1st – 3rd gen cephalosporin

***Incision & drainage for abscesses, furuncles or carbuncles**

***Oral antimicrobials: If no systemic signs & no comorbidities**

***IV agents: When there is evidence of systemic infection**

*** Include limb elevation and address risk factors**

Common Bone Infections- Osteomyelitis

Infection of bone characterized by progressive inflammatory destruction and apposition of new bone

S. aureus is most common organism

Presentation: Pain, fever, erythema, tenderness, edema, drainage, Elevated WBC, ESR, CRP, X-rays show lytic lesions,

Management:

*IV or oral antibiotic therapy for 4-6 weeks

*hyperbaric oxygen therapy

*Irrigation & debridement then organism specific antibiotics

Sepsis-Out Patient

- **Sepsis is a systemic inflammatory response syndrome that results from an infection**
  - ***Sepsis is defined as a Life-threatening organ dysfunction caused by dysregulated host response to infection***
- ***Septic Shock*: Subset of sepsis with circulatory & cellular/metabolic dysfunction associated with higher risk of mortality**

What Pathogens Cause Sepsis

The spectrum of sepsis causing pathogens is rapidly changing from predominantly gram-negative organisms to gram-positive organisms

How to Recognize Sepsis

- Common clinical features for sepsis are
- Fever (>38.3 °C)
- Hypothermia (<36 °C)
- Heart rate (>90 bpm)
- Tachypnea
- Altered mental status
- Edema
- Hyperglycemia (plasma glucose >120mg/dL)

quick SOFA (qSOFA)
Assessment tool for sepsis screening

The Third International Consensus Definitions for Sepsis and Septic Shock ("Sepsis-3") derived an assessment tool for sepsis screening in patients with infection who are not in intensive care units (ICUs).

This is called the *quick SOFA* (qSOFA) score

SOFA =Sequential Organ Failure Assessment

Quick SOFA SCORE: qSOFA

Assessment	qSOFA score
Low blood pressure (SBP ≤ 100 mmHg)	1
High respiratory rate (≥ 22 breaths/min)	1
Altered mentation (GCS ≤ 14)	1

- A tool to identify patients with suspected infection who are at greater risk for a poor outcome outside the intensive care
- **Presence of 2 or more qSOFA points near the onset of infection is associated with a greater risk of death or prolonged intensive care unit stay.**

What to do when sepsis is suspected?

- **When sepsis is suspected, clinicians should rapidly administer IV broad-spectrum antibiotics**
- **Surviving sepsis campaign bundle recommends the following:**
  - Measure and monitor lactate level
  - Obtain blood cultures prior to administration of antibiotics
  - Begin rapid administration of crystalloid to manage hypotension and elevated lactate (>4 mmol/L)
  - Apply vasopressors (**norepinephrine)** if patient is hypotensive during or after fluid resuscitation to maintain mean arterial pressure (MAP) ≥65 mm Hg

Take Home Points

1. Infectious diseases continue to be a major cause of mortality and morbidity.
2. Early diagnosis and treatment save lives.
3. Treatment options should be individualized while following national guidelines
4. Prescribers should use antibiotics responsibly to minimize resistance
5. Key factors to watch are globalization, climate change and substance use

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For Questions and Follow up Dialogue

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Q1. An 80-year-old man is brought to your urgent care with concerns of fatigue and mild confusion per his daughter. He was well up until one week ago when he complained of frequent urination prompting a visit to his primary care provider who prescribed "some type of antibiotic" and advised him to increase fluids. Last 3 days he has not eaten much, and has been unwilling to get out of the bed. PMH is significant for HTN and Type 2 DM. Initial vitals signs are T: 38.0 (100.4), HR: 114, RR: 24 , BP: 100/60, S_aO_2: 96% on room air and finger Stick: 110 mg/dl.

Which of the following is the most appropriate next step in the management of this patient?

a) Administer intravenous hydrocortisone
b) Administration of early parenteral nutrition
c) Discontinue antibiotics and follow up in 2 days
d) Initiate sepsis protocol & referral to hospital
e) Start rapid acting insulin

Q2. A 65-year-old woman with a history of uncontrolled diabetes and intravenous drug abuse comes to your outpatient office complaining of severe pain, fever, and rapidly progressing redness on the face. Her temperature is 38°C, heart rate is 105 beats per minute, respiration rate is 21 breaths per minute, her blood pressure is 142/90 mmHg. Skin examination reveals tense edema, bullous changes, grayish to brown discharge, necrosis and crepitus.

Which of the following is the next best step in the management of this patient?

a) Inpatient management with parenteral antimicrobials and surgical debridement
b) Inpatient management with topical antibiotics and surgical debridement
C) Outpatient management with incision and drainage
d) Outpatient management with oral antimicrobials and follow up in 7 days
e)Outpatient management with topical antimicrobials and follow up in 7 days

Q3. A 13-year-old boy was brought to the urgent care office with a 5-day history of severe sore throat, dysphagia, trismus, drooling, and a muffled "hot-potato" voice, but no respiratory distress. Physical examination revealed a unilateral enlarged tonsil crossing the midline, causing the uvula to deviate to the uninvolved side. Which of the following is the most likely diagnosis for this boy's illness?

a) Diphtheria
b) Kawasaki disease
c) Laryngitis
d) Peritonsillar abscesses
e) Viral pharyngitis

Solutions to Questions:

Q1. An 80-year-old man is brought to your urgent care with concerns of fatigue and mild confusion per his daughter

Correct answer is d (Initiate sepsis protocol & referral to hospital). He has confusion, abnormal vitals and signs of organ dysfunction with >2 qSOFA points. This gentleman most likely has urosepsis. This is a life threatening condition, patient need to be managed urgently and should be admitted in hospital.

Administering intravenous hydrocortisone is not the most appropriate step; If hemodynamic stability is not achievable by other means, then use intravenous hydrocortisone .

Administration of early parenteral nutrition is not recommended, but rather initiate early enteral nutrition. Discontinuing antibiotics and follow up in 2 days will lead to worst outcomes. Starting rapid acting insulin is not indicated in this patient whose blood glucose was 110 mg/dl. Insulin may also complicate this patient's condition by causing hypoglycemia.

Solutions to Questions:

Q2. A 65-year-old woman with a history of uncontrolled diabetes and intravenous drug abuse comes to your outpatient office complaining of severe pain, fever, and rapidly progressing redness on the face

The correct answer is a (Inpatient management with parenteral antimicrobials and surgical debridement). The Initial management of skin infection should be determined by severity, location, comorbidities, type of infection and presence or absence of purulence. The clinical features are suggestive of a necrotizing soft tissue infection in the face with systemic involvement in a patient with uncontrolled diabetes. This type of infection requires inpatient management, parenteral antibiotics and surgical debridement. Outpatient management with topical or oral antimicrobials is ideal for simple infections with no systemic signs or symptoms of spread and no uncontrolled comorbidities.

Q3. A 13-year-old boy was brought to the urgent care office with a 5-day history of severe sore throat, dysphagia, trismus, drooling, and a muffled "hot-potato" voice, but no respiratory distress

The correct answer is d. (Peritonsillar abscesses). The appearance of unilateral enlarged tonsil crossing the midline in an adult child with severe sore throat, dysphagia, trismus, drooling, and a muffled "hot-potato" voice is suggestive of peritonsillar abscesses. Laryngitis causes hoarseness but generally no pain. Diphtheria causes thick exudate, often associated with cervical lymphadenopathy in unimmunized children. Kawasaki disease is characterized with generalized inflammation of the oral mucosa. Viral pharyngitis is generally characterized by cough, coryza, and conjunctivitis.