Common Infections and Antimicrobial Prescription in PHC

30/11/2022

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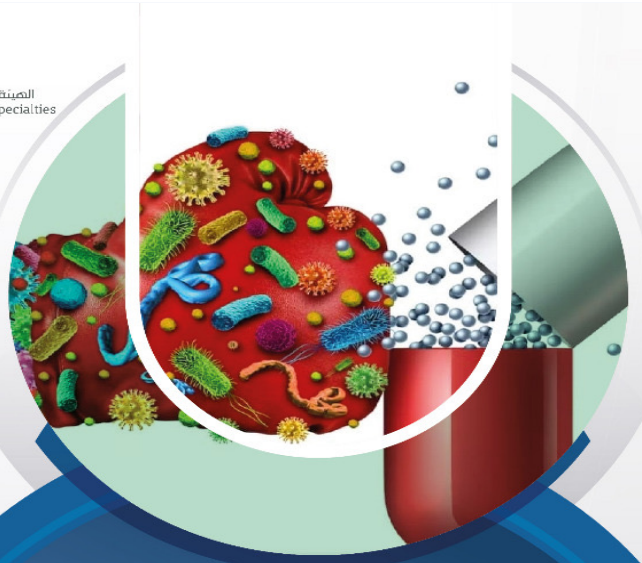

FAMILY MEDICINE RESIDENCY PROGRAM

MASTER CLASSES SERIES

CLINICAL APPROACH TO
COMMON INFECTIONS AND ANTIMICROBIAL PRESCRIPTION IN PRIMARY CARE

2ND MASTER CLASS NOV 30, 2022 FROM 08:15 TO 12:00

Required Pre Reading

FOR REGISTRATION

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Virtual

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FM R2, Johns Hopkins Aramco Healthcare

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GENERAL OBJECTIVES

1- Introduction to Antimicrobial Stewardship

2- Overview of common antibiotics used in the primary care setting.

3- Case-based approach to common infectious diseases in the primary care setting

Case List

1- Community Acquired Pneumonia (CAP)
2- Acute bronchitis
3- Septic arthritis
4- Conjunctivitis (bacterial)
5- Perichondritis
6- Otitis Media with effusion
7- Acute Otitis Media (AOM)
8- Otitis Externa (OE)
9- Impetigo
10- Cellulitis
11- Shingles
12- Viral URTI (common cold)
13- Influenza
14- Pharyngitis
15- Epiglottitis
16- Retropharyngeal abscess
17- Gastroenteritis
18- Food poisoning
19- Cystitis (simple)
20- Urethritis (Sexually Transmitted Infection)

Antimicrobial Stewardship

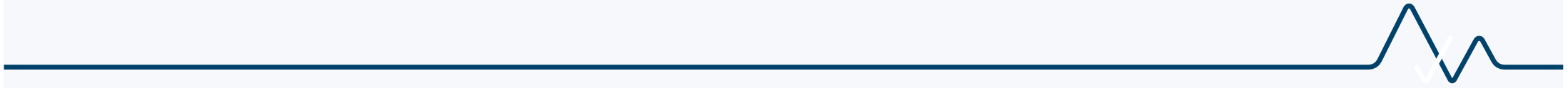
DR. MARIAM BAGIS, MBBS, CCFP, COE, CRA

ANTIMICROBIAL RESISTANCE

- The development of antibiotics has led to significant improvements in health outcomes. One of the greatest advancement in modern medicine is the discovery of penicillin and the ability to treat commonly encountered infectious diseases. Infections was one of the biggest causes of mortality during the pre-antibiotic era.

- Today, antimicrobials are among the most purchased medications worldwide.

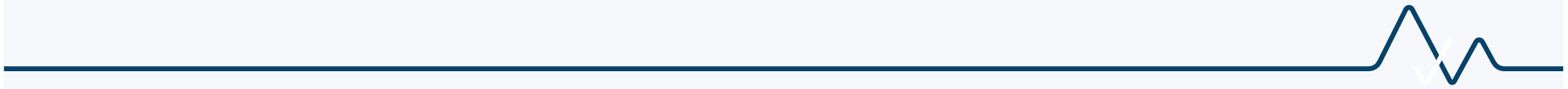
- The highest rates of antimicrobial resistance are recorded in the countries with the high antibiotics use.



ANTIMICROBIAL RESISTANCE

- Due to Antimicrobial resistance, there is decreasing in range of effective antimicrobial drugs and is a growing worldwide public health problem. The pharmaceutical industry has developed only 2 new antimicrobial classes of antibiotics in the 4 last decades.

- Antimicrobial resistance is a growing clinical challenge in both inpatient and outpatient settings. The increasing number of resistant pathogens are resulting in increased morbidity and mortality, in addition to prolonging hospital stays and increasing healthcare costs.



Morgan DJ, Okeke IN, et al. Non-prescription antimicrobial use worldwide: a systematic review. Lancet Infect Dis. (2011) **11**:692–701.

ANTIMICROBIAL RESISTANCE

- Inappropriate prescription and misuse of antibiotics are major factors underlying development of MDR organisms and is a growing public health issue
- The annual global deaths attributable to AMR are estimated to be 700,000 as per a 2016 study, commissioned by the UK government.
- It is estimated that at least every 10 minutes a patient dies in the USA or Europe because of fatal infections caused by antibiotic resistant bacteria.
- The global mortality attributable to antimicrobial resistance is estimated to reach 10 million annual deaths by 2050, making it one of the leading causes of death with an economic impact of up to 100 trillion US dollars (USD).

Alawi MM, Darwesh BM. A stepwise introduction of a successful antimicrobial stewardship program. Saudi Medical Journal. 2016; 37(12): 1350-1358. doi: https://doi.org/10.15537/smj.2016.12.15739

ANTIMICROBIAL RESISTANCE in SAUDI ARABIA

ANTIMICROBIAL RESISTANCE in SAUDI ARABIA

- There is substantial increase in multidrug resistant (MDR) Gram-negative bacilli in Saudi Arabia since the 1990s.
- There is increased prevalence of ESBL E. coli and Klebsiella pneumoniae.
- Region-wide surveillance studies in the Gulf Cooperation Council States (GCC) reported that most of carbapenem resistant Enterobacteriaceae (CRE) and Carbapenem resistant Acinetobacter baumannii (A. baumannii) (CRAB) also increased dramatically over the years.
- A study in 2015 from the security forces hospital (SFH) in Riyadh showed that the susceptibilities of A. baumannii to meropenem and imipenem in 2006 ranged between 60-80% while the susceptibility in 2012 was about 10%.

Alawi MM, Darwesh BM. A stepwise introduction of a successful antimicrobial stewardship program. Saudi Medical Journal. 2016; 37(12): 1350-1358. doi: https://doi.org/10.15537/smj.2016.12.15739

ANTIMICROBIAL RESISTANCE in SAUDI ARABIA

- The last-line of antibiotics available for carbapenem resistant gram-negative bacteria is colistin. However, there have been reports of colistin and pan-drug resistance.

- A Saudi national surveillance on Gram-positive cocci demonstrated that 32% of Staphylococcus aureus (S. aureus) are methicillin-resistant (MRSA), and 33% of Streptococcus pneumoniae are resistant penicillin G and 26% are resistant to erythromycin.

- A study in Riyadh tested 200 healthcare workers and showed that 40% had staph aureus colonization. Among those, 45% were methicillin-resistant (MRSA), resulting in total prevalence of 18% health workers carrying MRSA.

- Zowawi HM. Antimicrobial resistance in Saudi Arabia. An urgent call for an immediate action. Saudi Medical Journal. 2016; 37(9): 935-940. doi: doi.org/10.15537/smj.2016.9.16139
- Said KB, Al-Jarbou AN, Alrouji M, Al-Harbi HO. Surveillance of antimicrobial resistance among clinical isolates recovered from a tertiary hospital in AL Qassim Saudi Arabia. Int J Health Sci (Qassim) 2014; 8:3-12

ANTIMICROBIAL RESISTANCE in SAUDI ARABIA

- *Mycobacterium tuberculosis* including multidrug-resistant M tuberculosis, is increasing.
- Reports of increasing *C. difficile* associated diarrhea (CDAD) in the region.

- Zowawi HM. Antimicrobial resistance in Saudi Arabia. An urgent call for an immediate action. Saudi Medical Journal. 2016; 37(9): 935-940. doi: doi.org/10.15537/smj.2016.9.16139
- Morgan DJ, Okeke TN, et al. Non-prescription antimicrobial use worldwide: a systematic review. The Lancet Infectious Diseases, 2011; 11(9):692-701. doi.org/10.1016/S1473-3099(11)70054-8.

GLOBAL AND NATIONAL RESPONSE

GLOBAL AND NATIONAL RESPONSE

- Several leading health organizations have called urgent action to combat antimicrobial resistance, including the CDC and WHO.

- the World Health Organization launched the Global Action Plan on Antimicrobial Resistance. This plan was signed off by most of member states, including Saudi Arabia during the World Health Assembly in 2015.

GLOBAL AND NATIONAL RESPONSE

- Minister of Health implement a policy prohibiting dispensing of all antimicrobial agents without a prescription with the recommendation of the National Antimicrobial Stewardship subcommittee.

- In addition, it is required that any hospital in Saudi Arabia with 150 beds or more should implement an antibiotic stewardship program.

ANTIMICROBIAL STEWARDSHIP

ANTIMICROBIAL STEWARDSHIP

It is a coordinated set of efforts aimed to promote and increase the appropriate use of antimicrobials and is a key strategy to conserve the effectiveness of antibiotics into the future and minimize antimicrobial resistance.

ANTIMICROBIAL STEWARDSHIP

- An effective Antimicrobial Stewardship Program (ASP) is a proven prevention and control approach to decrease the spread of antimicrobial resistance.

- **It is defined as** the optimal selection dosage, and duration of antimicrobial treatment that results in the best clinical outcome including cure or prevention of infection, decreased mortality and length of hospital stay and minimal toxicity to patients

Amer M.R., Akhras, N. S., et al. Antimicrobial stewardship program implementation in a medical intensive care unit at a tertiary care hospital in Saudi Arabia. Ann Saudi Med 2013. 33(6):547-554. doi: 10.5144/0256-4947.2013.547

ANTIMICROBIAL STEWARDSHIP

Antibiotic stewardship is the effort:

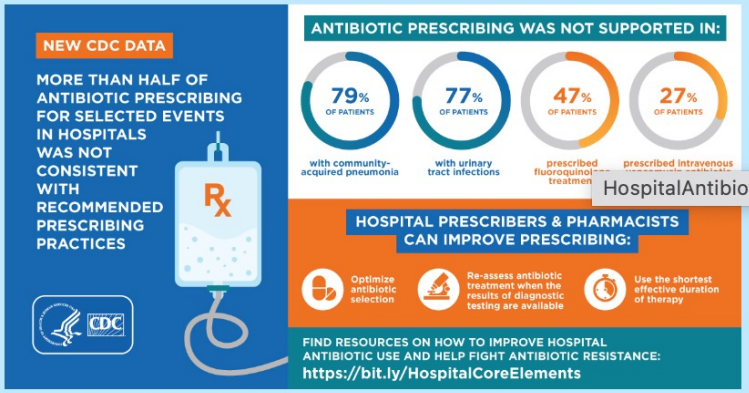
- To measure antibiotic prescribing.
- To improve antibiotic prescribing by clinicians and use by patients so that antibiotics are only prescribed and used when needed.
- To minimize misdiagnoses or delayed diagnoses leading to underuse of antibiotics.
- To ensure that the right drug, dose, and duration are selected when an antibiotic is needed.

Core Elements of Hospital Antibiotic Stewardship Programs

Print

The Core Elements of Hospital Antibiotic Stewardship Programs, 2019 [PDF – 40 pages]

Antibiotic Stewardship Program Assessment Tool (Print Only) [PDF – 8 pages]



New CDC data states more than half of antibiotic prescribing for selected events in hospitals was not consistent with recommended prescribing practices. Antibiotic

On This Page

HospitalAntibioticPrescribingData

ANTIMICROBIAL STEWARDSHIP

- It works!
- Is proven from multiple studies in acute care and in-patient settings.
- It is a safe and cost-effective strategy for improving the practice of prescribing antibiotics and to minimize the occurrence of multidrug resistance

Amer M.R., Akhras, N. S., et al. Antimicrobial stewardship program implementation in a medical intensive care unit at a tertiary care hospital in Saudi Arabia. Ann Saudi Med 2013. 33(6):547-554. doi: 10.5144/0256-4947.2013.547

ANTIMICROBIAL STEWARDSHIP

ANTIMICROBIAL STEWARDSHIP- OPD

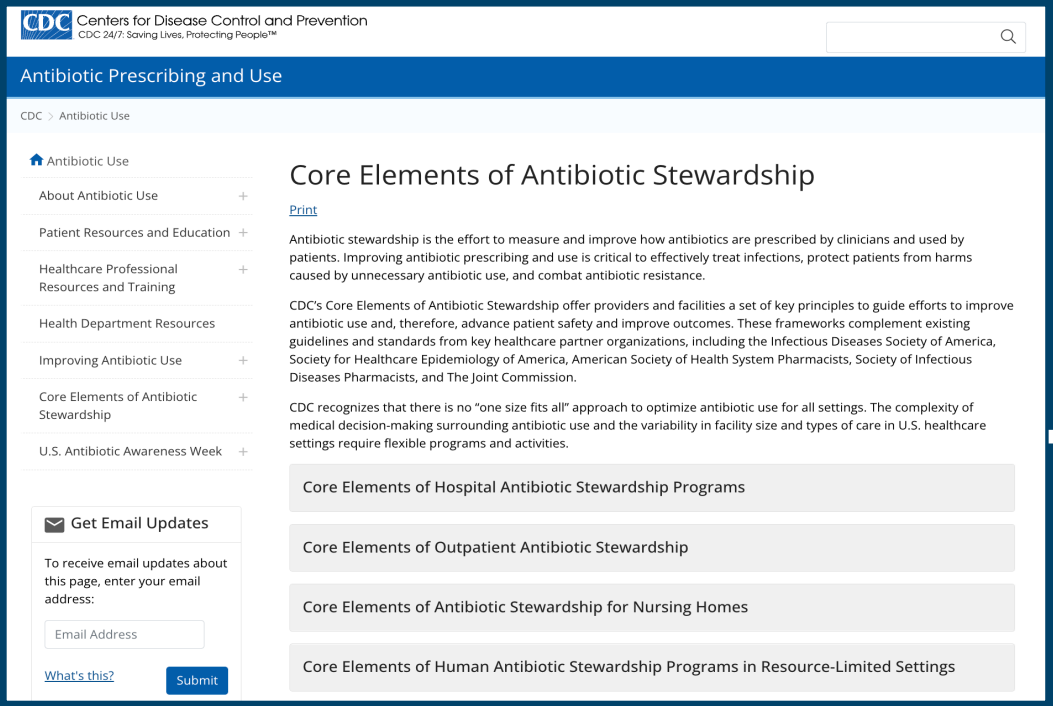
What about primary care and the outpatient setting?

ANTIMICROBIAL STEWARDSHIP- OPD

- Antimicrobial stewardship strategies have mainly focused on the hospital and post-acute care settings.

- Unfortunately, implementation of Antimicrobial stewardship in the primary care setting has been neglected.

- .In acknowledgment of the lack of attention to Antimicrobial stewardship in clinical settings outside of hospitals and post-acute care settings, the Center for Disease Control (CDC) released a framework addressing the **Core Elements of Outpatient Antibiotic Stewardship for outpatient facilities**


Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™
Antibiotic Prescribing and Use
CDC > Antibiotic Use
Antibiotic Use
About Antibiotic Use
Patient Resources and Education
Healthcare Professional Resources and Training
Health Department Resources
Improving Antibiotic Use
Core Elements of Antibiotic Stewardship
U.S. Antibiotic Awareness Week
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Core Elements of Antibiotic Stewardship
Print
Antibiotic stewardship is the effort to measure and improve how antibiotics are prescribed by clinicians and used by patients. Improving antibiotic prescribing and use is critical to effectively treat infections, protect patients from harms caused by unnecessary antibiotic use, and combat antibiotic resistance.
CDC's Core Elements of Antibiotic Stewardship offer providers and facilities a set of key principles to guide efforts to improve antibiotic use and, therefore, advance patient safety and improve outcomes. These frameworks complement existing guidelines and standards from key healthcare partner organizations, including the Infectious Diseases Society of America, Society for Healthcare Epidemiology of America, American Society of Health System Pharmacists, Society of Infectious Diseases Pharmacists, and The Joint Commission.
CDC recognizes that there is no "one size fits all" approach to optimize antibiotic use for all settings. The complexity of medical decision-making surrounding antibiotic use and the variability in facility size and types of care in U.S. healthcare settings require flexible programs and activities.
Core Elements of Hospital Antibiotic Stewardship Programs
Core Elements of Outpatient Antibiotic Stewardship
Core Elements of Antibiotic Stewardship for Nursing Homes
Core Elements of Human Antibiotic Stewardship Programs in Resource-Limited Settings


The Core Elements of Outpatient Antibiotic Stewardship
Appendix
National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion
CDC

ANTIMICROBIAL STEWARDSHIP- OPD

- The majority of antibiotic prescription occurs outside of hospitals and the most common indication is acute respiratory tract infections (ARIs).
- Therefore, primary care clinicians are critical players in addressing the problem of inappropriate antibiotic prescribing

Vent, M.L., Cosgrove, S.E., Price-Haywood, E.G. *et al.* Antimicrobial stewardship in the primary care setting: from dream to reality?. *BMC Fam Pract* **21**, 134 (2020). https://doi.org/10.1186/s12875-020-01191-0

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PRESCRIBING BEHAVIOR in the PRIMARY CARE

- Data from Saudi Arabia showed that despite good levels of awareness among physicians regarding MDR and the existence of local and national antimicrobial prescribing guidelines, a great proportion of them stated that they do not always comply with these guidelines.

- A communication from the National Institute for Health and Care Excellence (NICE) in the UK reported that 9 out of 10 general practitioners feel pressured to prescribe antibiotics and almost 100% of patients can get an antibiotic prescription on request.

NICE antimicrobial stewardship: right drug, dose and time? Lancet 2015;386:717

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ANTIBIOTIC PRESCRIBING BEHAVIOR in the PRIMARY CARE

Improving antibiotic prescribing at the point of care requires two strategies that complement each other:

- Changing the clinician behaviour and alleviating concerns related to diagnostic uncertainties; and,
- Educating patients and families about the role of antibiotics in medical care and their own wellbeing.

To optimise antibiotic use in the community. partnerships should be made with important stakeholders such as national and local health departments, health plans and payers (health insurance companies), patients, community pharmacies and pharmacists, local microbiologic laboratories and professional organizations as part of a collaborative approach

Vent, M.L., Cosgrove, S.E., Price-Haywood, E.G. *et al.* Antimicrobial stewardship in the primary care setting: from dream to reality?. *BMC Fam Pract* **21**, 134 (2020). https://doi.org/10.1186/s12875-020-01191-0

Avent *et al. BMC Family Practice* (2020) 21:134
https://doi.org/10.1186/s12875-020-01191-0

BMC Family Practice

DEBATE Open Access

Antimicrobial stewardship in the primary care setting: from dream to reality?

M. L. Avent[1,2*], S. E. Cosgrove[3], E. G. Price-Haywood[4,5] and M. L. van Driel[6]

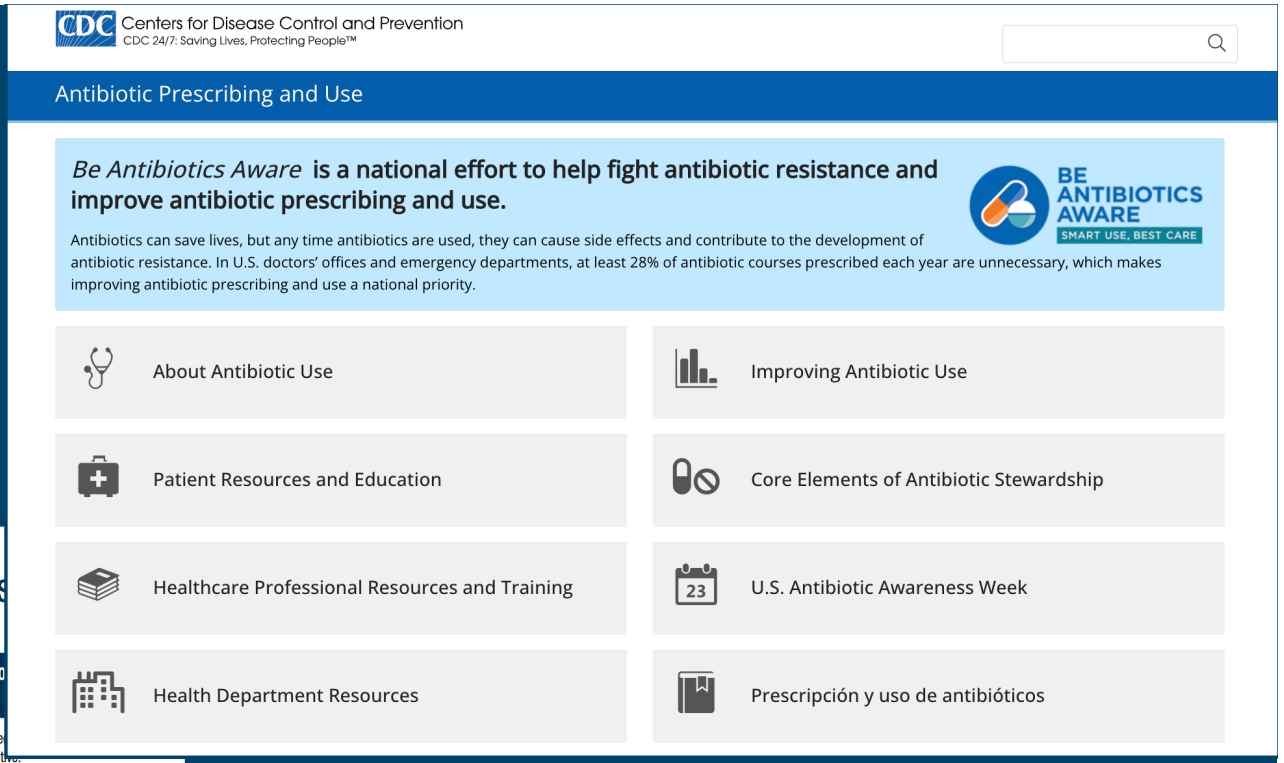
From: Antimicrobial stewardship in the primary care setting: from dream to reality?

Intervention	Impact on antibiotic use
Documenting clinical indications [16, 44]	Reduction in antibiotic prescribing.
Clinical prediction rules integrated into Electronic Health Records [18]	Reduction in antibiotic prescribing.
Clinical pathways/guidelines (print based or Electronic Health Record strategies) and patient education materials [17, 19, 32, 45, 46]	Reduction in antibiotic prescribing.
	Greater adherence to guidelines.
	Increase in appropriate antibiotic prescribing.
	Decrease in use of broad-spectrum antibiotics.

Appendix A. Supplemental Evidence Supporting Outpatient Stewards

Systematic Reviews

REFERENCE	INTERVENTIONS AND OUTCOMES	METHODS, PARTICIPANTS, AND SETTINGS	RESULTS	CONCLUSIO
Arnold SR, et al. **Interventions to improve antibiotic prescribing practices in ambulatory care.** *Cochrane Database Syst Rev* 2005. 4:CD003539.	**Interventions** • Physician educational materials • Audit and feedback • Educational meetings • Educational outreach visits • Financial and healthcare system changes • Physician reminders • Patient-based interventions • Multi-faceted interventions **Outcomes** • Improve selection, dose and duration of antibiotics prescribed • Reduce incidence of pathogens with antimicrobial resistance	**Methods** • Systematic review **Participants** • Healthcare consumers or primary care providers **Setting** • Primary care clinics and ambulatory care clinics	• 39 studies • Only small changes observed for single interventions using printed educational materials or audit and feedback. • Active educational interventions are more effective than nonactive interventions. • Delayed prescriptions effectively reduced antibiotic use by patients without negatively affecting patient outcomes. • Multifaceted interventions were more successful in decreasing inappropriate antibiotic prescribing.	• Multifacete… most effecti… • No single intervention is recommended for all settings.
Drekonja DM et al. **Antimicrobial stewardship in outpatient settings: a systematic review.** *Infect Control Hosp Epidemiol* 2015. Feb;36(2):142-52.	**Interventions** • Provider and or patient education • Provider feedback • Delayed prescribing • Communication skills training • Guidelines • Restriction Policies • Computerized clinical decision support • Financial incentives • Rapid diagnostics	**Methods** • Systematic review **Participants** • Primarily healthcare consumers and primary care providers **Setting** • Primary care clinics and ambulatory care clinics	• 50 studies • Stewardship programs using communication skills training and laboratory testing can lower antibiotic use. • Several stewardship interventions can effectively improve antibiotic prescribing. • Patient outcomes were not often reported, but did not appear to	• Outpatient antibiotic stewardship programs can improve antibiotic prescribing without negatively affecting patient outcomes. • Sustainability and scalability of specific interventions is less clear.



STRATEGIES IN THE OUTPATIENT SETTING

STRATEGIES IN THE OUTPATIENT SETTING

- Back-up prescribing or watchful waiting

- Education

  Providing educational resources on antibiotic prescribing to clinicians and patients and ensuring access to relevant expertise on optimising antibiotic prescribing is a core element of the CDC framework.

- Patient communication strategies should include a combination of evidence-based practice with effective patient communication

Vent, M.L., Cosgrove, S.E., Price-Haywood, E.G. *et al.* Antimicrobial stewardship in the primary care setting: from dream to reality?. *BMC Fam Pract* **21**, 134 (2020). https://doi.org/10.1186/s12875-020-01191-0

Acute Bronchitis Clinical Practice Guideline

*For COVID-19 assessment and management please refer to the MoH latest protocol

DEFINITION

Acute bronchitis is a **self-limitin**
individuals. It is characterized by
absence of chronic lung disease (
sinusitis or asthma).

CLINICAL PRESENTATION

Symptoms: Cough is the predo
the cough can persist for more th
increase in sputum production, is
present in the first few days in or
pneumonia. **Dyspnea**. **Wheeze**
pain on coughing.
Signs: General appearance can
reveal wheezing and rhonchi. Rh
consolidation on examination.

DIAGNOSIS

Uncomplicated acute bronc
active smoker, CHF, immunoco

Imaging: In general, it is n

Chest Xray should be co

- Alarming symptoms: moderat
  immunocompromised status,
  recent exposure to patient dia
- Mental status or behavioral ch
  symptoms.
- Abnormal vital signs: pulse >
  saturation <95%.
- Abnormal signs on chest exar

Diagnostic testing: Not routi

- **Testing for influenza A an**
  - Indicated in patients
    High risk defined as (
    who are pregnant or
    facilities, Native Ame
    with certain chronic
    kidney disease, immu
    immunosuppressive
  - Anti-viral treatment s
- **Testing for pertussis:** Not
  paroxysmal cough, whooping

Etiology

Viruses: About 90% of the ca
coronavirus, rhinoviruses, respi

Bacterial: From 1-10% of ca
pertussis, and *Chlamydophila p*

ACUTE RHINOSINUSITIS IN ADULTS CLINICAL PRACTICE GUIDELINE

DEFINITION

Acute rhinosinusitis (also commonly called sinusitis) is an inflammation of the mucosa in the paranasal sinuses and nasal cavity, primarily due to infectious cause, lasting >7-10 days and less than 4 weeks.

ETIOLOGY

Acute rhinosinusitis Etiology	
Viral (Most often)	Rhinovirus, adenovirus, influenza and parainfluenza virus.
Bacterial	*Streptococcus pneumoniae, Haemophiles influenzae,* and *Moraxella catarrhalis.*

The American Academy of Otolaryngology–Head and Neck Surgery (AAO-HNS) classification of rhinosinusitis based on symptom duration

Acute: symptoms lasting ≤ 4 weeks
Subacute: symptoms 4-12 weeks
Chronic: symptoms ≥ 12 weeks

DIAGNOSIS

CLINICAL PRESNETATION:
First few days viral and bacterial acute rhinosinusitis cannot be differentiated based on symptoms.

- Fever: can be present in the first several days in both viral and bacterial infection.
- Nasal discharge does not predict likelihood of bacterial sinus infection.
- Pattern of initial improvement followed by worsening of symptoms (**double sickening**, which occurs between 5-10 days since start of symptoms) is consistent with acute bacterial rhinosinusitis.
- Symptoms not improving 10 days after start of URTI has a probability of being bacterial infection.
- Localized and predominant unilateral sinus pain/tenderness is reliable for diagnosing bacterial sinusitis.

Risk Factors For Acute Bacterial Rhinosinusitis

- Dental infections and procedures.
- Sinus surgeries and procedures.
- Nasal packing.
- Mechanical ventilation.
- Immunodeficiency (e.g., HIV).
- Impaired ciliary motility: smoking, cystic fibrosis, immotile cilia syndrome.
- Mechanical obstruction: deviated nasal septum, nasal polyps, hypertrophic middle turbinates, tumors, trauma, foreign bodies.
- Preceding viral URTI.
- Allergic rhinitis.
- Vasomotor rhinitis

Source: AAFP 2016 Jul 15;94(2):57-105

DIAGNOSIS:
Uncomplicated acute rhinosinusitis is clinical diagnosis.

- **Viral:**
  - Presumed acute viral rhinosinusitis if symptoms less than 7 days and do not worsen.
  - Typically, it is self-limiting within 10 days.
- **Bacterial:** Presumed acute bacterial rhinosinusitis:
  - Severe symptoms (fever ≥ 39ºC, purulent nasal discharge ≥3-4 consecutive days).
  - Symptoms does not resolve after ≥10 days.
  - Worsening symptoms and signs following initial improvement (**double sickening**).
  - Unilateral cheek or maxillary tooth pain and purulent nasal discharge.

INVESTIGATINO

DIAGNOSTIC TESTING: Testing is not routinely required in simple acute rhinosinusitis unless indicated.

IMAGING:

- Radiographic imaging should not be routinely obtained in patients with uncomplicated acute rhinosinusitis.
- Positive results in imaging, such as fluid in sinuses, cannot differentiate between viral and bacterial sinusitis.
- Imaging with CT:
  - In patients with recurrent acute or chronic rhinosinusitis, CT sinuses without contrast is the imaging method of choice.
  - It is indicated only after completing maximal medical therapy, and primarily for surgical assessment. Additionally, it can be used to assess mechanical causes of recurrent chronic sinusitis.

NATIONAL ANTIMICROBIAL RESISTANCE COMMITTEE

وزارة الصحة
Ministry of Health
الإدارة العامة للرعاية الصيدلية
General Administration of Pharmaceutical Care

National Antimicrobial Therapy Guidelines for Community and Hospital Acquired Infections in Adults

National Antimicrobial Stewardship Program

ared by the Antimicrobial Stewardship Subcommittee of the National Antimicrobial Resistance

Committee and the General Administration of Pharmaceutical Care at Ministry of Health

_____ Hospital **Pharmaceutical Care Department** _____ Region **(Antibiotic Stewardship Program)** **Physician Order Form** (Please fill all applicable information and stick it on patient profile, and forward the copy to the Pharmacy Department within 24 hrs)	MRN. ☐☐☐☐☐☐☐☐ NAME: _____ AGE: ☐☐ SEX: ☐ M ☐ F NATIONALITY: _____ WEIGHT (ACTUAL/ESTIMATED) _____KG HEIGHT: _____CM ALLERGY: _____

Antibiotics order (Acute Bacterial Rhinosinusitis)

Culture: ❒ Pending ❒ (+) Culture ❒ (-) Culture ❒ Not sent

IDSA recommends that any of the 3 following clinical presentations be used to identify patients with acute bacterial vs. viral rhinosinusitis:

- Symptoms or signs persistent & not improving for ≥10 days
- *Severe* symptoms or signs for at least 3–4 days
- *Worsening* symptoms or signs OR "double sickening" for lasted 5–6 days and were initially improving)

Empiric Therapy for Acute Bacterial Rhinosinusitis (for renal failure patient appendix)

Severity	First line	Alternative
Mild cases	❒ Amoxycillin-Clavulanate 1000mg PO q12hr 5-7 days	❒ Cefuroxime axetil 500 mg PO q12hr for 5-7 days (Only if non-immediate-type and non-severe hypersensitivity reactions to penicillins) **OR** ❒ Doxycycline 100 mg PO q12hr for 5-7 days
Severe infection requiring hospitalization	❒ Amoxycillin-Clavulanate IV 1g q8 hr for 5-7 days	❒ Ceftriaxone 1–2 g IV q24 hr for 5-7 days (Only if non-immediate-type and non-severe hypersensitivity reactions to penicillins) **OR** ❒ Levofloxacin 500 mg PO/IV q24hr for 5-7 days (if immediate-type or severe hypersensitivity reaction to beta-lactams)

Physician Name: _____ pager/ mobile: _____
Physician signature: _____
Nurse name: _____ Nurse signature: _____
Date: ___/___/____ Time: _____ AM/PM

Physician/Pharmacist note:

_____
_____
_____
_____

Chow, AW; Benninger, MS; Brook, I; Brozek. "IDSA clinical practice guideline for acute bacterial rhinosinusitis in children and adults". *Clin infect dis 2012* **;54** (8): e72–e112

SUMMARY

SUMMARY

- Antimicrobial resistance is a growing public health problem globally and locally.
- Emergence of Multiple drug-resistance organisms in Saudi Arabia
- Inappropriate use of antibiotics is the main cause
- Antimicrobial stewardship is a safe and cost-effective strategy for improving the practice of prescribing antibiotics and to minimize the occurrence of multidrug resistance
- Primary care physicians play an major part in the solving the problem of inappropriate antibiotic prescribing.
- Strategies that can be implemented in outpatient setting.

ANTIBIOTIC RESISTANCE WHAT HEALTH WORKERS CAN DO

HANDLE ANTIBIOTICS WITH CARE

Antibiotic resistance happens when bacteria change and become resistant to the antibiotics used to treat the infections they cause.

1. **Prevent infections** by ensuring your hands, instruments and environment are clean
2. Keep your patients' **vaccinations** up to date
3. If you think a patient might need antibiotics, where possible, **test to confirm** and find out which one
4. Only prescribe and dispense antibiotics when they are **truly needed**
5. Prescribe and dispense **the right antibiotic at the right dose for the right duration**

www.who.int/drugresistance

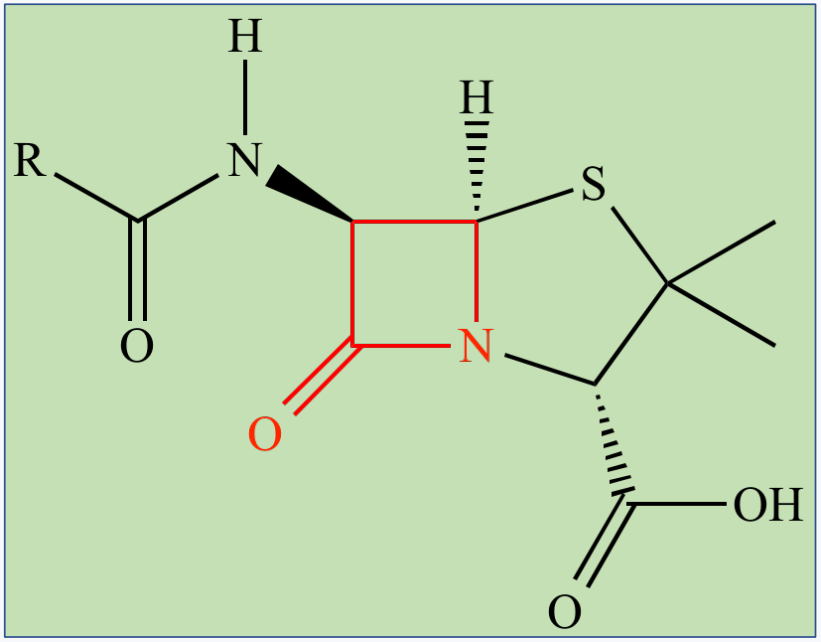
#AntibioticResistance

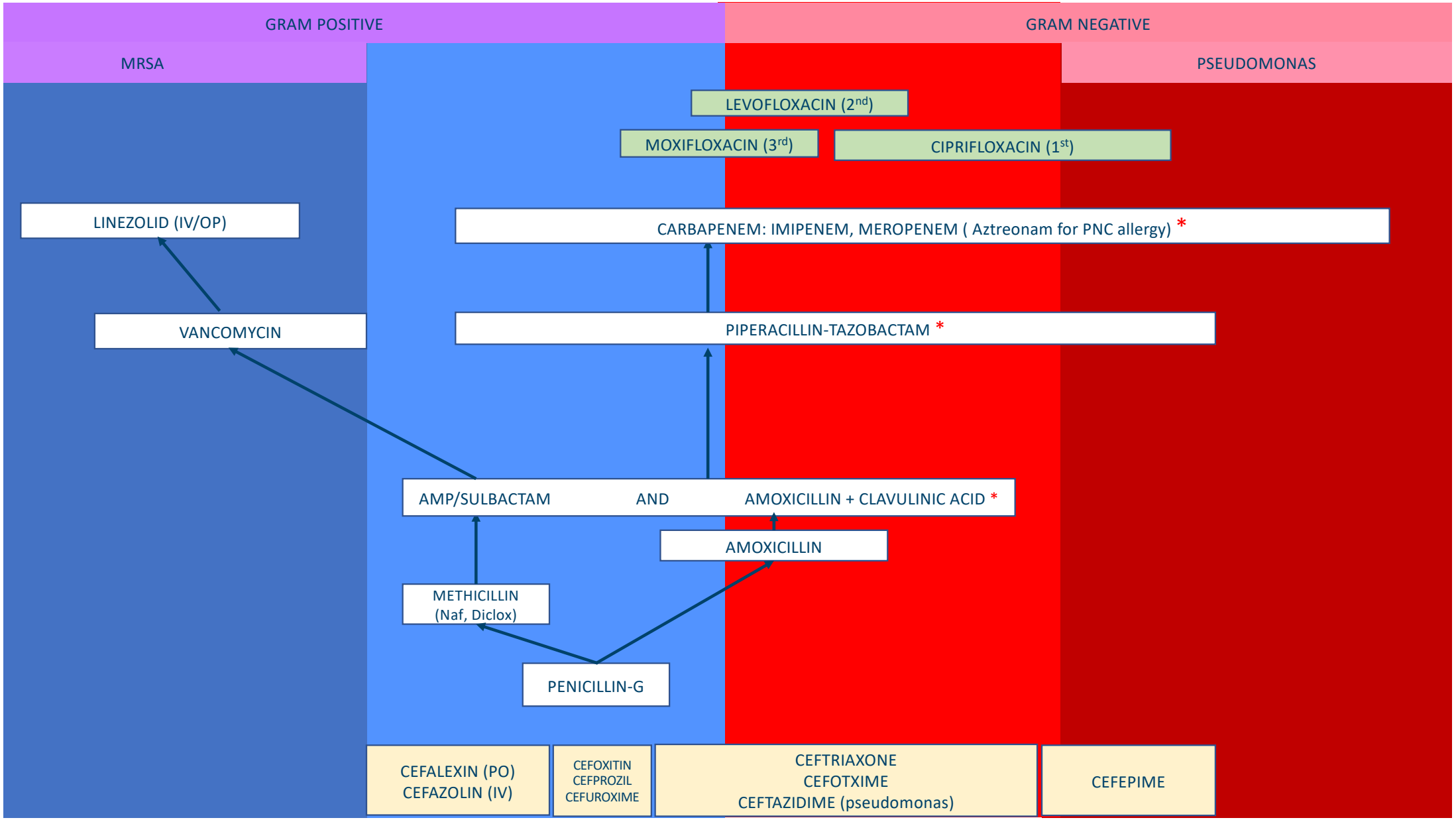
World Health Organization

Overview of Antimicrobials

DR. MARIAM BAGIS, MBBS, CCFP, COE, CRA

Beta-lactam ring




GRAM POSITIVE
GRAM NEGATIVE
MRSA
PSEUDOMONAS
LEVOFLOXACIN (2nd)
MOXIFLOXACIN (3rd)
CIPRIFLOXACIN (1st)
LINEZOLID (IV/OP)
CARBAPENEM: IMIPENEM, MEROPENEM (Aztreonam for PNC allergy) *
VANCOMYCIN
PIPERACILLIN-TAZOBACTAM *
AMP/SULBACTAM
AND
AMOXICILLIN + CLAVULINIC ACID *
AMOXICILLIN
METHICILLIN
(Naf, Diclox)
PENICILLIN-G
CEFALEXIN (PO)
CEFAZOLIN (IV)
CEFOXITIN
CEFPROZIL
CEFUROXIME
CEFTRIAXONE
CEFOTXIME
CEFTAZIDIME (pseudomonas)
CEFEPIME

Clinical Cases

Case #1

DR. GHADIR ALSABI
DR. AMMAR ABDULFATTAH AL KUBAISH, SBFM, ABFM.

A 24-year-old previously healthy university student presents to you

- 3-day history of a dry cough.
- Associated with malaise, headache, fever as well as muscle aches.

No other upper respiratory tract symptoms before this illness began (no rhinorrhea, sore throat, or conjunctivitis).

No episodes like this in the past
Her roommate developed the same symptoms 2 days ago.

On examination:
Temp= 39°C, HR= 102 beats, and RR= 24 .
You hear a few scattered rales in the right lung
No other abnormalities.

What are your differential diagnosis?

What is the most probable diagnosis?

A 24-year-old previously healthy university student presents to you

- 3-day history of a dry cough.
- Associated with malaise, headache, fever as well as muscle aches.

No other upper respiratory tract symptoms before this illness began (no rhinorrhea, sore throat, or conjunctivitis).

No episodes like this in the past
Her roommate developed the same symptoms 2 days ago.

On examination:
Temp= 39°C, HR= 102 beats, and RR= 24 .
You hear a few scattered rales in the right lung
No other abnormalities.

Community Acquired Pneumonia

Clinical Presentation:

- Systemic signs (fever, chills, Malaise and weakness)
- Respiratory Symptoms (Dyspnea, cough with or without sputum production, pleuritic chest pain)
- Signs and symptoms of pneumonia can be subtle in patients with advanced age or impaired immune systems.

Physical Examination:

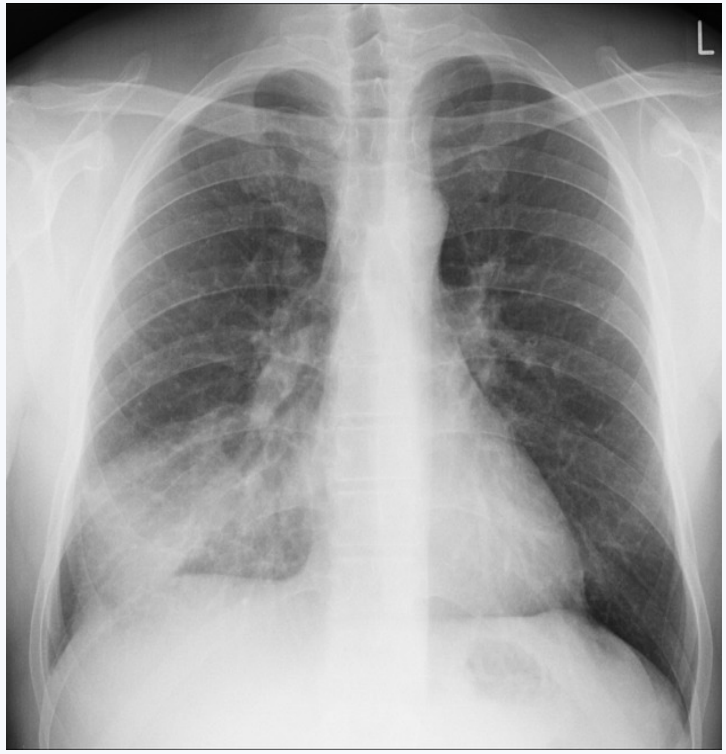
- Vital signs: fever, tachycardia, hypoxia, tachypnea
- Chest: crepitations, bronchial breath sounds, signs of consolidation, dullness to percussion, egophony.
- Patients with no vital sign abnormalities and normal lung examination are unlikely to have pneumonia

Let's go back to our patient!

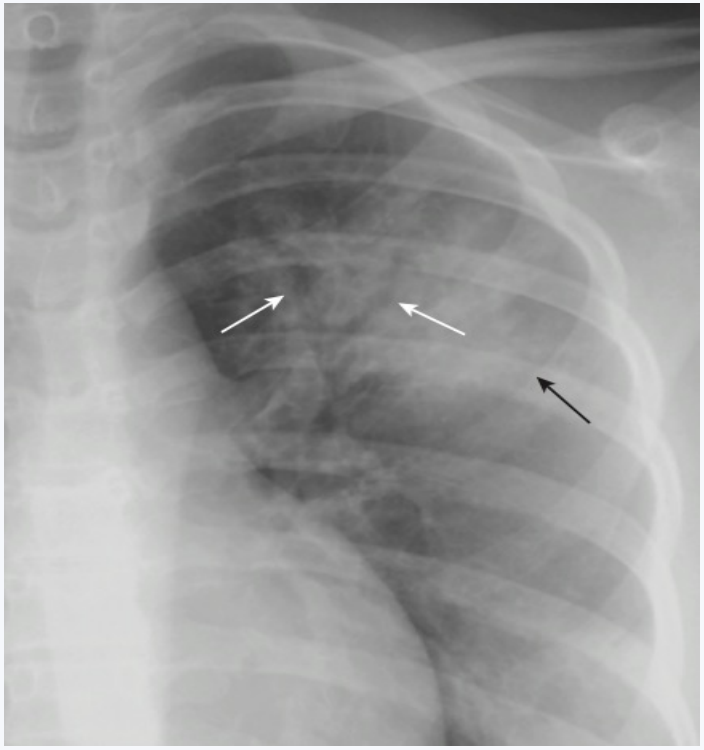
What do you think is the most cost- effective strategy in terms of confirming the diagnosis at the present time?

What do you expect to see?

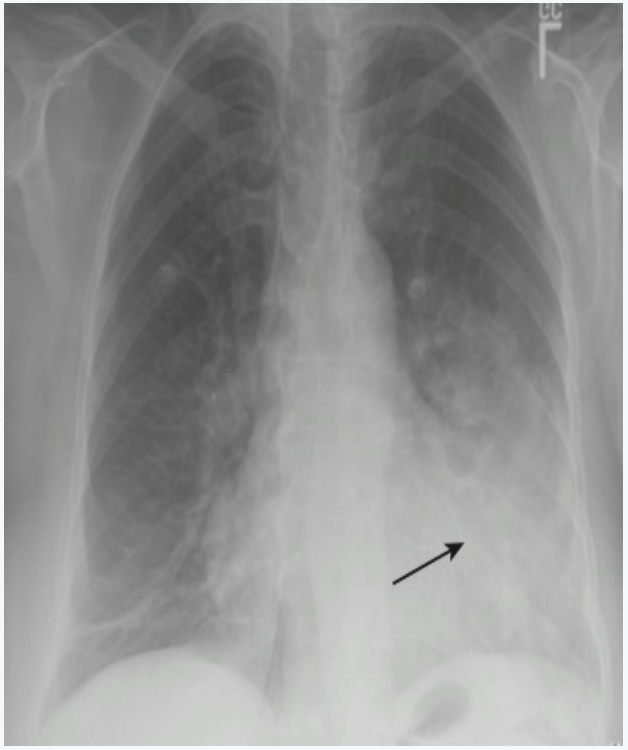
You ordered Chest X- ray which showed:



Right lobe opacity

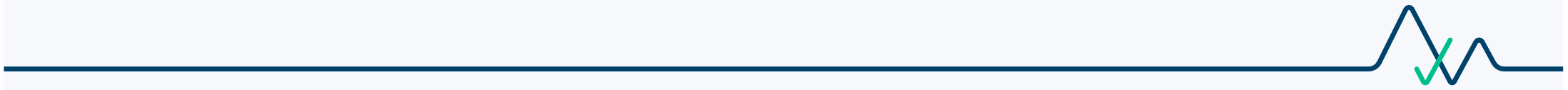


Air bronchogram



Silhouette sign

Would you like to order any additional tests?



Investigations:

- CBC, blood/ sputum cultures, and urinary antigen testing are not beneficial in patients with non-severe CAP.
- Unnecessary for most outpatients since The overall rate of pathogen detection is low at 30-40%
- *Recommended:* severe CAP, recent travel, local outbreak or hospitalized patients

Would you treat her as an inpatient or outpatient?

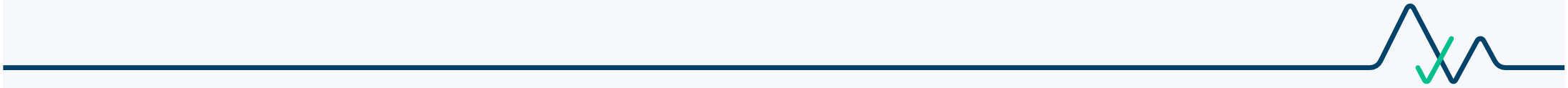
Scoring systems:

- Pneumonia Severity Index (need for hospitalization)
- CURB-65 (or CRB-65)
- ATS/IDSA criteria for severe CAP (predict the need for intensive care)

CURB-65

Confusion	1 point
Urea (BUN >19 mg/dL or 7 mmol/L)	1 point
RR ≥30 per minute	1 point
Blood Pressure diastolic ≤60 or systolic <90 mmHg	1 point
Age ≥65 years	1 point

Score	Risk	Disposition
0 - 1 points	1.5% mortality	Outpatient care
2 points	9.2% mortality	Inpatient care or Outpatient w/ close FU
3 - 5 points	22% mortality	Inpatient admission with consideration for ICU admission



Pneumonia Severity Index

Criteria		Points
Sex	Male	0
	Female	10
Demographic factors	Age	1 point for each year
	Nursing home resident	10
Comorbid conditions	Neoplastic disease	30
	Liver disease	20
	Congestive heart failure	10
	Cerebrovascular disease	10
	Renal disease	10
Physical examination findings	Altered mental status	20
	Respiratory rate > 30	20
	Systolic BP < 90	20
	Temperature < 35 or > 40	15
	Heart rate > 125 bpm	10
Laboratory and radiographic findings	Arterial pH < 7.35	30
	Blood urea nitrogen ≥30 mg/dL	20
	Sodium <130 mEq/L	20
	Glucose ≥250 mg/dL (14 mmol/L)	10
	Hematocrit <30 percent	10
	The partial pressure of arterial oxygen <60 mmHg or oxygen saturation <90%	10
	Pleural effusion	10

	Points Interpretation	
See note below	Class I: 0.1% mortality	Outpatient
0-70 points	Class II: 0.6% mortality	Outpatient
71-90 points	Class III: 0.9% mortality	Inpatient
91-130 points	Class IV: 9.3% mortality	Inpatient
131-405 points	Class V: 27% mortality	Inpatient

Pathogens that cause pneumonia:

Most common pathogens in adults	Less common pathogens
– Streptococcus pneumoniae 20-60% (most common bacterial cause) – Mycoplasma pneumoniae 1-40% – Chlamydia pneumoniae 4-10% – Haemophilus influenzae 3-10% – Legionella 2-10% – Moraxella catarrhalis 1-5% – Viruses	– Staphylococcus, MRSA – Gram-negative, Pseud, aeruginosa – Pneumocystis – Mycobacterium tuberculosis

Risk factor	Related pathogens
Alcoholism	Anaerobes, Klebsiella pneumoniae
Aspiration	Anaerobes
Bioterrorism	Bacillus anthracis (anthrax), Francisella tularensis (tularemia), Yersinia pestis (plague)
COPD	H. influenzae, M. catarrhalis
Exposure to farm animals or droppings	Histoplasma, Blastomyces, Coccidioides
Hotel or cruise ship travel in the past two weeks	Legionella
Influenza infection in past few weeks	S. aureus

Management:

Healthy outpatient adults without comorbidities:
No antibiotic use in past 3 months

- **First line:**
  - Azithromycin 500 mg once then 250 mg daily for 4 days

- **Alternative:**
  - Doxycycline 100 mg PO q12hr 5 days

- Efficacy of Shorter duration of treatment (5-7 days) is similar to that of longer courses
- Azithromycin has a slightly higher risk for arrythmias

Management:

Patients with comorbidities:
OR antibiotic use in past 3 months

•First line:

- High dose amoxicillin 1 g PO q 8 hrs

OR

amoxicillin-clavulanate 875/125 mg PO BID for 5-7 days

PLUS

- Azithromycin 500 mg once then 250 mg daily for 4 days

•Alternative:

- Levofloxacin 750 mg PO q24h for 5 days

- Before stopping therapy, the patient should be afebrile for >48h and clinically stable

Special cases:

Pregnant patients:

- Abx choices is similar to those used in nonpregnant patients
- However, the use of **tetracyclines**, **clarithromycin**, and the **fluoroquinolones** should be avoided.
- Combination of amoxicillin or amoxicillin/clavulanate plus azithromycin

Penicillin allergic patients:

- Doxycycline 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total)
- Clarithromycin 500 mg twice a day for 5 days
- Levofloxacin 500 mg twice a day orally for 5 day

Would you routinely repeat the CXR?

Follow up care:

•Within **24 to 48 hours** after being diagnosed
•To assess for improvement of symptoms (cough, SOB, chest pain), resolution of fever and normalization of HR, RR, oxygenation

Prevention:

Adults 65 years and older:

- Should receive both the 13-valent pneumococcal conjugate vaccine **(PCV 13)**

AND

- 23-valent pneumococcal polysaccharide vaccine **(PPSV 23)**
- preferably with PCV13 administered first, **followed** by PPSV23 in 12 months

- All adults should be immunized against influenza
- Smoking cessation

Prevention:

>65 y/o or 19 w/ comorbidities:

- 20 valent pneumococcal conjugate vaccine (PCV 20) **alone**

OR

- 15 pneumococcal conjugate vaccine (PCV 15) **followed** by 23 valent pneumococcal polysaccharide vaccine (PPSV23) *one year later*

- 13 valent pneumococcal conjugate vaccine (PCV 13) is no longer recommended
- Adults previously vaccinated w/ both PCV 13 AND PPSV 23 do not require PCV 20 or PCV15 vaccines
- Adults vaccinated only w/ PPSV 23 should receive a single does of PCV15 OR PCV20 one year after receiving PPSV 23

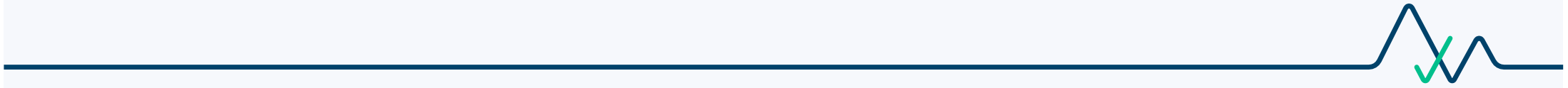
Case #2

DR. GHADIR ALSABI
DR. AMMAR ABDULFATTAH AL KUBAISH, SBFM, ABFM.

A 38 y/o male presents to the clinic w/ cough for 2 weeks. The cough was initially dry and accompanied by fever, sore throat and sneezing. Although the other symptoms have subsided, in the past week the cough has become productive of yellow sputum, especially in the morning, and cough severity has increased. The patient reports mild wheezing and chest pain after an episode of coughing. He denies difficulty breathing, hemoptysis, headache, nausea, abdominal pain. His past medical history is unremarkable, and he has no known allergies. He does not use alcohol or tobacco products. He works as an elementary school teacher and believes he may have been infected at work.

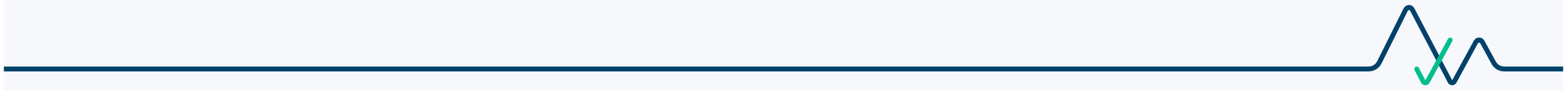
V/S:
RR= 17, HR= 90, BP= 126/88, T= 99F, O2= 96%

Chest auscultation= coarse rhonchi bilaterally at the lung bases.
No egophony or tactile fremitus. The throat is mildly edematous w/o exudate



What are your DDx?

What is your most probable Dx?



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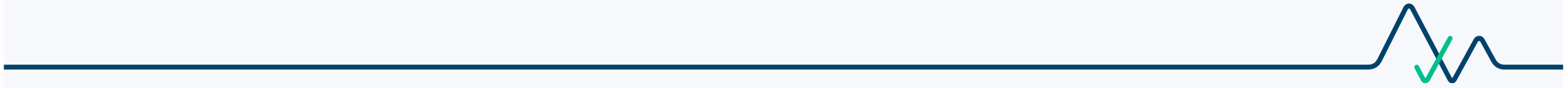


Acute Bronchitis

Overview:

An inflammation of the lower respiratory tract in which cough (with or without phlegm) is a predominant feature
The peak incidence of respiratory virus transmission is late fall and winter seasons.

What are the most commonly identified pathogens?

90% are viral: rhinovirus, enterovirus, influenza A and B, parainfluenza, coronavirus, and RSV
Bacteria: *Bordetella pertussis, Mycoplasma pneumoniae*, and *Chlamydia pneumoniae*

Assessment

History:

- ***Cough*** is the hallmark symptom
- May last for 1 to 3 weeks
- With or without sputum production (does not correlate w/ bacterial infection)
- May be preceded w/ URTI
- If a fever is documented at >37.8°C more evaluation is needed to look for other causes like influenza or pneumonia.

Assessment

Physical Examination:

General:

- May have low-grade fever, mildly ill

HEENT:

- Rhinitis, pharyngitis, or other symptoms indistinguishable from common cold

Lungs:

- Lung examination mostly useful for **R/O** other conditions

may detect wheezing or rhonchi that improve with coughing

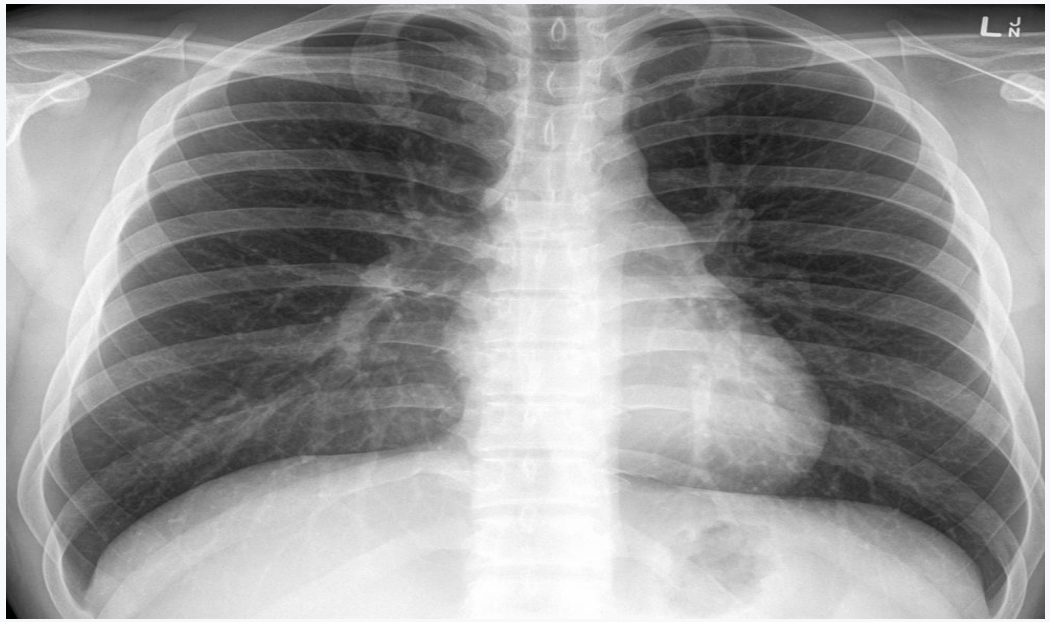
What further investigations should be done?

Imaging or laboratory testing **not recommended** unless pneumonia suspected

When is it indicated to do CXR?

- Dyspnea
- Bloody or rust colored sputum
- HR >100
- RR >24 breaths
- Temp > 37.8°C
- Focal consolidation, egophony, or fremitus on chest examination
- Altered mental status in the elderly

A chest X- ray was done to the patient which showed:



Lungs and pleural spaces are clear.
Normal cardio mediastinal contour

Do Abx have a role in Acute Bronchitis?

Management

- Antibiotics are not recommended (90% viral) unless pertussis is suspected
- Self-limited (resolve in 1 -3 wks)
- Reassurance and symptom control is a key

Supportive management for cold symptoms:

- Analgesics such as paracetamol or nonsteroidal anti-inflammatory drugs
  - May help relieve symptoms such as headache, malaise, muscle pain, joint pain

Management

Supportive management of cough:

Non-pharmacologic therapy:

Throat lozenges, Hot tea, Honey, Smoking cessation or avoidance of secondhand smoke

Pharmacologic therapy:

- Dextromethorphan or guaifenesin: uncertain benefit, help reduce requests for antibiotics
- Beta2 agonists: Limited evidence unless the patient has a known case of lung disease or evidence of wheeze or airway obstruction

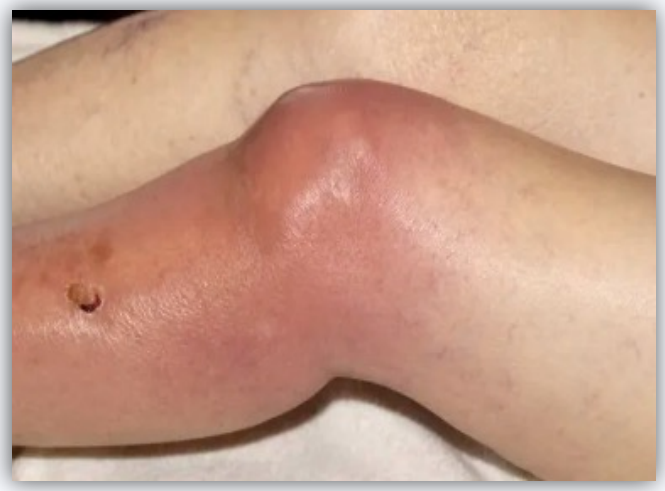
Follow up:

- Do not require follow up
- Recover without complications within 1 to 3 weeks
- Educated on features that warrant concern such as new-onset fever, difficulty breathing, symptoms lasting >3 to 4 weeks, or bloody sputum.

Case #3

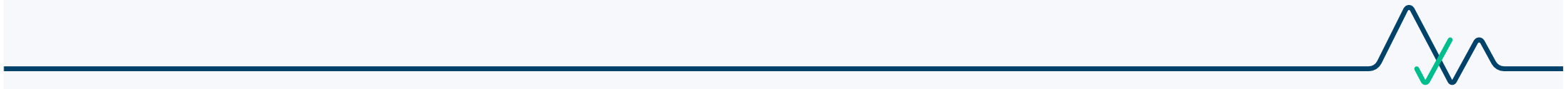
DR. GHADIR ALSABI
DR. AMMAR ABDULFATTAH AL KUBAISH, SBFM, ABFM.

A 45-year-old female with a history of rheumatoid arthritis, on chronic low-dose prednisone, presents to your clinic with 2 days of right knee pain. The patient reports that her knee has been swollen and painful to touch, and she now is having difficulty bearing weight due to the pain. She has had previous knee pain, but nothing this severe. She denies any trauma, fevers, chills, knee surgery, illegal drug use, or risk for std



On examination: she is well appearing, afebrile, and has a moderate right knee effusion with limited ROM. There is overlying erythema, and the knee feels warm to touch.

What is your differential diagnosis?



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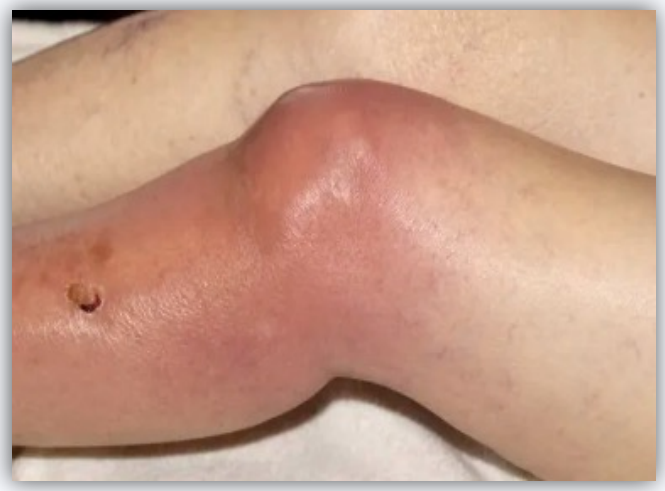


On examination: she is well appearing, afebrile, and has a moderate right knee effusion with limited ROM. There is overlying erythema, and the knee feels warm to touch.

Clinical Manifestations:

Signs and symptoms:

- Present acutely with a single swollen and painful joint
- Swelling, warmth, and restricted movement
- Most patients are febrile. However, older patients may be afebrile
- Usually present as monoarticular, but polyarticular infection occurs in approximately 20%
- knee is involved in more than 50 percent of cases; wrists, ankles, and hips are also affected commonly

Risk factors by mechanism of infection:

Direct inoculation:

- skin infection or ulcers
- previous intra-articular injection
- trauma
- prosthetic joints (< 24 months after placement)

Contiguous spread:

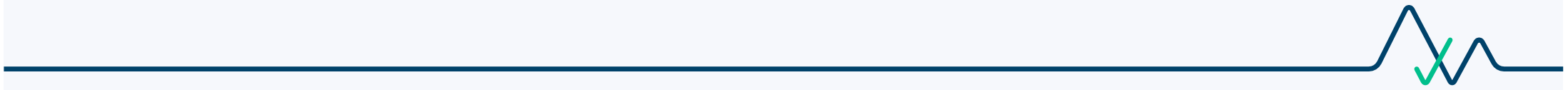
- Skin infection, cutaneous ulceration

Hematogenous spread:

- Diabetes mellitus
- HIV infection
- Immunosuppressive medication
- use Intravenous drug abuse
- Rheumatoid arthritis

What is your next step to confirm the diagnosis ?

You obtain 10 mL of cloudy synovial fluid that is sent to the lab for Gram stain, culture, cell count with differential, and crystal analysis. The Gram stain is negative with cultures pending. The synovial WBC count is 51,000/µL with >90% polymorphonuclear cells. The crystal analysis is negative. You obtain a peripheral WBC count that is 11,000/µL and an ESR is 55 mm/hr.



Making a diagnosis

Obtaining clinical specimens:
collection of synovial fluid and blood cultures should be performed prior to administration of antibiotics

Synovial fluid:
- obtained via arthrocentesis
- should be sent for Gram stain, bacterial culture, white blood cell count with differential, and assessment for crystals
- In the setting of septic arthritis, synovial fluid analysis typically demonstrates the following:

WBC count	**>20,000***
Percent neutrophils	**>75%**
Crystal examination by polarized microscopy	Negative
Stain, culture for microorganisms	culture is (+) > 60% of patients with nongonococcal bacterial arthritis

Making a diagnosis

Laboratory Evaluation:

- CRP and ESR are > 90% sensitive at a cutoff value of 20 mg/L and 15 mm/hour respectively
- Not diagnostic
- Helpful in ruling out septic arthritis

Making a diagnosis

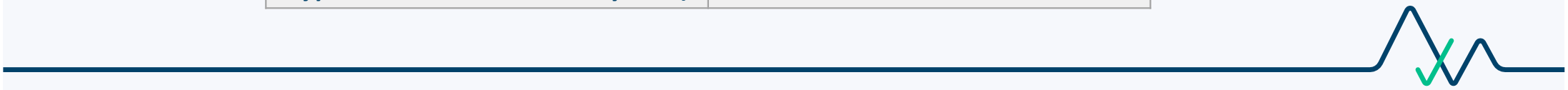
What about imaging?

- Plain radiography establishes a baseline and can evaluate for fractures evaluation of concurrent bone and joint disease
- No imaging finding is pathognomonic

Microbiology:

What is the most common cause of septic arthritis?

Staphylococcus aureus	Healthy adults, skin breakdown, previously damaged joint (eg, rheumatoid arthritis), prosthetic joint
Streptococcal species	Healthy adults, splenic dysfunction
Neisseria gonorrhoeae	Healthy adults (particularly young, sexually active)
gram-negative bacteria	older patients, IV drug users
Fungal species (*Candida, Cryptococcus,* coccidioidomycosis)	Immunocompromised hosts



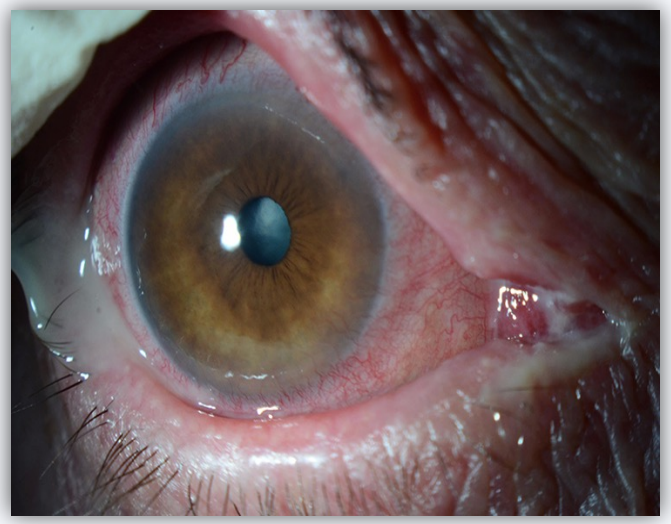
Management:

- Empiric systemic antibiotics should be initiated **after** obtaining synovial fluid if there is a clinical concern for septic arthritis
- Selection of antibiotics is based on the initial Gram stain of synovial fluid
- Subcartilaginous bone loss, cartilage destruction, and permanent joint dysfunction can occur if appropriate antibiotic therapy is not initiated within **24 to 48 hours** of onset
- Transfer the patient to the in-patient care for appropriate IV antibiotics

Case #4

DR. GHADIR ALSABI
DR. AMMAR ABDULFATTAH AL KUBAISH, SBFM, ABFM.

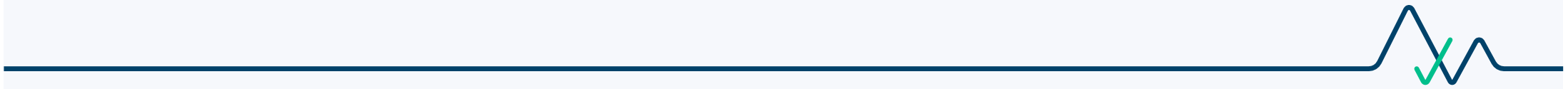
A 17-year-old girl comes to your office with a 1-day history of red eye. She describes not being able to open her right eye in the morning because of crusting and discharge. The right eye feels swollen and uncomfortable, although there is no pain.
She denied photophobia, use of contact lenses



On examination:

She has a significant redness and injection of the right bulbar and palpebral conjunctivae.
There is a mucopurulent discharge present. No corneal opacity or distorted pupil shape.
Her visual acuity is normal.
Normal pupillary light reflex

What is her most probable cause of her symptoms?



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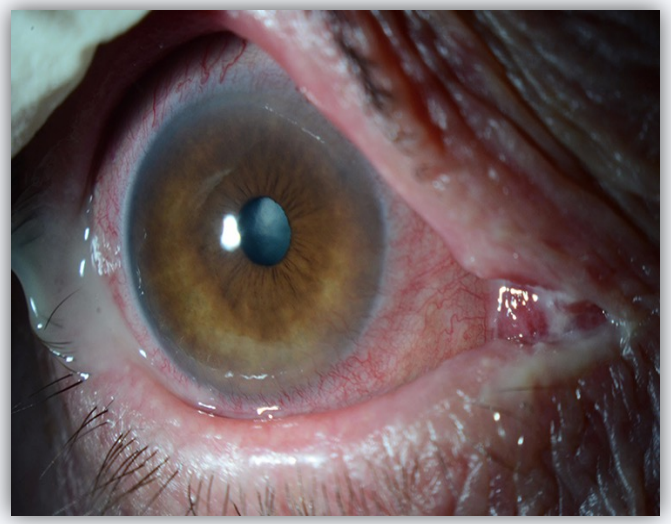

On examination:

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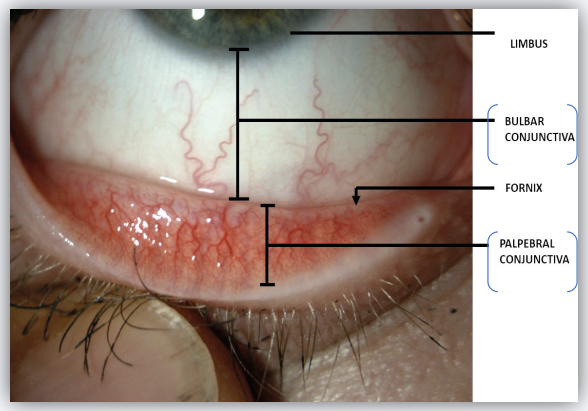
There is a mucopurulent discharge present. No corneal opacity or distorted pupil shape.
Her visual acuity is normal.
Normal pupillary light reflex

Bacterial Conjunctivitis

History:

- Morning crusting, daytime redness and discharge
- Unilateral/ bilateral
- character of the ocular discharge
- Burning and gritty feeling or itching (viral and allergic conjunctivitis)
- Trauma
- Contact lenses use



Examination:

- Diffuse conjunctival injection involving the bulbar as well as the palpebral conjunctiva (the mucus membrane on the inner surface of the lids).
- If injection is localized → (other DDx: foreign body, pterygium, or episcleritis)
- Purulent discharge
- **visual acuity is preserved**, normal pupillary reaction

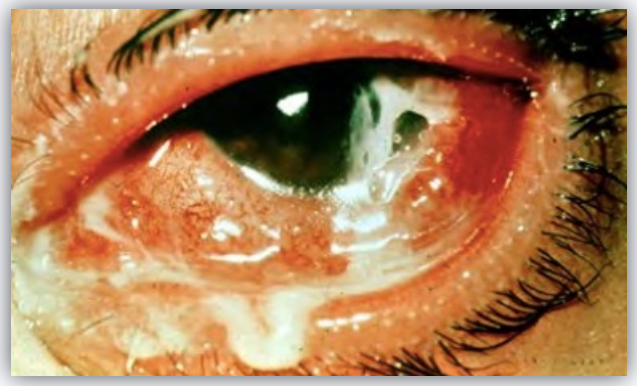
Viral conjunctivitis vs bacterial conjunctivitis :

	Bacterial	Viral
Systemic symptoms.	Usually none.	May be part of a viral prodrome followed by adenopathy, fever, pharyngitis, and upper respiratory tract infection. There may be an enlarged and tender preauricular node.
Itching.	Limited to none.	Limited to none. Primary complaint is grittiness, burning or irritation.
Ocular discharge.	Purulent, may be yellow, white, or green. Recurs at lid margins and corners of the eye within minutes of wiping lids.	Watery with strands of mucus.
Conjunctival appearance.	Pink or red.	Pink or red. Very rarely hemorrhagic. Tarsal conjunctiva may have a follicular or "bumpy" appearance.

Common Causes:

- **Adults:** Staphylococcus aureus
- **Children:** Streptococcus pneumoniae and Haemophiles *influenzae*, and *Moraxella catarrhalis*
- Highly contagious, spread by direct contact with the patient and their secretions or with contaminated objects and surfaces

- ***N. gonorrhoeae*** can cause **Hyperacute bacterial conjunctivitis**
    - Severe and sight-threatening, requiring immediate ophthalmologic referral
    - Transmitted from the genitalia → hands → eyes.
    - Concurrent urethritis is typically present
    - Characterized by a profuse purulent discharge + redness, lid swelling, chemosis and tender preauricular adenopathy



Do you need to confirm your Dx with laboratory tests?

Management

- Preventing contagion
- Stop contact lens use until infection is resolved and remains free of discharge for 24h
- Bacterial conjunctivitis is self-limited in most cases, although topical antibiotics may shorten the clinical course

- **Erythromycin** 5 mg/gram ophthalmic ointment
  - Dose: 0.5 inch (1.25 cm) 4 times daily for 5 to 7 days

OR

- **Trimethoprim-polymyxin B** drops
  - 1 to 2 drops 4 times daily for 5 to 7 days

OR

- **Ciprofloxacin** 0.3% ophthalmic drops (preferred agent in contact lens wearer)
  - 1 to 2 drops 4 times daily for 5 to 7 days

Management

- Patients should respond to treatment within 1-2 days by showing a decrease in discharge, redness, and irritation. At this point it is reasonable to reduce the dose from 4 times daily to twice daily
- F/U 2-3 days initially, then every 5-7 days until it resolves
- Patients who do not respond should be referred to an ophthalmologist

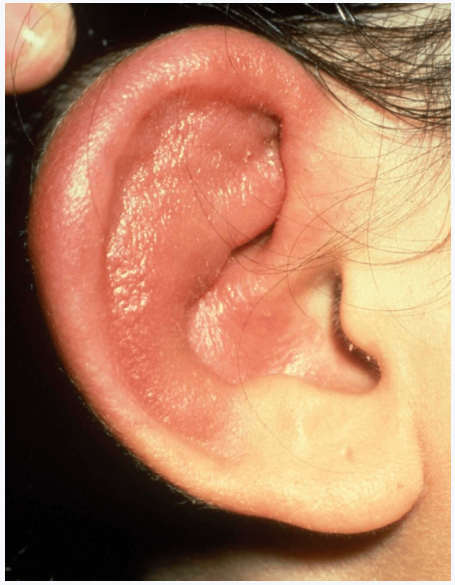
Urgent Ophthalmology Referral:

- Reduction of visual acuity **(i**nfectious keratitis, iritis, angle-closure glaucoma**)**
- Ciliary flush
- Photophobia
- Severe foreign body sensation that prevents the patient from keeping the eye open
- Corneal opacity
- Fixed pupil
- Severe headache with nausea

Case #5

DR. LATIFA ALANAZI
DR. MESHARI FAHAD ALSHURAIM

27 years old lady previously medically and surgically free attended to the clinic complaining of **3 days Hx** of right ear pinna **redness, swelling and sever pain**. Patient denies any hearing loss, ear discharge or tinnitus, patient denies any dizziness or vertigo. She is concern about the look as she had **ear piercing** 4 weeks ago and her ear is severely red and swelled, *she is afraid that it might be permanent.*



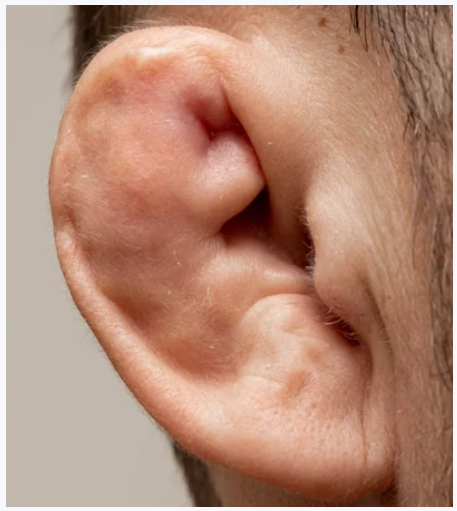
Upon examination
the patient had an inflamed, erythematous and **tender right auricle**. **The lobule remains unaffected**. pre- and post-auricular lymph nodes were enlarged and tender. However mastoid and temporal bones were not tender. Examination of the rest of the ear was normal, tympanic membrane was intact, and hearing was not impaired. She was afebrile and all other systemic examinations were normal.

Case 5:

What is your best management plan?

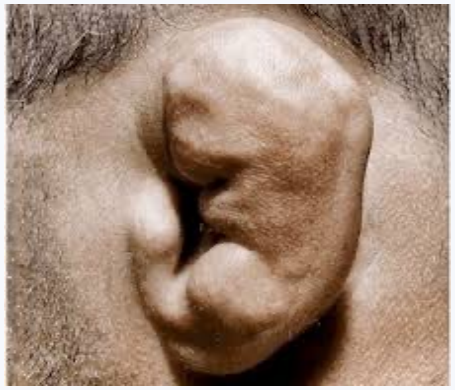
A) CT Head
B) Topical fluroquinolones
C) Oral amoxicillin and clavulanic acid
D) Systemic antibiotics with referral to ENT
E) Reassurance and follow up

Case 5: Perichondritis



Perichondritis is an infection and inflammatory condition of the external ear that requires prompt diagnosis and treatment. Delays can result in cartilage necrosis with **subsequent deformities** of the ear.
The blood supply to cartilage is provided by the perichondrium. Swelling caused by infectious or inflammatory processes, especially an abscess separating the perichondrium from both sides, can lead to avascular necrosis and a **deformed pinna in a matter of weeks.** (Cauliflower ear).

Treatment



Includes prompt referral to ENT, systemic, and possibly IV antibiotics.
Incision and drainage and input from the plastic surgery team if there is abscess formation.
Antibiotic therapy usually includes ciprofloxacin or other fluoroquinolone as the most likely organism is *Pseudomonas aeruginosa.*

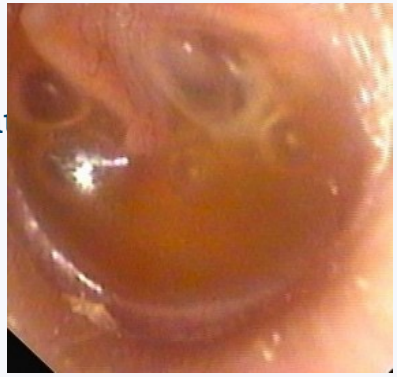
Staphylococcus aureus and *Escherichia coli* can also be implicated.

Case #6

DR. LATIFA ALANAZI
DR. MESHARI FAHAD ALSHURAIM

Case 6:

18 months old boy is brought to the clinic because he has been pulling his ears. 2 weeks ago, he patient was taken to an urgent care center for fever and irritability and was found to have acute otitis media of the right ear. He **completed the prescribed course of amoxicillin, with resolution of symptoms.** However, for the past few days, the patient has been tugging at both of his ears, and his parents are concerned that he may have another ear infection. Temperature is 36.8 C. On otoscopic examination, air fluid levels are visible posterior to both tympanic membranes which appear translucent and gray. Pneumatic insufflation demonstrates reduced mobility of tympanic membranes bilaterally. Both external ear canals are clear. The remainder of the examination is unremarkable.



Which of the following is the best next step in management of this patien

A) Additional antibiotic course.
B) Glucocorticoid therapy.
C) Intranasal decongestant.
D) Observation and follow up.
E) Tympanostomy tube placement.

Reference: Uworld

Case 6 : Otitis Media with Effusion

This patient has otitis media with effusion (OME), defined by middle ear fluid without tympanic membrane inflammation (eg, bulging, erythema). Young children, particularly age 6-24 months are predisposed to fluid accumulation within the middle ear due to narrow straight Eustachian tubes that drain poorly. Most effusions develop in the setting of a viral infection or following an episode of acute otitis media.
OME is typically asymptomatic but may cause mild discomfort (ear tugging and pulling as seen in this patient) due to pressure on tympanic membrane. Because effusion limit TM vibration, conductive hearing loss is also common. OME does not cause fever or sever ear pain. Physical examination reveals air-fluid levels posterior to TM and poor TM mobility on pneumatic insufflation. In contrast to acute otitis media, the effusion in OME is non purulent, and TM is not bulging or erythematous.
OME usually resolves within weeks and does not require treatment. However, patient **should be observed** with **follow up** for resolution because chronic OME (> 3 months) can cause speech delay and long term hearing loss. Tympanostomy tube placement is warranted for chronic OME with associated hearing loss.

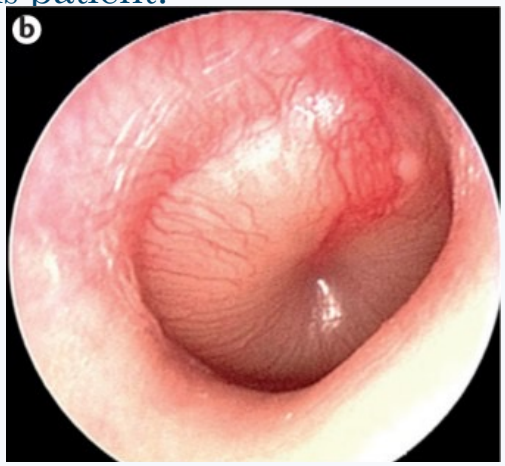
Case #7

DR. LATIFA ALANAZI
DR. MESHARI FAHAD ALSHURAIM

Case 7:

A 12-month-old girl is brought to the office due to 3 days of fever, rhinorrhea, and nasal congestion. The patient completed a course of oral antibiotics for an ear infection 3 weeks ago and was noted to have a persistent middle ear effusion at a well child visit last week. There is no history of additional infections or medical conditions. She has no allergies. Both parents smoke cigarettes and both older siblings received Tympanostomy tubes as infants. **Temperature is 39.4 C**. The patient is irritable but easily consoled by her mother. External ear examination is unremarkable, and external ear canals are patent. Otoscope shows **bilateral bulging and erythematous tympanic membranes** with poor mobility on insufflation. The oropharynx appears normal without lesions or sores, and the lungs are clear to auscultation. Which of the following is the most appropriate next step in management of this patient?

A) Oral antibiotics
B) Ototopical antibiotics
C) Supportive care and observation.
D) Temporal CT scan
E) Tympanocentesis and culture
F) Viral nasopharyngeal PCR testing.



Reference: Uworld

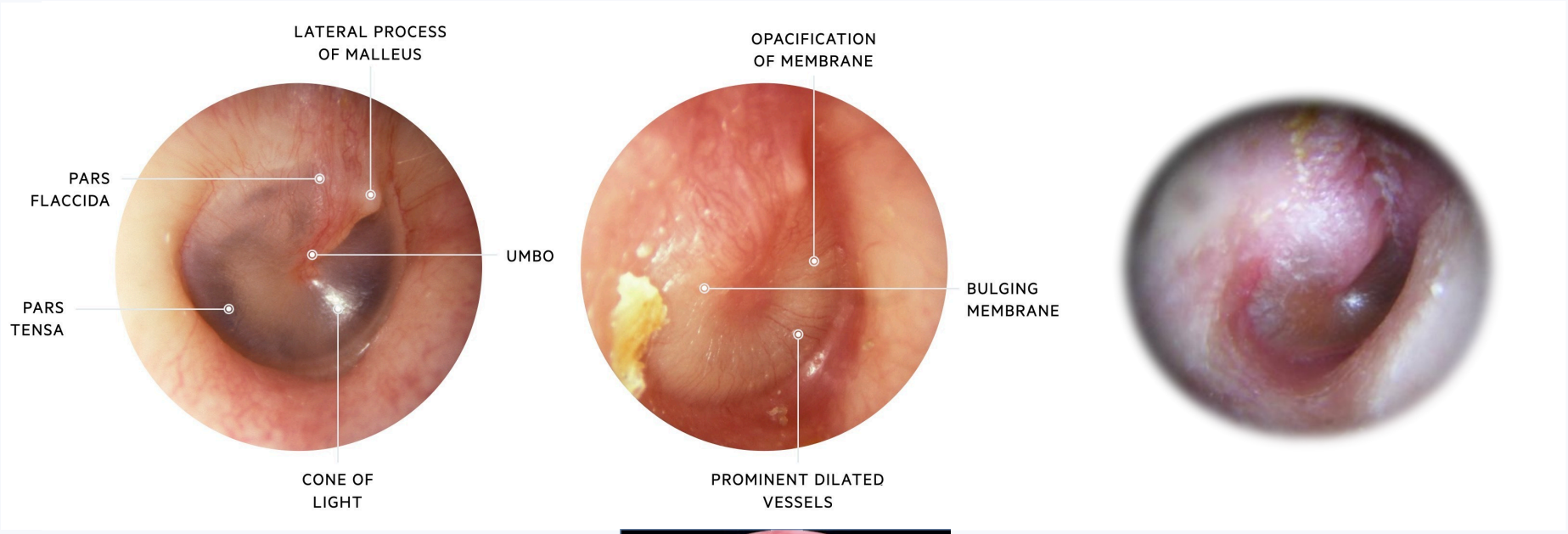
Case 7 : Acute Otitis Media

Acute otitis media (AOM) is common in children age 6-18 months because their eustachian tubes are straight and drain poorly. Risk factors include day care attendance, cigarette smoke exposure and recent URTI. Common pathogens include ***streptococcus pneumonia, nontyapeable haemophilus influenzea, and Moraxella catarrhalis***.

Diagnosis is confirmed on otoscopy by visualization of a **bulging tympanic** membrane and/or the presence of middle ear effusion (indicated by poor TM mobility on insufflation) with **TM inflammation (eg, erythema).** Treatment with oral antibiotics is recommended in specific situation:

- First line therapy with amoxicillin is indicated for infants age < 6 months and for children age or >6 months old with high fever (>39 C), sever pain, or bilateral disease.
- Second line therapy with amoxicillin clavulanate is indicated for refractory symptoms or recurrent AOM (within 30 days) after antibiotic therapy.

Therefore, this patient with high fever and recurrent, bilateral AOM after recent antibiotics warrants a course of oral amoxicillin-clavulanate.


LATERAL PROCESS
OF MALLEUS
PARS
FLACCIDA
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OPACIFICATION
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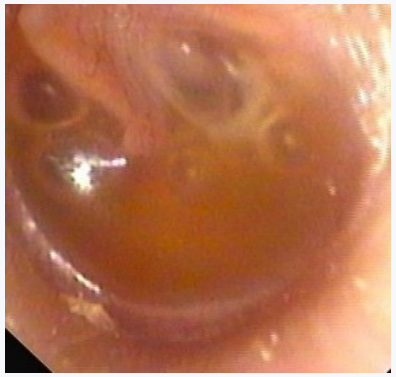
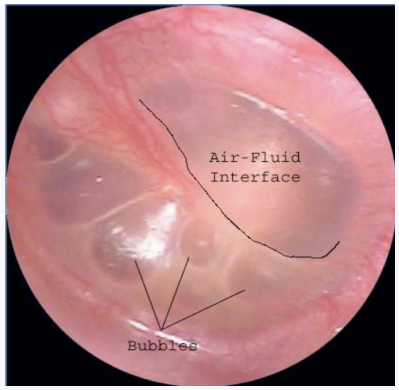
MEMBRANE
PROMINENT DILATED
VESSELS




Air-Fluid
Interface
Bubbles

Management of Otitis Media

First:

- It's a **clinical diagnosis**, generally no investigations indicated.
- Explain the condition to the patient and their family, as well as the fact that it is generally self-limiting. Normally the illness lasts 3 days but it may last up to a week.
- Analgesia and antipyretics are advised. Paracetamol and ibuprofen (in absence of contra-indications) at appropriate doses can be used.

In all cases give safety netting advice to return if symptoms worsen, do not improve after 3 days or the patient becomes systemically unwell.

What about Antibiotics?

- Guidelines from AAFP and American academy of pediatrics (AAP) recommends observation first 24-48 hours in mild symptoms is consensus, but controversial. In our region with low health literacy and difficult access to care, best to start antibiotics right away if diagnosis made by Hx and exam of TM.
- Guidelines advise to give antibiotics in sever symptoms, AAP defines severe symptoms as severe ear pain for more than 48 hours and temp >39.

Management of Otitis Media in Children

Age	Symptom severity	Laterality	Management
6m-23m	Severe	>	Antibiotics
	Non-severe	Unilateral	Antibiotics / Observe
		Bilateral	Antibiotics
>24m	Severe	>	Antibiotics
	Non-severe	Unilateral / Bilateral	Antibiotics / Observe

- ❑ AAP defines severe symptoms as severe ear pain for more than 48 hours and temp >39.
- ❑ AOM may be treated with close observation only in children without sever signs or symptoms.
- ❑ First line antibiotic choice for AOM is high dose amoxicillin (90 mg/kg/d)
- Children younger than 24 months: 10 days course
- Children 2 to 5 years: 7 days course
- Children older than 5 years with mild symptoms: 5 days course.

The essentials: Section 10 Chapter 6 & Uptodate

Management of Otitis Media, Antibiotics Choice?

No Penicillin allergy		Penicillin allergy
First-line	Amoxicillin: 80mg-90mg/kg per day in two divided doses	Cefdinir: 14mg/kg per day, either one dose OR two divided doses Cefuroxime: 30mg/kg per day in two divided doses Cefpodoxime: 10mg/kg per day in two divided doses Ceftriaxone IM or IV: 50mg/kg per day for 1-3 days (max dose 1g per day)
Amoxicillin use in previous 30 days OR **Purulent conjunctivitis** OR **Treatment failure at 48- 72 hours**	Amoxicillin/Clavulanate: 90mg/kg 6.4mg/kg per day in two divided doses	Ceftriaxone IM or IV: 50mg/kg per day for 1-3 days (max dose 1g per day)
Treatment failure at 48- 72 hours		Ceftriaxone IM or IV: 50mg/kg per day for 1-3 days (max dose 1g per day) Clindamycin: 30-40mg/kg per day in three divided doses for 3 days Tympanocentesis for middle ear fluid culture

As per Uptodate Suggested Maximum dose of Amoxicillin is 3 g/day

When to Admit?

When to Admit?

NICE CKS advise the following patients <u>should be admitted</u> for treatment:

- People with a severe systemic infection.
- People with suspected acute complications of acute otitis media (AOM), such as meningitis, mastoiditis, intracranial abscess, sinus thrombosis or facial nerve paralysis.
- Children younger than 3 months of age with a temperature of 38°C or more.

NICE CKS advise the following patients are <u>considered for admission</u>:

- Children younger than 3 months of age.
- Children 3–6 months of age with a temperature of 39°C or more.

Reference: NICE Clinical Knowledge

Management of Otitis Media in Adults

- No evidence to suggest observation as an option for adults, so AOM in adults should be treated with antibiotics.
- Amoxicillin remains the first line antibiotic.

Antibiotic choice in Adults?

- If no antibiotic use in the last 1-3 months adults: amox first line, or amox-clav. Duration: 10 days
- In case if antibiotic has been used in the past 1-3 months, or failed response to amox (Abx takes up to 72 for response), start with amox-clav.
- In case of refractory: levoflocxaxin BID x 5 days.

When to Refer?

When to Refer?

Persistent AOM: Those with **persistent symptoms of AOM should be referred to ENT**, particularly if lasting longer than 6 weeks or there is persistent hearing loss.

Recurrent AOM: ENT referral for specialist management should be considered for those with recurrent AOM.

- Pediatric patient with ≥4 cases of AOM per year or CSOM → refer to ENT to consider myringotomy with tube as per AAP to prevent early hearing loss and affect on language development in ages 6-24 months.
- In Adults recurrent AOM defined as > 2 episodes per year or if there is evidence of otitis media with effusion persisting for more than 6 weeks to rule out postnasal eustachian tube obstruction.

If nasopharyngeal cancer is suspected an urgent referral to ENT is required. NICE advises high suspicion if:

- Persistent symptoms and signs of otitis media with effusion (OME) in between episodes (for example, conductive hearing loss) due to obstruction of the eustachian tube orifice.
- Chronic OME in an adult. (may suggest nasopharyngeal mass)
- Persistent cervical lymphadenopathy (usually in the upper levels of the neck).

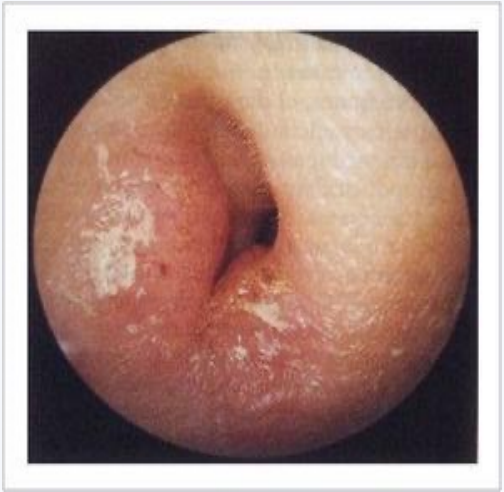
Case #8

DR. LATIFA ALANAZI
DR. MESHARI FAHAD ALSHURAIM

Case 8

35 Years old lady comes to the office due to left ear pain and itching that began yesterday. The patient is an avid long distance runner and uses earbuds to listen to music while training. After a long run yesterday she took out her earbuds and noticed a thick green discharge on the left side. She used cotton tipped applicators to clean out both ears. This morning she was unable to insert her left earbud due to significant pain. She takes no medications. Temperature is 37 C, blood pressure is 110/70, and pulse is 70/min. Examination of the left ear causes significant pain. The ear canal is red and swollen, with green drainage that obscures the tympanic membrane. The right ear appears normal. The scalp and hair are normal. Which of the following is the most likely diagnosis?

A) Acute otitis externa.
B) Allergic contact dermatitis
C) Otitis media with effusion.
D) Relapsing polychondritis.
E) Tympanic membrane perforation.



Reference: Uworld

Case 8: Otitis Externa

This patient with rapid onset ear pain, pruritus/itchiness, purulent drainage, external auditory canal swelling, and erythema has acute otitis externa (OE), Also known as "swimmer's ear". The best known risk factor for OE is swimming in outdoor water sources, which alters the ear canal PH -Low pH (acidic) environment is normal in external ear- introduces bacteria into ear canal and causes skin maceration. However, other conditions that disrupt the skin barrier (trauma from cotton tipped applicator) or retain moisture in the canal (headphone use while sweating) can also increase the risk.
Pseudomonas aeruginosa is the most common pathogen in OE, followed by staphylococcus aureus. There fore, **empiric treatment** regimens should include antipseudomonal antibiotics (fluoroquinolone drops). When the ear canal is significantly swollen, a wick can be used to facilitate medication delivery. Systemic antibiotics are not needed for uncomplicated OE. Patient should also be instructed to keep the ear dry, avoid swimming and avoid further trauma.

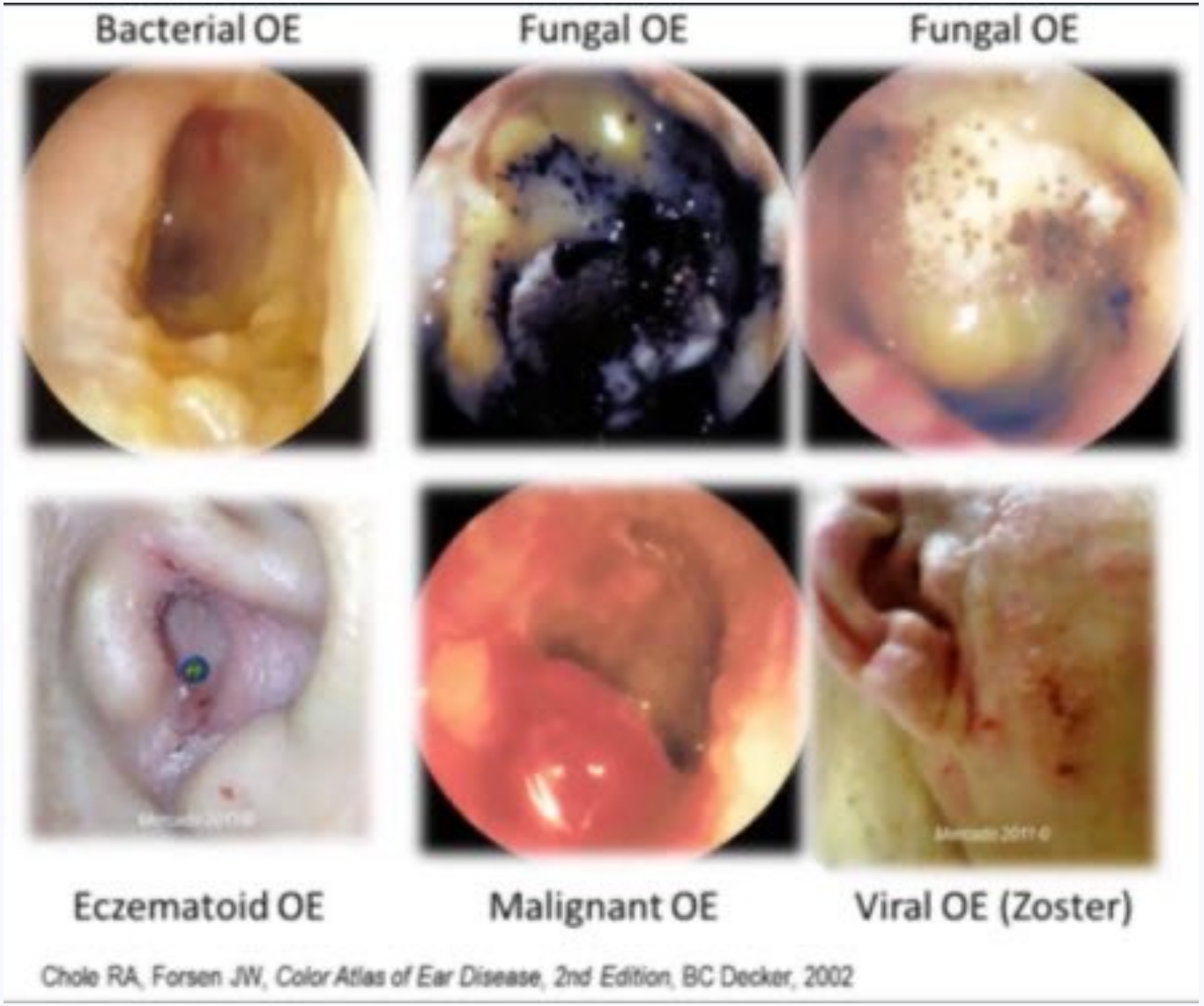
Reference: The essentials & Uworld

Otitis Externa

- Pathology: Low pH (acidic) environment is normal in external ear. Removal of cerumen increases pH (basic) which makes it more susceptible to infections.
- Exam: depends on stage of infection. Can be painful with external ear manipulation with mild redness, to more redness and swelling. There can be discharge.
- Diagnosis: clinical
- Investigation: generally, not needed
- Treatment: topical meds, note topical ciprofloxacin is the only FDA approved drug for middle ear and no ototoxicity such as aminoglycosides ..etc.

ALERT TO KEEP IN MIND:

- **WATCH OUT FOR NECROTIZING/MALIGNANT OE ! IT IS A MEDICAL EMERGENCY** and **LIFE-THREATENING** condition as it is an extension of the infection into osteomyelitis of temporal bone. Can present with facial nerve palsy due to extension into the bone of ear canal. Palsies have poor prognosis so diagnosis and prompt treatment is crucial.
- **Elderly patient not improving or symptoms are worse?? DO NOT LET IT PASS. Work them up:**
  - Investigation: ESR, culture as resistance is high, CT, if cannot be done in primary care, sent to urgent care or ENT.
  - Treatment: can start systemic Abx after obtaining culture.


Bacterial OE
Fungal OE
Fungal OE
Eczematoid OE
Malignant OE
Viral OE (Zoster)
Chole RA, Forsen JW, Color Atlas of Ear Disease, 2nd Edition, BC Decker, 2002

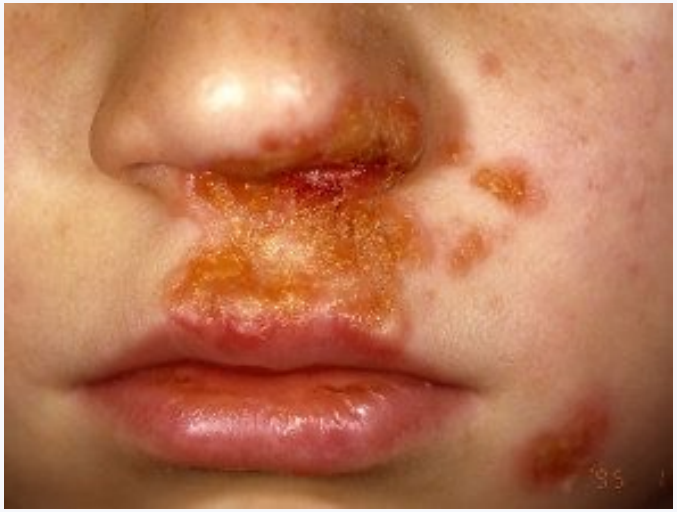
Case #9

DR. LATIFA ALANAZI
DR. MESHARI FAHAD ALSHURAIM

Case 9

5 years old girl previously medically free presents to your clinic with a one week Hx pruritic rash around her mouth. Patient is afebrile, alert, oriented, Physical examination reveals several pustules with thick, adherent crusts that have a golden appearance. No lymphadenopathy is present. Physical examination otherwise unremarkable.

- What is the most likely diagnosis?
- What is the most likely causative organism?
- What is the first line treatment?



Reference: Rosh

Case 9: Impetigo

- What is the most likely diagnosis? **Impetigo**
- What is the most likely causative organism?

Most commonly ***S. aureus* and *Beta hemolytic streptococcus (Strep pyogenes)***

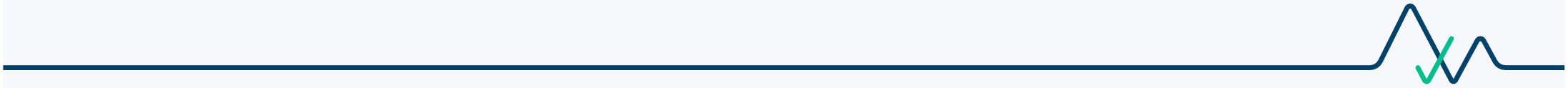
- What is the first line treatment?

For limited impetigo topical antibiotics are preferred.

Topical antibiotic preparations recommended for impetigo:

- **Mupirocin** 2% cream or ointment (Bactroban): TID for 5 days
- **Retapamulin** 1% ointment (Altabax): BID for 5 days
- **Fusidic Acid** BID – TID for 5 days

Extensive impetigo Oral therapy should be administered to patients with numerous impetigo lesions.



Reference: AAFP & Uptodate

Case #10

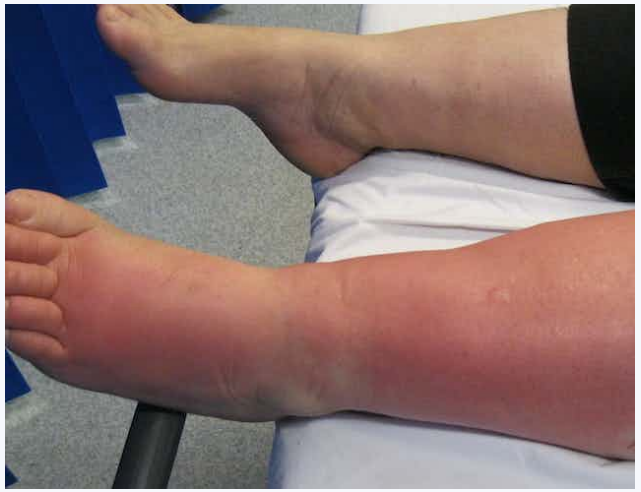
DR. LATIFA ALANAZI
DR. MESHARI FAHAD ALSHURAIM

Case 10

60 Years old woman comes to the emergency department due to progressive pain, swelling, and redness of her left lower limb for 2 days. She has had no obvious trauma or insect bite to that area. She does not use tobacco, alcohol, or illicit drugs. **Temperature is 39** C, blood pressure is 130/80 mm Hg, pulse is 106/min, and respirations are 18/min. The patient appears well. Her left anterior leg is swollen, erythematous, tender, and warm to touch over ha 10x5 cm region, as shown bellow. The erythema is present throughout the affected area and has a flat border. There is no overlying crepitus or bullae. The left thigh and right leg are normal in appearance. The remainder of the examination is unremarkable.

CBC showed

- Hbg 14. g/Dl
- Platelets 222,000/mm3
- **Leukocytes 15.500/ mm3**
- Neutrophils 86%
- Lymphocytes 14%

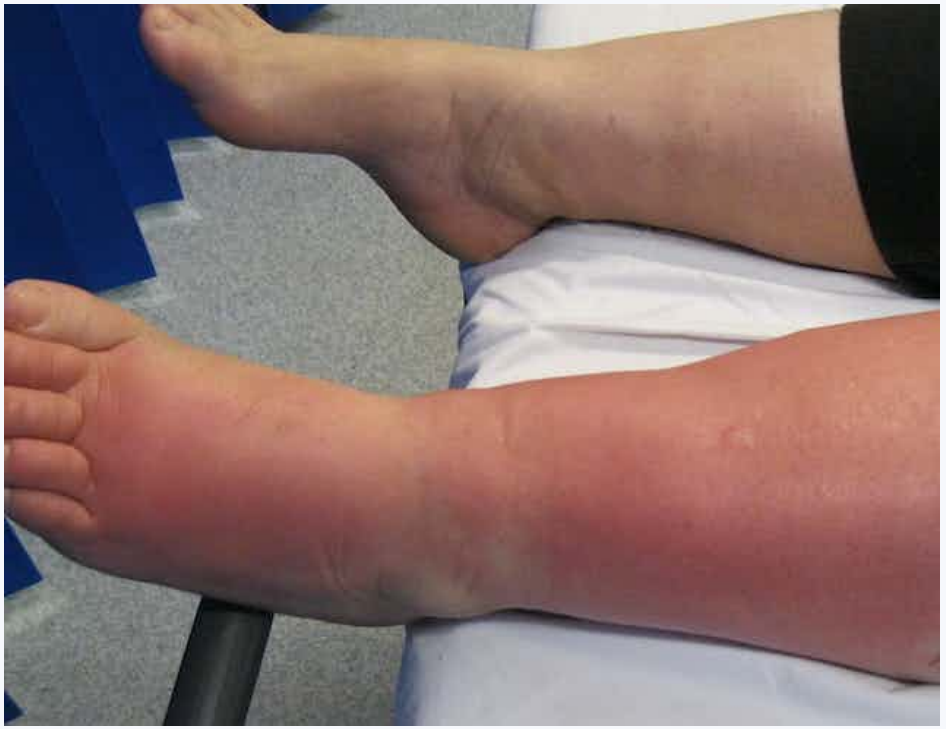


Reference: Uworld

Case 10

Which of the following is the most likely diagnosis?

A) Cellulitis
B) Deep venous thrombosis
C) Erysipelas
D) Stasis dermatitis
E) Erythema nodosum
F) Necrotizing fasciitis



Reference: Uworld

Case 10: Cellulitis

Cellulitis is a skin infection of the deep dermis and subcutaneous fat, usually caused by beta hemolytic streptococcus or staphylococcus aureus. Infections take root in areas of skin disruption (eg, insect bite, toe web impetigo, stasis edema). Patients typically develop a slowly spreading rash that is warm, tender and erythematous with flat, indistinct borders. Fever and regional lypmhangitis/lymphadenitis may be present. Laboratory studies usually show leukocytosis with predominance of neutrophils, c characteristic of most acute bacterial infections. Diagnosis is based largely on clinical findings, but blood culture may be useful in patients with systemic toxicity, extensive rash, or certain comorbidities immunocompromised.

- Why its not B? deep venous thrombosis may cause calf swelling, erythema and warmth. An anterior rash, high fever, and leukocytosis are not typical.

Reference: Uworld

Case 10: Cellulitis

Cellulitis can occur on any part of the body. Depending on the location of cellulitis, antibiotic selection and other interventions, including surgery, can vary. For example, If cellulitis **involves the hand**, hospitalization is typically recommended along with evaluation by a surgeon

Treatment: should be managed with **empiric therapy** for infection due to beta-hemolytic streptococci and methicillin-susceptible *Staphylococcus aureus* (MSSA). –Unless MRSA is suspected-

Common options

❑ **For oral therapy:**

- Cephalexin 500 mg every six hours
- Dicloxacillin 500 mg every six hours
- Flucloxacillin 500 to 1000 mg orally every six hours (not available in the United States)
- Cefadroxil 500 mg orally every 12 hours or 1 g orally once daily

❑ **Oral therapy in cases allergic to penicillin**

- TMP-SMX (one to two double-strength tablets orally twice daily).
- Linezolid (600 mg orally every 12 hours).

❑ **For Intravenous therapy:**

- Cefazolin 1 to 2 g IV every eight hours
- Nafcillin 1 to 2 g IV every four hours
- Oxacillin 1 to 2 g IV every four hours

Reference: Uptodate & AAFP

Case 10: Cellulitis

Oral versus parenteral therapy?

Patients with mild infection may be treated with oral antibiotics.

Treatment with parenteral antibiotics is warranted in the following circumstances:

- Systemic signs of toxicity such as fever >100.5°F/38°C, hypotension, or sustained tachycardia (refractory hypotension should prompt consideration of toxic shock syndrome)
- Rapid progression of erythema (eg, doubling of the affected area within 24 hours; in particular, expansion over a few hours with severe pain should prompt consideration of necrotizing fasciitis)
- Extensive erythema
- Immunocompromising condition (eg, neutropenia, immunosuppressive drugs such as chemotherapy for malignancy)
- Inability to tolerate or absorb oral therapy

Reference: Uptodate & AAFP

Case 10: Cellulitis

Indications for MRSA coverage — Empiric coverage for MRSA is indicated for patients with MRSA risk factors and those who have increased morbidity if suboptimal antibiotics are administered. Conditions that warrant MRSA coverage include the following [2,4]:

- Systemic signs of toxicity (eg, fever >100.5°F/38°C, hypotension, sustained tachycardia)
- Cellulitis with purulent drainage or exudate
- Immunocompromising condition (eg, neutropenia, immunosuppressive drugs such as chemotherapy for malignancy, HIV)
- Presence of risk factor(s) for MRSA infection (eg, known MRSA colonization or past infection, recent health care exposure - Nursing home, hospital admission, Hemodialysis-
- long term facility- recent antibiotic use, intravenous drug use, overcrowded conditions)

Reference: Uptodate

Case 10: Cellulitis

Red flags that requires hospitalization

Any time cellulitis progresses rapidly or clinical symptoms, especially pain, seem to be out of proportion to physical exam, red-flag conditions should be considered.

- **Toxic shock syndrome**
- **Necrotizing fasciitis**
- **Joint involvement (with or without prosthesis)**
- **Involvement of vascular graft**
- **Pyomyositis**
- **Clostridial myonecrosis (gas gangrene)**
- **Compartment syndrome**

Reference: Uptodate & AAFP

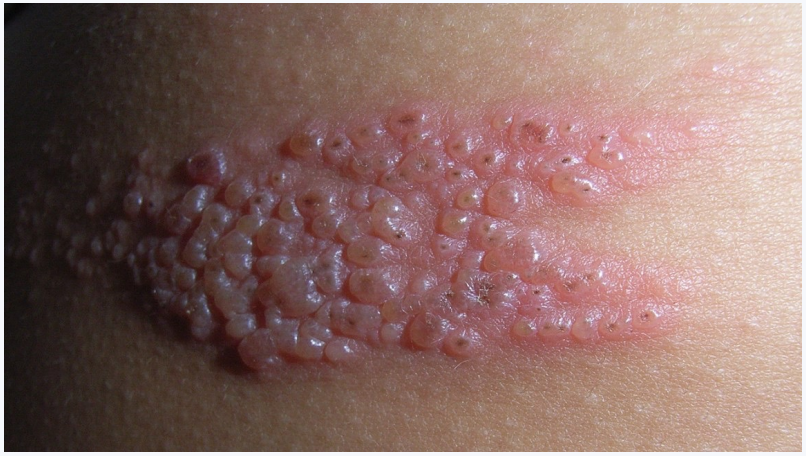
Case #11

DR. LATIFA ALANAZI
DR. MESHARI FAHAD ALSHURAIM

Case 11

62 Years old man, known case of T2DM, BPH and hypertension. Presented to the clinic due to sever pain / needle like, with an odd sensation on his back on the right side (unilateral) and developed a vesicular rash on erythematous base on the same area days after (shown in the image).

- What is the most likely diagnosis?
- How and when to treat?
- Possible complications?
- How can we prevent it?



Shingles

- **What is the most likely diagnosis?** Shingles
- **How and when to treat?**
  - The nucleoside analogues acyclovir, valacyclovir, or famciclovir can be used for treatment of acute herpes zoster infection. We prefer valacyclovir (1000 mg three times daily) or famciclovir (500 mg three times daily) because of their lower dosing frequency compared with acyclovir (800 mg five times daily). All regimens should be given for seven days.
  - For patients who present after 72 hours, we administer antiviral therapy if new lesions are appearing at the time of presentation. There is likely minimal benefit of antiviral therapy in the patient 72 hours after onset.
- **Possible complications?**
  - Herpes Zoster opthalmicus **- Sight threatening and requires urgent referral to ophthalmology-**
  - Post herpetic neuralgia

- **How can we prevent it?** Shingles Vaccine in adults 50 years and older.

Reference: Uptodate

Case #12

DR. NORAH MOHAMMED ALMARRI
DR. MESHARI FAHAD ALSHURAIM

Case12

A 30-year-old man presents with a 2-day history of runny nose and sore throat. He feels hot and sweaty, has a mild headache, coughing up clear sputum, and complains of muscle aches. He would like antibiotics as he was prescribed them last year for similar symptoms.

-On examination, he is afebrile and has a normal pulse, a slightly inflamed pharynx, and non-tender cervical lymphadenopathy. There is no neck stiffness and his chest is clear. He smokes 10 cigarettes per day.

References: Rosh

A 30-year-old man presents with a 2-day history of runny nose and sore throat. He feels hot and sweaty, has a mild headache, coughing up clear sputum, and complains of muscle aches. He would like antibiotics as he was prescribed them last year for similar symptoms.

-On examination, he is afebrile and has a normal pulse, a slightly inflamed pharynx, and non-tender cervical lymphadenopathy. There is no neck stiffness and his chest is clear. He smokes 10 cigarettes per day.

-What is the most likely Dx?

Common Cold

References: Rosh

Common cold
(viral rhinitis, rhinopharyngitis, and acute coryza)

backgrounds

- It's Seasonal patterns of infection, most infections occur in the winter period.
- Symptoms peak within1 to 3 days and usually clear by 1 week.

Etiologies:

- rhinoviruses followed by coronavirus, influenza, parainfluenza, respiratory syncytial virus.

Transmission:

- hand contact or droplets via sneezing or coughing.
-

Diagnosisis:

- Clinically, no need for investigations.
- Chest radiograph is only indicated if a lower respiratory tract infection is suspected.

Treatment:

- supportive management.

Proven effective	Uncertain benefit	Ineffective treatment
• Analgesics • Decongestants • Antihistamines combined with decongestant • Ipratropium • Zinc and complementary treatments	• Nasal irrigation • Increased fluid intake	• Antibiotics • Antihistamine monotherapy • Antiviral therapy • Antitussive and expectorants • Intranasal corticosteroids • Complementary and alternative treatments (vit C, vit D, steam)

Pharmacological Treatment

1- Reassurance and supportive care:

- ✓ Self-limiting clears within 7 to 10 days.
- ✓ Hygiene measures and limiting the spread to others .
- ✓ Resting and maintaining fluid intake.

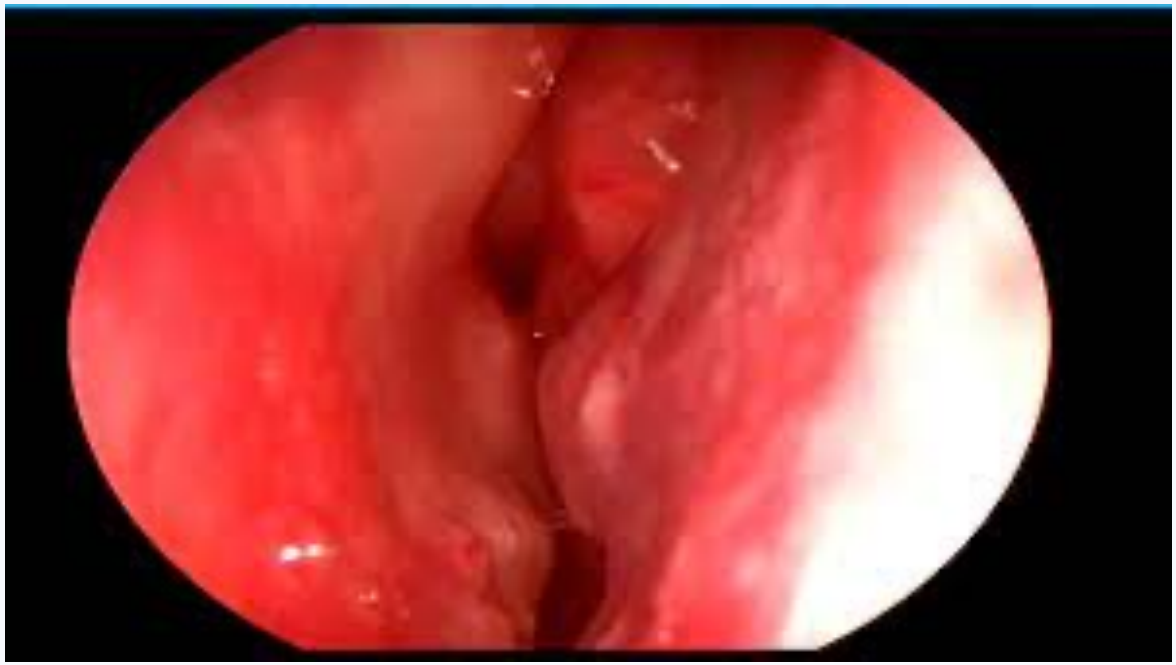
2- Analgesics/Antipyretics

- ✓ Acetaminophen ,Ibuprofen ,Aspirin and Naproxen.

3- Decongestant and/or Antihistamine .

medications	Dosage
Acetaminophen	Children: 15 mg/kg orally every 4-6 hours when required, maximum 75 mg/kg/day. Adults: 500-1000 mg orally every 4-6 hours when required, maximum 4000 mg/day.
Ibuprofen	Children: 5-10 mg/kg orally every 4-6 hours when required, maximum 30 mg/kg/day. Adults: 200-400 mg orally every 4-6 hours when required, maximum 2400 mg/day.
Naproxen	Adults: 250-500 mg orally twice daily when required, maximum 1250 mg/day.
Aspirin	Adults: 300-600 mg orally every 4 hours when required, maximum 4000 mg/day.
oxymetazoline nasal	children ≥6 y of age and adult: 1-2 drops/sprays in each nostril two to four times daily when required.
Nasal Ipratropium	children 6-11 y of age: 2 sprays in each nostril three times daily when required children ≥12 years of age and adults: 2 sprays in each nostril three to four times daily when required.
Loratadine	**Loratadine 5 mg**: 12 years and older: 1 tablet orally every 12 hours Maximum dose: 2 tablets per 24 hours. (AAFP)

Rhinitis Medicamentosa



Treatment

- stop using nasal spray.
- Use saline nasal spray.
- To treat more severe congestion, can used oral steroid.

(Reference: The Essential, Chapter 5)

Case #13

DR. NORAH MOHAMMED ALMARRI
DR. MESHARI FAHAD ALSHURAIM

Case13

A 61 years old man presents with cough, fever, and shaking chills for two days. He has been unable to work. His coworkers have had similar illness over the past couple of weeks.
On auscultation, crackles are present throughout his lung fields. His oxygenation level 96% on room air.
Patient was not yet receive his Flu vaccine.

DDX?

References :Rosh

A symptom-only clinical prediction rule may aid clinicians in diagnosing **influenza.**

Clinical Prediction Rule:

2 points for fever and cough
2 points for myalgia
1 point for chills or sweats
1 point for symptom onset within the past 48 hours

- **2 or fewer points: at low risk of influenza**
- **4 or more points: at high risk and may be considered for empiric treatment**

Which of following is the most likely to provide prompt and most accurate confirmation of the diagnosis?

A. Rapid antigen test
B. Reverse transcriptase polymerase chain reaction (RT-PCR)
C. Serology
D. Viral culture

Answer: B

References: Rosh

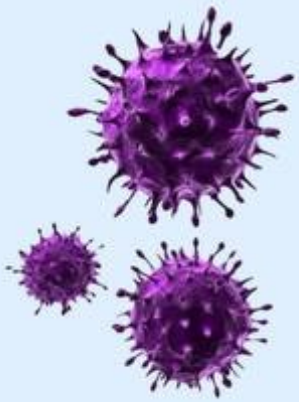
- Onset is typically rapid. Duration: 2-8 days.
- The major complication of influenza is pneumonia, mainly in the high-risk group.
- Some patients may complain of persistent weakness or easy fatigability symptoms referred to as post-influenza asthenia, which lasts for several weeks

Influenza

Most common cause of viral pneumonia in adults

Clinical

- Type A (pandemic), Type B (epidemic), Type C (sporadic)
- Spread via respiratory droplets
- Sudden-onset fever
- Headache
- Nonproductive cough
- Myalgia
- Sore throat
- Fatigue/Malaise
- GI symptoms
- Altered mental status (older patients)



People at increased risk of complications of influenza

Special groups:

- Adults 65 years and older.
- Children younger than 5 years.
- Institutionalized adults (e.g. residents of nursing homes or chronic care facilities.
- Pregnant and postpartum women up to 2 weeks postpartum, including pregnancy loss.

People with coexisting medical conditions:

- Morbid obesity
- Sickle cell anemia and other hemoglobinopathies
- Chronic kidney disease.
- Chronic liver disease.
- Heart disease (acquired or congenital)Immunosuppression (e.g. HIV infection, cancer, transplant recipients, use of immunosuppressive medications).
- Asthma or chronic pulmonary disease.
- Any condition that may compromise the handling of respiratory secretions (e.g. Neuromuscular disease, cerebral palsy, stroke, dementia).
- Long-term aspirin therapy in patients younger than 19 years.
- Metabolic disorders (acquired [e.g., diabetes mellitus] or inherited [e.g., mitochondrial disorders]).

The Essentials: Section 2, Chapter 20

Management

- Supportive treatment.
- The decision to begin antiviral treatment should be based on the clinical diagnosis of influenza, not on test results. Laboratory diagnosis should be obtained when result will change clinical management and for patient with sever illness.
- Patient with sever illness or who are at high risk of complication from influenza should receive antiviral treatment regardless of symptom duration, although early treatment is most beneficial.
- Pregnancy is considered a risk factor for complicated influenza. The only antiviral used in pregnancy is Oseltamivir with no change in dosing.
- Salicylates should be avoid for children and adolescents below 18 years of age with influenza due to Reye syndrome.

Antiviral treatment of early influenza infection	
Medication	**Dosage**
Oseltamivir (Tamiflu), (oral capsules or suspension)	Adults and children 13 y and older: 75 mg orally twice daily for 5 days. Children: -2 weeks to < 1 y (any weight): 3 mg/kg orally twice daily for 5 days. -Children ≥1 year of age and body weight ≤15 kg: 30 mg twice daily for 5 days. -15-23 kg: 45 mg twice daily for 5 days. -23-40 kg: 60 mg twice daily for 5 days. ->40 kg: adult dose.
Zanamivir (Relenza) (powder inhalation, IV)	Children ≥7 years of age and adults: 10mg twice per day for 5 days. (2 doses should be taken on the first day of treatment, provided there is at least 2 hours between doses; on subsequent days, doses should be about 12 hours apart at approximately the same time each day)
Peramivir (Rapivab) (solution for injection)	Children 2-12 years of age: 12 mg/kg intravenously as a single dose, maximum 600 mg/dose. Children ≥ 13 and Adults: 600 mg as a single dose.
Baloxavir (Xofluza), (oral tablets)	Children ≥12 years of age and adults (body weight 40-79 kg): 40 mg orally as a single dose. 80 kg: 80 mg orally as a single dose.

Vaccine:

- Everyone ≥6 months old is recommended for annual vaccination.
- Do not routinely avoid influenza vaccination in egg-allergic patients.

Prevention :

- Hand hygiene especially after contact with respiratory secretions
- Respiratory hygiene (covering the nose and mouth when coughing, disposing of used tissues promptly)
- Health care workers when in contact with infected patients should use gloves, gowns, masks, and eye protection, as appropriate.

Case #14

DR. NORAH MOHAMMED ALMARRI
DR. MESHARI FAHAD ALSHURAIM

Case 14

A 16 year-old adolescent presents to your office with a chief complaint of sore throat. She denies any history of fever but reports a mild cough. Vital signs are within normal limits and you appreciate anterior cervical lymphadenopathy on your exam. Her tonsils appear erythematous without exudate or enlargement. What would be the most appropriate next step in the management of this patient?

A. Perform a throat culture
B. Perform in office rapid antigen detection testing for streptococcal pharyngitis.
C. Start patient on amoxicillin
D. Supportive care

References: Rosh

Centor criteria strep pharyngitis

criteria	Points
Absence of Cough	1
Swollen tender anterior cervical lymph nodes	1
Temperature > 38	1
Tonsillar exudate	1
Age 3-14	1
Age 15-44	0
Age 45+	1-

Answer: D

Cumulative Score	
Score of 0–1	No need for further testing.
Score of 2-3	Testing with RADT and/or culture.
Score of >4	RADT and/or culture + empiric antibiotics may be appropriate.

Clinical Picture:

Viral pharyngitis	Bacterial pharyngitis
– **Gradual** after several days • rhinorrhea and cough • Conjunctivitis • Diarrhea • **Posterior** cervical lymphadenopathy	• **Acute** onset sore throat • **Fever** • Notable tender, **anterior** cervical lymphadenopathy • Tonsillar exudate or inflammation on examination • Palate petechiae and scarlatiniform rash (although rare but they are highly specific and often missed)

Amoxicillin dosages for the treatment of GABHS

Patient group	Dosage of amoxicillin
Pediatric with mild to moderate infection	25 mg/kg/day Can be given twice or three times daily
Pediatric with severe infection	45 mg/kg/day (maximum 1000 mg per day) Can be given twice or three times daily
Adults with mild to moderate pharyngitis	500 mg twice daily or 250 mg Q8h for 10 days
Adults with severe pharyngitis	875 mg twice daily or 500 mg q8h daily for 10 days

Antibiotic regimens for type I hypersensitivity

Azithromycin	Clarithromycin	Clindamycin
Pediatric 12 mg/kg/day for 5 days (maximum 500 per day)	Pediatric 7.5 mg/kg twice daily for 10 days	Pediatric 7 mg/kg/day three times daily for 10 days
Adult 500 mg for 1st day followed by 250 for 4 days	Adult 250 twice daily for 10 days	Adult 300 mg q8h for 10 days

Referral for tonsillectomy:

- If recurrent tonsillitis:
  - ⩾3 episodes in each of three years.
  - ⩾5 episodes in each of two years.
  - ⩾7 episodes in one year .

Each episode should be documented with one of the following:

- Fever >38 degrees centigrade -or-
- Tonsillar exudates -or-
- Cervical lymphadenopathy -or-
- Positive GABHS culture

Other conditions that favor tonsillectomy are those in which tonsils are hypertrophied causing:

- Airway obstruction
- Sleep related difficulties

Case #15

DR. NORAH MOHAMMED ALMARRI
DR. MESHARI FAHAD ALSHURAIM

Case15

A 4 years old boy presents to the ED with his mother fever, and inspiratory stridor. His fever started 3 days ago and has been hovering around 102˚F despite over the counter fever reducers. His breathing become more high pitched and noisy earlier this morning. He appears somewhat lethargic. The patient has not received any vaccinations. The mother denies cough, cyanosis, drooling, or sign of anxiety. His past medical history is unremarkable, and he has no known allergies.

Vital signs include Bp 125/82 mmHg, HR 115bpm, RR27/min, and T 39.1
Chest auscultations reveals mild inspiratory stridor at the level of trachea. Cervical lymphadenopathy is noted. Oral examination reveals a swollen epiglottitis.

(References: Rosh)

A 4 years old boy presents to the ED with his mother fever, and inspiratory stridor. His fever started 3 days ago and has been hovering around 102˚F despite over the counter fever reducers. His breathing become more high pitched and noisy earlier this morning. He appears somewhat lethargic. The patient has not received any vaccinations. The mother denies cough, cyanosis, drooling, or sign of anxiety. His past medical history is unremarkable, and he has no known allergies.

Vital signs include Bp 125/82 mmHg, HR 115bpm, RR27/min, and T 39.1
Chest auscultations reveals mild inspiratory stridor at the level of trachea. Cervical lymphadenopathy is noted. Oral examination reveals a swollen epiglottitis.

What is the most appropriate next step in managing this patient?

A. Administer supplemental humidified oxygen and assemble airway specialist
B. Begin –bag-valve-mask ventilation with 100% oxygen
C. Begin empirical antibiotic therapy with intravenous ceftriaxone and oxacillin
D. Obtain blood cultures and samples from the epiglottis

Answer: A

(References: Rosh)

- **Administer supplemental humidified oxygen(A)** It is appropriate at this time to for easier breathing and to **assemble airway specialists** (e.g. anesthesiologist, otolaryngologist) for possible endotracheal intubation in controlled environment such as the operating room.

- **Bag-valve-mask ventilation with 100% oxygen(B)** is more appropriate fist step in patients with epiglottitis who can not maintain their own airway, with sign of airway obstruction such as cyanosis, droolling, panicked appearance, and sitting in the “tripod” or “sniffing” position. Manually ventilating the patient is required before performing emergency intubation.

- **Obtaining intravenous access to deliver medications (C),** and **diagnostic tests such as phlebotomy or epiglottic cultures (D) s**teps that are more invasive and may provoke young patients should be postponed before the airway can be secured. As provoking anxiety and crying can cause abrupt airway obstruction.

(References: Rosh)

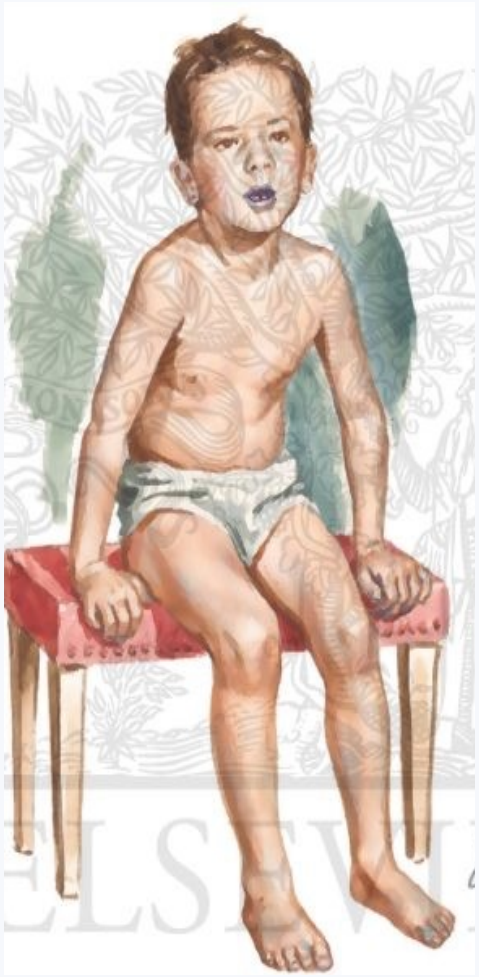
- (URTI) symptoms, mild cough, sore throat , fever.

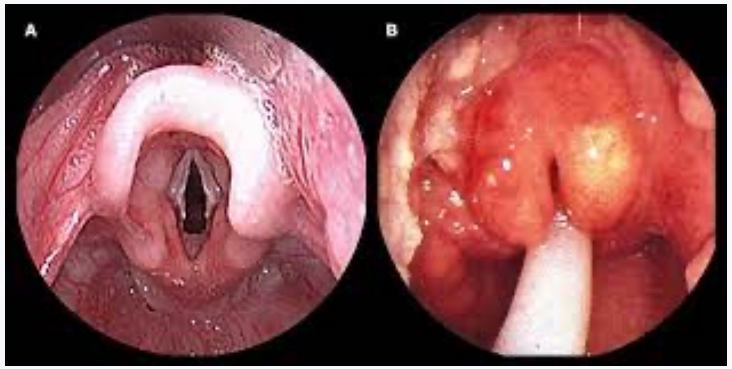
Four D's

- Drooling
- Dysphagia /Odynophagia
- Dysphonia - Muffled voice- "Hot potato voice".
- Distresses respiratory efforts
  - Tripod position
  - Stridor

Etiologies:

- Haemophilus influenza type b (before Hib vaccine).
- Streptococcus spp.
- Staphylococcus aureus.
- Moraxella catarrhalis.



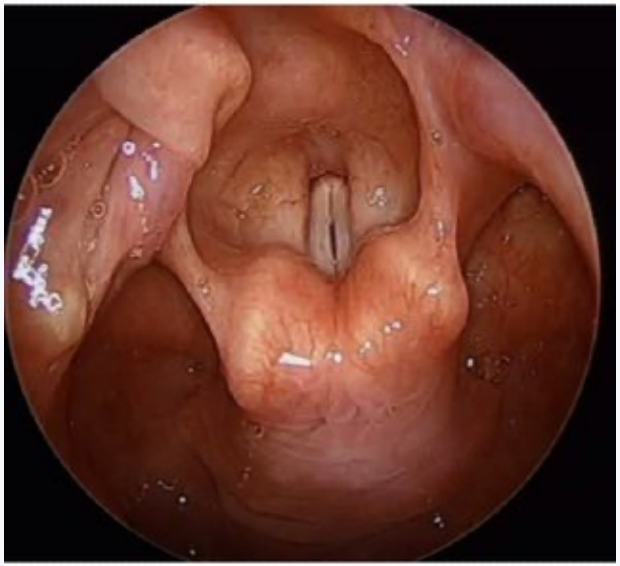


DO:

- **Reassure – Keep calm – Anticipate intubation**

DO NOT DO:

- **Examine throat OR Throat culture**
  without securing the airway



Management

- **Airway secure** → High flow O2→ IV acess → ER referral +ENT consulatation.
- Antipyretic agents may also be necessary.
- Adjuvant therapy may be used which includes **corticosteroids and racemic epinephrine**.
- Avoid agitating the patient.
- Avoid therapy such as sedation.
- Start appropriate **empiric antibiotic** regimen intravenously to cover the most common organisms. Optimal duration for the treatment is usually a 7–10 days.

Antibiotic	Pediatric dose	Adult dose
Ceftriaxone	50–100 mg/kg/day once daily or divided into two doses(Maximum daily dose 2 g .)	2 g every 24 hours
Cefotaxime	150–200 mg/kg/day in 4 divided doses (Maximum daily dose 10 g)	2 g every 4–8 hours
Vancomycin	40–60 mg/kg/day in 3–4 divided doses(Maximum daily dose 2 g)	2 g per day IV every 6–12 hours
Clindamycin	30–40 mg/kg/day in 3–4 divided doses(Maximum daily dose 2.7 g)	600–900 mg every 8 hours
Levofloxacin	8 mg/kg every 12 hours	750 mg every 24 hours

Case #16

DR. NORAH MOHAMMED ALMARRI
DR. MESHARI FAHAD ALSHURAIM

Case 16

A 3-year-old boy appears toxic and presents with a one-week history of fever .
He has progressively not been able to eat and is now drooling ,has hyper-extension of the neck ,looks like he has torticolis and has stridor .The most likely diagnosis is:

A. Epiglottitis
B. Retropharyngeal abscess
C. Foreign body in the lung
D. Quinsy (peritonsillar abscess)

ANSWER: B

References: Rosh

Retropharyngeal Abscess

- Abscesses are a polymicrobial and caused by the following organisms:
  Aerobic organisms (group A streptococci and Staphylococcus aureus, including methicillin-resistant S aureus (MRSA), Anaerobic organisms, Gram-negative organisms (Pseudomonas, Haemophilus influenzae, H parainfluenzae)
- It occurs in 6 months to 4 years of age.
- presentation: fever, drooling, dysphagia, inspiratory stridor and may hold their head in a torticollis-like position.
- Investigation: CT neck with contrast.Plain Xray shows widening of the retropharyngeal space.
- DO NOT palpate as may cause the abscess to rupture.
- If the abscess ruptures, it may result in rapid and fatal airway obstruction.

Management

- Refer patients immediately to Emegency via ambulance. If you have available, apply supplemental oxygen.
  Secondary care management may include:
  - ✓ Intubation
  - ✓ Intravenous fluids if the patient is dehydrated
  - ✓ Intravenous antibiotics
  - ✓ Surgical drainage
- Empirical use of antibiotics such as:
  - ✓ Ceftriaxone + metronidazole
  - ✓ Levofloxacin + clindamycin
  - ✓ Ampicillin-sulbactam

Prognosis

The mortality rate is high if it is associated with airway obstruction and other complications, such as (mediastinitis, aspiration pneumonia, epidural abscess, jugular venous thrombosis, necrotizing fasciitis, sepsis, and erosion into the carotid artery).

What is the most common microbiological cause of a skin abscess?

A. Cryptococcosis
B. Group A Streptococcus
C. Staphylococcus aureus
D. Streptococcus pyogenes

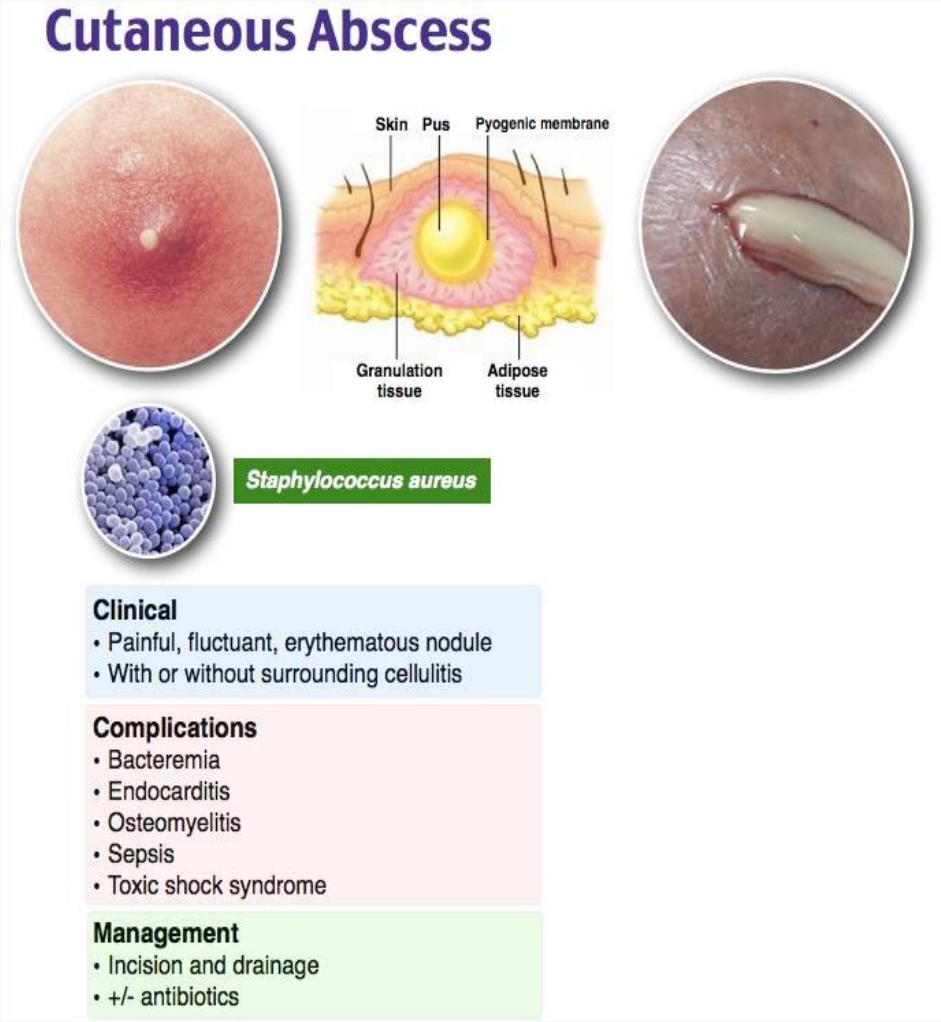
Answer is C

Explanation:

- Risk factors for developing skin abscess include skin barrier disruption, a coexisting inflammatory condition of the skin, edema due to impaired lymphatic drainage or venous insufficiency, obesity, immunosuppression, or a preexisting skin infection.
- Patients with a skin abscess often present with a painful, fluctuant, erythematous nodule, with or without surrounding cellulitis.
- Patients with a drainable abscess should undergo incision and drainage with culture and susceptibility testing of debrided material.
- Staphylococcus aureus is the most common microbiological cause of a skin abscess.
- Cryptococcosis (A) is uncommon causes of skin abscesses.
- Group A Streptococcus (B) and Streptococcus pyogenes (D) are the two most common causes of cellulitis.

References: Rosh

- An abscess is **a painful collection of pus, usually caused by a bacterial infection**. Abscesses can develop anywhere in the body.
- It is clinical diagnosis.
- Most commonly it caused by staphylococcus aureus, streptococcus, anaerobes (often polymicrobial)
- Deeper abscesses, including internal abscesses, are harder to diagnose may need to order imaging tests.



References: Rosh

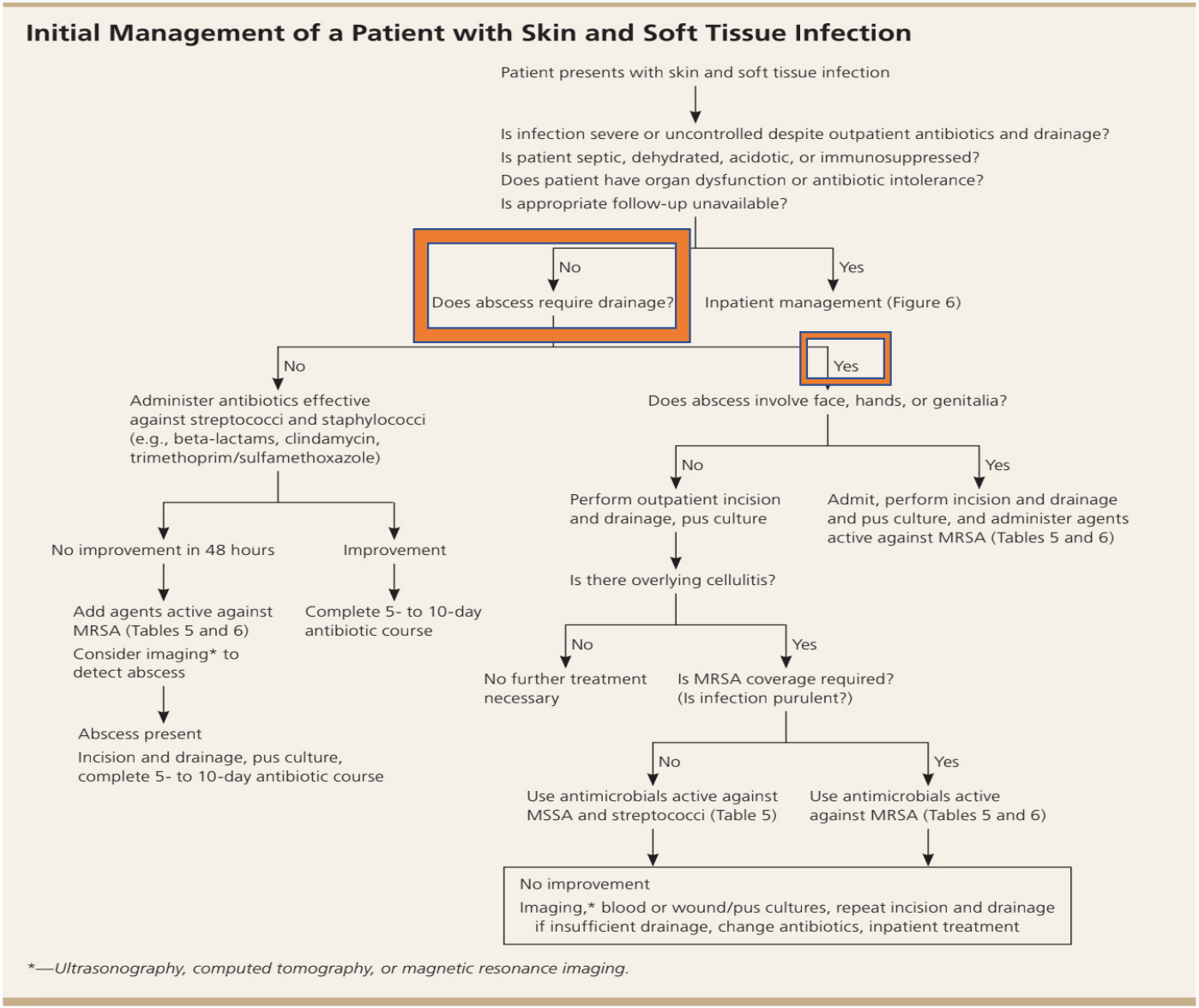


Figure 5. Initial management of skin and soft tissue infections. (MRSA = methicillin-resistant *Staphylococcus aureus*; MSSA = methicillin-sensitive *S. aureus*.)

References: AAFP

At 2018 an antimicrobial guidelines prepared by antimicrobial stewardship technical subcommittee under National Antimicrobial Resistance committee (AMR). The current edition is aimed at guiding physicians who practice across different levels of healthcare acuity to select appropriate empirical antibiotics for treatment of common community & healthcare associated infections.

Skin and Soft Tissue Infection

Culture: ❒ Pending ❒ (+) Culture ❒ (-) Culture ❒ Not sent

Therapy for Purulent Skin and Soft Tissue Infections (Furuncle/Carbuncle/Abscess)

(For renal failure patients, see Appendix)

Severity	Empiric Therapy	Duration
Mild	❒ Incision and drainage only or with antibiotics in some cases (similarly to moderate cases)	7–10 days
Moderate	❒ Incision and drainage with: ❒ Trimethoprim-sulfamethoxazole PO160/800 mg [DS] q12h ❒ Doxycycline PO 100mg q12h	
Severe	Incision and drainage with ❒ Vancomycin IV 15mg/kg q12h **OR** ❒ Linezoild PO 600mg q12hr **OR** ❒ Daptomycin IV 4mg/kg q24h	

Therapy for non-purulent Skin and Soft Tissue Infections (Necrotizing infection/Cellulitis/Erysipelas)

Severity	**Empiric Therapy**	**Duration**
Mild	❒ Cloxacillin or Flucloxacillin 500mg PO q6h **OR** ❒ Cephalexin 500mg PO q6h (if non-immediate-type or non-severe hypersensitivity reaction to penicillin) **OR** ❒ Clindamycin PO 300-450 mg q6hr (if immediate-type or severe hypersensitivity reaction to beta-lactam)	7–10 days
Moderate	❒ Penicillin G 2-4 million units IV q4-6h **OR** ❒ Cefazolin 1g IV q8h (if non-immediate-type or non-severe hypersensitivity reaction to penicillin) **OR** ❒ Clindamycin 600mg IV q8h (if immediate-type or severe hypersensitivity reaction to beta-lactam)	
Severe	❒ Vancomycin IV 15mg/kg q12hr **PLUS** ❒ Piperacillin-tazobactam IV 4.5g q6-8hr **OR** ❒ Vancomycin IV 15mg/kg q12h **PLUS** ❒ Imipenem-cilastatin IV 500mg q6hr **OR** ❒ Vancomycin IV 15mg/kg q12h **PLUS** ❒ Meropenem IV 1000mg q8hr **OR** ❒ Vancomycin IV 15mg/kg q12h **PLUS** ❒ Ciprofloxacin PO 500-750mg **OR** ❒ Ciprofloxacin IV 400mg q12h **PLUS** ❒ Metronidazole PO/IV 500mg q8h **If necrotizing fasciitis,** also add ❒ Clindamycin 600-900mg IV q8h	

Case #17

DR. SARA ABDULMAJEED ALALI
DR. AMMAR ABDULFATTAH AL KUBAISH, SBFM, ABFM.

Case #17

A 22-year-old previously healthy male reports a 3-day history of explosive and watery diarrhea.

He is having up to six bowel movements per day. He recalls eating at a new Mexican restaurant 5 days ago.

He denies fever, blood in his stool, or recent travel. His friends ate from the same food but he is the only one experiencing symptoms.

His vital signs are normal (including supine and standing blood pressures), and the remainder of the physical examination is remarkable only for mild, diffuse abdominal tenderness.

What are the differentials?
Gastroenteritis, food poisoning, IBS, IBD

Most probable Diagnosis?
Gastroenteritis, why>> (mention the points in red that are in the next slide)

Case #17

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Gastroenteritis Overview

Acute gastroenteritis: diarrheal disease (three or more times per day or at least 200 g of stool per day)

- rapid onset
- lasts less than two weeks and
- *may be* accompanied by nausea, vomiting, fever, or abdominal pain.

Diarrhea: passage of loose or watery stools

- ≥3 during 24hrs
- Reflects increased water content of the stool (whether due to impaired water absorption and/or active water secretion by the bowel)
- Most causes of acute diarrhea are infectious: viral, baterial, protozoal

Acute Diarrhea	Persistant Diarrhea	Chronic Diarrhea
≤14 days	15-29 days	>30 days

Gastroenteritis Etiology

*Most common causes of infectious gastroenteritis are **viral** causes*

- **Viral Causes**: *Norovirus*, rotavirus, enteric adenovirus, and astrovirus
- **Bacterial Causes**: *Staphylococcus aureus*, *Campylobacter jejuni*, *Shigella* spp, *Salmonella* spp, *Yersinia*, and *Escherichia coli*
- **Parasites**: *Giardia* and *Cryptosporidium*
- (Protozoa are less commonly identified as the etiologic agents of acute gastrointestinal illness.)
- *please refer to family medicine: the essentials for further information about common etiologies (Section 2 > chapter 20 > Foodborne infections and Gastroenteritis)

Reference: Uptodate

History

The goals of history are to assess:

- **HPI**: symptom onset and duration, any associated nausea, vomiting, fever, loss of appetite, muscle aches, dehydration, headache, and mucus or blood in the stool.

•**The severity of the symptoms**

•**Assessment of hydration status:** dark yellow or scant urine, decreased skin turgor, orthostatic hypotension

•**Oral tolerance:** amount and type of oral intake

•Frequency and estimated **volume of emesis or stool**

•**Clues of etiology** (viral vs bacterial)

•**Beware of alarming symptoms**

Reference: FM: The Essentials Section 2 Chapter 20

History

- **Characteristic history of GE**: diarrhea of rapid onset that lasts less than one week +/- nausea, vomiting, fever, or abdominal pain

- **History clues suggestive of viral** cause: intermediate incubation period (24 to 60 hours), a short infection duration (12 to 60 hours), and a high frequency of vomiting

- Clues suggestive of **inflammatory** diarrhea: Fever, mucoid/bloody stools

Reference: UpToDate

Red flags

- High fever (temperature over 102°F, measured by mouth)
- Continuous vomiting which prevents keeping liquids in the stomach (which can lead to dehydration)
- Signs of dehydration include: little or no urination, very dry mouth and throat, or feeling dizzy when standing up
- Bloody stools
- Diarrhea lasts more than 3 days

	Likely pathogens	Mean incubation period	Classic/common food sources	Other epidemiologic clues
Watery diarrhea	Norovirus	24 to 48 hours	Shellfish, prepared foods, vegetables, fruit	▪ Outbreaks in: • Restaurants • Health care facilities • Schools and childcare centers • Cruise ships • Military populations
	Clostridioides (formerly *Clostridium*) *difficile**	N/A	N/A	▪ Antibiotic use ▪ Hospitalization ▪ Cancer chemotherapy ▪ Gastric acid suppression ▪ Inflammatory bowel disease
	Clostridium perfringens	8 to 16 hours	Meat, poultry, gravy, home-canned goods	
	Enterotoxigenic *Escherichia coli*	1 to 3 days	Fecally contaminated food or water	▪ Travel to resource-limited settings
	Other enteric viruses (rotavirus, enteric adenovirus, astrovirus, sapovirus)	10 to 72 hours	Fecally contaminated food or water	▪ Daycare centers ▪ Gastroenteritis in children ▪ Immunocompromised adults
	Giardia lamblia	7 to 14 days	Fecally contaminated food or water	▪ Daycare centers ▪ Swimming pools ▪ Travel, hiking, camping (particularly when there is contact with water in which beavers reside)
	Cryptosporidium parvum	2 to 28 days	Vegetables, fruit, unpasteurized milk	▪ Daycare centers ▪ Swimming pools and recreational water sources ▪ Animal exposure ▪ Chronic diarrhea in advanced HIV infection
	Listeria monocytogenes	1 day (gastroenteritis)	Processed/delicatessen meats, hot dogs, soft cheese, pâtés, and fruit	▪ Pregnancy ▪ Immunocompromising condition ▪ Extremes of age
	Cyclospora cayetanensis	1 to 11 days	Imported berries, herbs	▪ Chronic diarrhea in advanced HIV infection
Inflammatory diarrhea (fever, mucoid or bloody stools)¶	Nontyphoidal *Salmonella*	1 to 3 days	Poultry, eggs, and egg products, fresh produce, meat, fish, unpasteurized milk or juice, nut butters, spices	▪ Animal contact (petting zoos, reptiles, live poultry, other pets) ▪ Travel to resource-limited settings
	Campylobacter spp	1 to 3 days	Poultry, meat, unpasteurized milk	▪ Travel to resource-limited settings ▪ Animal contact (young puppies or kittens, occupational contact)
	Shigella spp	1 to 3 days	Raw vegetables	▪ Daycare centers ▪ Crowded living conditions ▪ Men who have sex with men ▪ Travel to resource-limited settings
	Enterohemorrhagic *E. coli*	1 to 8 days	Ground beef and other meat, fresh produce, unpasteurized milk and juice	▪ Daycare centers ▪ Nursing homes ▪ Extremes of age
	Yersinia spp	4 to 6 days	Pork or pork products, untreated water	▪ Abnormalities of iron-metabolism (eg, cirrhosis, hemochromatosis, thalassemia) ▪ Blood transfusion
	Vibrio parahemolyticus	1 to 3 days	Raw seafood and shellfish	▪ Cirrhosis
	Entamoeba histolytica	1 to 3 weeks	Fecally contaminated food or water	▪ Travel to resource-limited settings ▪ Men who have sex with men

Physical Examination: goals

- Rule out surgical causes of GI symptoms
- Identify signs of dehydration: dry mucous membranes, decreased skin turgor, tachycardia, hypotension, or altered mental status. Oral tolerance, urine output
- Characteristic physical examination of GE: mild, diffuse, abdominal tenderness

Is our patient dehydrated?

No, because he is vitally stable, his blood pressure is normal, no signs of dehydration among examination, no complaint in urine output or oral tolerance

Case #17

A 22-year-old previously healthy male reports a 3-day history of explosive and watery diarrhea.

He is having up to six bowel movements per day. He recalls eating at a new Mexican restaurant 5 days ago.

He denies fever, blood in his stool, or recent travel. His friends ate from the same food but he is the only one experiencing symptoms.

His vital signs are normal (including supine and standing blood pressures), and the remainder of the physical examination is remarkable only for mild, diffuse abdominal tenderness.

Hydration Assesment

Clinical Dehydration Scale

Characteristic	0 Point	1 Point	2 Points
Appearance	Normal	Thirsty, restless, or lethargic and irritable upon touched	Drowsy, limp, cold, sweaty, comatose
Eyes	Normal	Slightly sunken	Very sunken
Mucous membranes	Moist	Sticky	Dry
Tears	Tears	Decreased tears	Absent tears
Scoring: 0 points = less than 3% dehydration; 1 to 4 points = mild (3% to 6%) dehydration; 5 to 8 points = moderate / severe (more than 6%) dehydration			

Reassuring Features

- Normal oral intake
- Normal urine output
- No vomiting

If all 3 findings are present, dehydration is not likely clinically significant

To admit or to treat as an outpatient?

>> No need for admission, he is stable, tolerating orally, no red flags

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When to consider sending for inpatient care

- Signs of sepsis >> check vitals and general well being
- Signs of severe dehydration >> asses hydration
- Dehydration not responding to oral hydration >> assess hydration
- Clinically ill, severe disease, cannot tolerate orally
- Signs of peritonitis or abdominal abscess >> abdominal exam
- Infant <3 months and frail patients
- Recent hospitalization of antibiotics suspecting C. diff → send for testing >>inpatient care setting if testing not available in primary care facility.

AAFP http://www.lhp.leedsth.nhs.uk/detail.aspx?id=1211

To perform stool testing or not?

Diagnosis is already made clinically, he doesn't have any red flags including fever, bloody stool, hx of travel, or any other red flags that may indicate admission

★ **Indication of Stool testing** (PCR and culture) in acute diarrhea

- Fever $\geq$ 38°C $\geq$ 72 hours with or without bloody stool
- Bloody or mucoid stool (with or without fever)
- History of recent travel **WITH** moderate to severe disease **WITH** fever **AND** bloody stool (mild case without fever, no bloody stool testing not recommended)
- Signs of sepsis
- Immunocompromised hosts
- Risk of outbreak
- Diarrhea and symptoms lasting $\geq$ 7 days
- Recent hospitalization of antibiotics (consider C. diff testing)

AAFP, IDSA guidelines 2017, Sandford guide

Stool Testing: Notes

- PCR multiplex panels for initial detection of potential pathogens are more sensitive and specific, and rapidity of test performance compared to culture and microscopy. However, not readily available in all primary care centers.

- Detection of pathogen may represent colonization without invasive disease.
- Interpretation should include consideration of clinical assessment.

- In cases of bloody diarrhea caused by Shiga-Toxin producing E. coli (STEC) infection, monitor CBC and basic metabolic count for hemolytic-uremic syndrome.

When to order labs?

- Laboratory tests are not routinely warranted for most patients with acute diarrhea.
- CBC: not reliably distinguish bacterial etiologies of diarrhea from others but may be helpful in suggesting severe disease or potential complications.
- Metabolic panel: If substantial volume depletion is present (suggested by signs or symptoms such as dark and concentrated urine)

Managemnt

- Fluid repletion
- Dietary reccomendations
- Stop medications (SADMANS) until normal health status
- Symptom management
- +/- Emperic antibiotic therapy

How will you replace fluid loss?

Our patient doesn't seem dehydrated so I will prevent dehydration by advising him to drink plenty of fluids slowly and continuosly untill fluid is no longer lost

Fluid Repletion

The most critical therapy in diarrheal illness is rehydration

- **Mild illness:** preferably oral replacement, with solutions that contain water, salt, and sugar (Diluted fruit juices and flavored soft drinks along with saltine crackers and broths or soups)
- **Mild-moderate:** ORS, such as Pedialyte, hydralite (available at Nahdi Pharmacy)
- **Severe:** initially receive intravenous fluid repletion. Once they are replete, they can be switched to ORS (if young, healthy, medically free: can give IV in treatment room, rather than admission) (special consideration: HF, pregnancy, ..)

Reference: Uptodate

Rehydration: mild-moderate

- In patients with mild or moderate hypovolemia **>>** ORS is administrated in **frequent, small** amounts
- no more than **5 mL** administered **every one to two minutes** by spoon or syringe,

>> **total volume** of **50 to 100 mL/kg** replaced quickly **over 3-4 hours**.

- ***Continue sipping on fluids, as much as you can until fluid is no longer lost (no need to jug quickly)***

Reference: Uptodate

Dietary reccomendations

- **Boiled starches and cereals** (eg, potatoes, noodles, rice, wheat, and oat) *with salt*
- **crackers, bananas, soup, and boiled vegetables** may also be consumed [3].
- **Avoid**: foods with high fat content and dairy products, until the gut function returns to normal after a severe bout of diarrhea.

Reference: UpToDate

Symptomatic therapy

Avoid antimotility agents in patients with clinical features suggestive of dysentery (fever, bloody or mucoid stools)

- **Loperamide:** use cautiously, in whom fever is absent or low grade and the stools are not bloody.

>>Dose: two tablets (4 mg) initially, then 2 mg after each unformed stool for ≤2 days, with a maximum of 16 mg/day.

- **Alternative to loperamide**: bismuth salicylate (somewhat less effective and there is the potential for salicylate toxicity (especially in those who take aspirin for any reason and pregnant women).

- **Antiemetic: ondansetron** (Zofran) to improve success and oral rehydration rates.

Reference: Uptodate

To initiate empiric antimicrobial therapy or not?

Our patient doesn't need empiric antimicrobial therapy because his symptoms seem to be of viral cause by which antibiotics will be of no use

Generally..

- No routine use of empiric antibiotics in adults with acute diarrhea.

- Clinical presentation of our case suggests viral cause

★Indications for empiric antibiotics in acute diarrhea in primary care:

- Fever ≥ 38°C ≥ 72 days (with or without bloody stool)
- History of recent travel **WITH** moderate to severe disease **WITH** fever (with or without bloody stool)

Empiric antibiotic therapy for acute watery diarrhea and Traveler's Diarrhea			
	Single dose (oral)	**Three-day dose (oral)**	**Comments**
****Azithromycin (macrolide)**	1000mg	500mg OD	Invasive pathogens (e.g., *Compylobacter jejuni*). Preferred in febrile illness with or without bloody diarrhea and quinolone resistance.
****Ciprofloxacin (Fluroquinolone)**	750 mg	500mg OD	Gram negative (e.g., Shigella) Re-evaluate 12-24 hours after single-dose; continue up to 3 days if diarrhea not resolved
Levofloxacin (Fluroquinolone)	500mg	500mg OD	
Rifaximin (Rifamycins: macrolide)	n/a	200mg TID	Not useful with invasive causes of diarrhea (e.g., STEC, EHEC)

Note: Doses assume **normal** renal and hepatic function

AAFP, Sanford guide, doi: 10.7205/MILMED-D-17-00068

Empiric therapy: special considerations

- Suspicion of C. diff usually need admission, no outpatient treatment)
- For pregnant women with diarrhea accompanied by fever or systemic illness who had potential exposure to *Listeria* monocytogenes
- cholera (eg, travel to an endemic or epidemic setting), empiric antibiotic coverage of *Vibrio cholerae* is reasonable

Indications for targeted antibiotics in acute diarrhea in primary care (Abx guided by PCR and culture results)

- Diarrhea and symptoms lasting ≥ 7 days
- History of travel with mild disease (no fever, no bloody stool) but symptoms not resolving despite symptomatic treatment
- Bloody stool with or without fever (Bloody stools without fever is concerning for Shiga Toxin-producing E. coli (STEC). Antibiotics should be avoided in STEC infections since there is no evidence that antibiotics are helpful and may increase risk of developing hemolytic uremic syndrome HUS. Mainstay of treatment is hydration).

AAFP, IDSA guidelines 2017, Sandford guide

Follow up

- In general, follow-up stool testing is **not necessary**, even if it was initially positive.
- If diarrhea resolves or responds rapidly to therapy, no further work-up or treatment is necessary. (If diarrhea becomes persistent, the search for an etiology should be expanded to try to isolate a treatable process or pathogen or identify a noninfectious etiology.)
- In some locations, **a negative stool test following infection** with certain bacterial infections (eg, *Salmonella*, *Shigella*, Shiga toxin-producing *E. coli*) is mandated for occupations with a high risk of transmission (eg, **food handling or direct patient care**) before returning to work after a diarrheal illness.

Case #18

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Case #18

A 28-year-old previously healthy female reports a 1-day history of watery diarrhea.
She is having up to 5 bowel movements per day.

She recalls eating at a food truck 1 day ago, symptoms appeared almost 8 hours after her meal.

She denies fever, blood in her stool, or recent travel.
Family members who ate the same food are experiencing similar symptoms.

Her vital signs are normal (including supine and standing blood pressures), and the remainder of the physical examination is remarkable only for mild, diffuse abdominal tenderness.

Reference: UpToDate

What are the differentials?

Gastroenteritis, food poisoning, IBS, IBD

Then we will discuss the differences between gastroenteritis and food poisoning: >> incubation period, family memebers with similar symptoms, food trucks have poor cooling systems for their food

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Asses Severity of illness: hx + physical, *similar to GE approach*

History	Physical Examination
•The severity of the symptoms •Risk of complications such as dehydration •Amount and type of oral intake •Frequency and estimated volume of emesis or stool •Suspected contaminated food •Onset of symptoms after suspected contaminated food consumption •Neurological symptoms **Red flags** •High fever (temperature over 38.889°C, measured orally) •Continuous vomiting which prevents keeping liquids in the stomach (which can lead to dehydration) •Signs of dehydration include: little or no urination, very dry mouth and throat, or feeling dizzy when standing up •Bloody stools	Aim of PE: Narrow differentials, estimate volume depletion severity) Vitals: check for signs of volume depletion (low BP (<90/60), orthostatic hypotension, tachycadia) Clinical Dehydration Scale: evaluates 4 clinical features to estimate the degree of dehydration.

Approach to food poisoning

Similar approach to GE

ensure assesment of
Incubation period (duration between potential contaminated food consumption to onset of symptoms)

Source of infection

Potential Source to Likely Pathogen

Differential diagnosis of foodborne disease by item consumed

Item	Commonly associated microbes*
Raw seafood	Norwalk-like virus, *Vibrio* spp, hepatitis A
Raw eggs	*Salmonella* spp
Undercooked meat or poultry	*Salmonella* spp, *Campylobacter* spp, STEC, *Clostridium perfringens*
Unpasteurized milk or juice	*Salmonella* spp, *Campylobacter* spp, STEC, *Yersinia enterocolitica*
Unpasteurized soft cheeses	*Salmonella* spp, *Campylobacter* spp, STEC, *Y. enterocolitica*, *Listeria monocytogenes*
Homemade canned goods	*Clostridium botulinum*
Raw hot dogs, deli meat	*L. monocytogenes*

Reference: UpToDate

Incubation period

- **Within 6 hours** – suggests ingestion of a **preformed toxin** of *Staphylococcus aureus* or *Bacillus cereus*, particularly if nausea and vomiting were the initial symptoms

- **At 8 to 16 hours** – suggests infection with ***Clostridium perfringens***

- **At more than 16 hours** – suggests either **viral or other bacterial** infection (eg, contamination of food with enterotoxigenic (salmonella, shigella) or STEC or other pathogens)

Reference: UpToDate

Keep in mind other differentials: ask about systemic symptoms

DON'T FORGET TO R/O OTHER CAUSES, and look out for systemic features

Neurological symptoms:

- **Botulism** –visual disturbances and potentially life-threatening descending paralysis following Typical foods associated with botulism are those canned at home, fermented fish, herb-infused oils, and foods held warm for extended periods of time. Stool and serum can be tested for toxin
- **Ciguatera toxin** –associated with consumption of large reef fish, such as grouper, red snapper, amberjack, and barracuda, that have consumed dinoflagellates that produce heat-stable ciguatoxin. Nausea, vomiting, diarrhea, and abdominal pain in the first two to six hours. These symptoms can be followed by paresthesia, weakness, and/or reversal of hot or cold. Cardiovascular abnormalities can also develop.
- **Other toxins** – Shellfish may also contain toxins that fall into three groups (diarrheic, neurotoxic, and amnesic) causing the various symptoms that their names imply. Symptoms usually occur within 30 minutes to several hours following exposure
- There are also a variety of mushroom toxins that result in a mixture of gastrointestinal and neurologic disturbances, including hallucinations and confusion.
- This might require inpatient care

Reference: UpToDate

When to consider sending for inpatient care

- Signs of sepsis >> check vitals and general well being
- Signs of severe dehydration >> asses hydration
- Dehydration not responding to oral hydration >> assess hydration
- Clinically ill, severe disease, cannot tolerate orally
- Signs of peritonitis or abdominal abscess >> abdominal exam
- Infant <3 months and frail patients
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AAFP http://www.lhp.leedsth.nhs.uk/detail.aspx?id=1211

Should you order investigations?

Yes, because food poisining is a public health concern

Should you pursue diagnostic testing?

High clinical suspicion of food poisoning: public health concern so you should investigate for the source!

>>Perform stool testing to detect causative agent of the food poisoning
ie. *Salmonella*, *Shigella*, *Campylobacter*, *Yersinia*, *Clostridium difficile*, and Shiga toxin-producing *Escherichia coli*

Managemnt

- Fluid repletion
- Dietary reccomendations
- Stop medications (SADMANS) until normal health status
- Symptom management
- +/- Emperic antibiotic therapy (similar to GE emepric antibiotic therapy)

Case #19

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Case #19

A 27-year-old non married woman presents to her primary care physician with a report of urinating more frequently and pain with urination.

She denies blood in her urine, fevers, chills, flank pain, and vaginal discharge.

She reports having experienced similar symptoms a few years ago and that they went away after a course of antibiotics.

The patient has no other past medical or surgical Hx.

What are the differentials?

Simple cystitis

excessive caffeine intake

vaginitis

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The patient has no other past medical or surgical Hx.

Classification of UTI:

- **Acute uncomplicated UTI**: Also known as cystitis or lower urinary tract infection. It is a bacterial infection of the bladder and associated structures. No structural abnormalities or comorbidities, such as DM, immunocompromised state, or pregnancy. Typically, an infection in an afebrile non-pregnant immune-competent female patient.

- **Recurrent cystitis in women**

- **Complicated UTI:** Bacterial infection in the urinary tract that carries a higher risk of treatment failure, longer antibiotic course and required further investigations. Therefore, all urinary tract infections in immunocompromised patients, males, and those associated with fevers, stones, sepsis, urinary obstruction, catheters, or involving the kidneys are considered complicated infections. UTI in men is considered complicated.

- **UTI in men:** Also considered to be complicated

- **Pyelonephritis:** infection of the upper urinary tract. Also divided into acute uncomplicated (can be managed with outpatient care) and complicated pyelonephritis (usually present with obstruction, underlying renal disease, male sex, immunocompromised, stone disease, anatomic or functional urinary tract abnormality. Severe illness/sepsis, unreliable oral intake, elevated serum creatinine, and severe pain requires hospitalization)

- **Urinary tract infection and asymptomatic bacteriuria in pregnancy**

- **Asymptomatic bacteriuria**

- **Catheter-associated urinary tract infection**

- **Emphysematous UTI**

- **UTI in kidney transplant patients**

AAFP https://www.aafp.org/pubs/afp/issues/1999/0301/p1225.html
Sanford Guide, Up to Date

Acute simple cystitis

UTIs are the most common bacterial infections in women

Symptoms:

- Dysuria
- Frequent voiding of small volumes
- Urinary urgency
- Hematuria
- Urine that appears cloudy
- Supra-pubic discomfort (Pelvic pain, in women, especially in the center of the pelvis and around the area of the pubic bone)
- Strong-smelling urine (depends on type of bacteria)

History

- Uncomplicated UTI host features: immunocompetent, no comorbidities, no known urologic abnormalities, non-pregnant, premenopausal, **female.**

- Acute symptoms of dysuria, urinary frequency or urgency, and/or suprapubic pain, particularly in the absence of vaginal symptoms

Ddx

- Vaginits
- Urethritis
- Painful bladder syndrome
- Pelvic inflammatory disease
- Interstitial Inflammatory cystitis

Physical Examination

- Fever (if present, simple cystitis is unlikely)
- Check for costovertebral angle tenderness
- Check for abdominal tenderness
- A pelvic examination is indicated if signs or symptoms suggesting vaginitis or urethritis are present

Etiology

Organism	Percentage
Escherichia coli	86%
Staphylococcus saprophyticus	4%
Klebsiella species	3%
Enterobacter species	1.4%
Citrobacter species	0.8%
Enterococcus species	0.5%

Diagnosis

- The clinical diagnosis of cystitis is made in a patient who has classic signs and symptoms
- **Acute** symptoms of **dysuria, urinary frequency, or urgency**, and/or **suprapubic pain**, the probability of cystitis is > 50 %
- In the **absence of vaginal symptoms** (e.g., vaginal pruritus or discharge) the probability of cystitis is >90%

Acute simple cystics does NOT include:

- fever (>99.9°F/37.7°C)
- including chills
- rigors
- marked fatigue or malaise beyond baseline
- flank pain
- and costovertebral angle tenderness

Management

- healthy nonpregnant young females with typical symptoms of acute simple cystitis >> Prescribe **empiric antibiotic** (no need for investigations)

- Otherwise >> investigate

Emperic Antibiotic Therpay

- Nitrofurantoin
- fosfomycin,
- trimethoprim-sulfamethoxazole (Bactrim or co-trimoxazole)

- The choice between medications should be individualized and based on patient allergy and G6PD status, compliance history, local practice patterns, local community resistance prevalence, availability, and cost.

Medication	Dose	Pregnancy Category
First line		
Fosfomycin	3 g single dose	B
Nitrofurantoin*	100 mg twice per day for five days	B
Trimethoprim/ sulfamethoxazole	160/800 mg twice per day for three days	C
Second line		
Ciprofloxacin*	250 mg twice per day for three days	C
Ciprofloxacin, extended-release	500 mg per day for three day	C
Levofloxacin	200 mg per day for three days or 400 mg single dose	C
Third line		
Amoxicillin/clavulanate	500/125 mg twice per day for seven days	B
Cefdinir	300 mg twice per day for 10 days	B
Cefpodoxime	100 mg twice per day for seven days	B

Contraindications

- Nitrofurantoin: **avoided** if there is suspicion for early pyelonephritis or if the creatinine clearance is <30 mL/minute, or if G6PD deficient, pregnancy (3rd trimester)

- Trimethoprim-sulfamethoxazole: **avoided** if sulfamethoxazole allergy

- Fosfomycin: **avoided** if there is suspicion for early pyelonephritis, avoid in anything outside of the definition of acute simple cystitis

Investigations: UA/dipstick and Urine culture

- Gold standard in the diagnosis of urinary tract infection: suprapubic aspiration of the bladder (not performed in clinical practice, instead urine sample is obtained)
- Ideal urine sample: a clean-catch, midstream sample
- Best initial: UA
- Most accurate: Urine culture

UA interpretations

- Leukocyte estrase >> Pyuria
- Nitrite >> Enterobacteriaceae (gram –ve bacteria)

UA/dipstick interpretations

- **Pyuria** (>10/microL: positive) (present in almost all females with acute cystitis; its absences strongly suggests an alternative diagnosis)
- **Blood cell casts** in the urine, although rare, are indicative of upper tract infection rather than simple cystitis.
- **A positive nitrite** test is a reliable index of significant bacteriuria, although a negative test does not exclude bacteriuria.
- >>WBCs and no bacteria
  - Urethritis
  - Prostatitis
  - Interstitial nephritis -the predominant WBCs are eosinophils

- **Lack of pyuria suggests against UTI**
- **Hematuria > repeat, but don't be alarmed**

**Leukocyte estrase >> Pyuria ** Nitrite >> Enterobacteriaceae (gram –ve bacteria) FM: The Essentials Section 2 Chapter 14, UpToDate

Urine Culture

- confirms the presence of bacteriuria
- identifies and provides antibiotic susceptibility information on the causative organism (often retrospectively, if treatment is empirically given)

Positive culture:

- Symptomatic: $\geq 10^2$/m colony forming units (CFU)/ml
- Asymptomatic: $\geq 10^5$ CFU/ml

Management

- If urine culture obtained>> treat according to sensitivitiy

Follow up

- Follow-up urine cultures are not needed in patients with acute simple cystitis whose symptoms resolve on antimicrobials.

- Patients who have **persistent symptoms after 48 to 72 hours of empiric antimicrobial** therapy or have **recurrent symptoms within a few weeks** of treatment should have additional evaluation. This includes urine culture and empiric treatment with another antimicrobial agent.

Case #20

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Case#20

A 19-year-old man complains of a purulent discharge (pus) from the penis and burning with urination for three days.

He has no fever or other manifestations.

He states that he has had numerous sexual partners, does not use condoms consistently, and had intercourse with a new partner he met at a party four days before the onset of symptoms.

His physical examination is normal except for spontaneous discharge of pus from the urethral meatus.

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His physical examination is normal except for spontaneous discharge of pus from the urethral meatus.

What are the differentials?

Sexually transmitted diseases including chlamydia and gonorreha

Clinical Presentation (potential complications of gonorrhea and chlamydia)

Presentation defers according to gender

Female	**Male**	**Both**
Cervicitis (MC) Dysuria-pyuria syndrome due to urethritis Pelvic inflammatory disease Pregnancy complications Bartholinitis	Urethritis Epididymitis Prostatitis	Conjunctivits Pharyngitis Proctitic and rectal infections Genital lymphogranuloma venereum (typically caused by chlamydia) Reactive arthritis/reactive arthritis triad (RAT)

Sexual History

The Five P's approach for health care providers obtaining sexual histories when suspecting STI

Partners	1/ Are you currently having sex of any kind? 2/ What is the gender(s) of your partner(s)?
Practices	1/ To understand any risks for sexually transmitted infections (STIs), I need to ask more specific questions about the kind of sex you have had recently. 2/ What kind of sexual contact do you have or have you had? 3/ Do you have vaginal sex, meaning 'penis in vagina' sex? 4/ Do you have anal sex, meaning 'penis in rectum/anus' sex?
Protection from STIs	1/ Do you and your partner(s) discuss prevention of STIs and human immunodeficiency virus (HIV)? 2/ Do you and your partner(s) discuss getting tested? 3/ What protection methods do you use? 4/In what situations do you use condoms?
Past history of STIs	1/ Have you ever been tested for STIs and HIV? 2/ Have you ever been diagnosed with an STI in the past? 3/ Have any of your partners had an STI?
Pregnancy intention	1/ Do you think you would like to have (more) children in the future? 2/ How important is it to you to prevent pregnancy (until then)? 3/ Are you or your partner using contraception or practicing any form of birth control? 4/ Would you like to talk about ways to prevent pregnancy?

Sexually Transmitted Diseases

If left undiagnosed and untreated, STIs may lead to severe complications such as pelvic inflammatory disease, infertility, ectopic pregnancy in women, congenital infections and cancer and more.

Bacteria	Viruses	Other
– Neisseria gonorrhea – Chlamydia trachomatis – Treponema pallidum – Haemophilus ducreyi – Klebsiella (Calymmatobacterium) granulomatis – Ureaplasma urealyticum – Mycoplasma genitalium	-HIV (types 1 and 2) – Human T-cell lymphotropic virus type 1 – Herpes simplex virus type 2 – Human papillomavirus (multiple genital genotypes) – Hepatitis B virus – Molluscum contagiosum virus	– Trichomonas vaginalis – Pthirus pubis

Chlamydia Trachomatis

Chlamydia trachomatis is the **most common bacterial cause of sexually transmitted genital infections**

The majority of affected persons are asymptomatic and, thus, provide an ongoing reservoir for infection.

Incubation Period and asymptomatic presence

Incubation period: **5-14 days** following infection. (However, it is unclear how long those with asymptomatic disease may carry the infection.)

Diagnosis

- Nucleic acid amplification testing (NAAT) (test of choice)
- any testing for *C. trachomatis* should also prompt testing for *N. gonorrhoeae*.
- If NAAT not available >> culture, antigen detection can be used

- Preferred specimens for testing:
  - Genitourinary infection or screening in females- **vaginal swab**
  - Genitourinary infection or screening in males- **first-catch urine** is the diagnostic test of choice.
  - Rectal infection- NAAT should be performed on a **rectal swab specimen**

Gonorrhea

- Gonorrhea is an infection with the gram-negative coccus Neisseria gonorrhea
- it is a major cause of morbidity among sexually active individuals worldwide.
- The most common sites of gonorrhea infection are the **urogenital tract as urethritis in males and cervicitis in females**. Additionally, N. gonorrhea can infect extragenital sites such as eyes, rectum and pharynx .

Incubation Period

Incubation Period in symptomatic males **2-5 days**

Cervicitis in females **within 10 days** *[most females (up to 70% are asymptomatic)]*

Diagnosis

Clinically by **history and physical examination**. Treatment of N. gonorrhea urogenital infection is empiric before results of diagnostic tests are available.

(NAAT) is the test of choice for the initial microbiologic diagnosis of N. gonorrhea infection.

Sample for NAAT:

Female: vaginal swab

Male: First catch urine, Urethral swab

For extragenital infections, NAAT, used on *pharyngeal and rectal swabs* is also the preferred test.

(In men, urethral swab for microscopic evaluation of urethritis shows **polymorphonuclear leukocytes with intracellular gram-negative diplococci on gram stain**. This is enough to establish the diagnosis of N. gonorrhea.)

Culture remains important for its ability to assess antibiotic susceptibilities of the isolate when resistance is suspected.

Co test for Chlamydia, syphillus, HIV

Swabs

- Urethral swabs are obtained by inserting a male urethral cotton swab 2 to 3 centimeters into the urethral meatus and rotating 360 degrees two to three times.

- Cervical specimens are collected by inserting the tip of a swab 1 to 2 centimeters into the cervical os and rotating 360 degrees two to three times.

- Rectal specimens may be obtained by inserting the swab 3 to 4 cm into the rectal vault

- Pharyngeal specimens are procured from the posterior pharynx with a swab

Goals of treatment

- Prevent complicated infections related to chlamydia and their sequelae (eg, pelvic inflammatory disease)
- Decrease the risk of transmission to others; this includes sex partners and infants at delivery
- Resolve symptoms; between 83 and 86 percent of symptomatic patients with cervicitis or urethritis improve clinically within two weeks of starting treatment
- Prevent reinfection

Should you report?

Yes it is a notifiable disease

Management Goals

- Concomitant gonococcal and chlamydia management empirically (no need for testing if diagnosis is clear)
- Active antimicrobial therapy
- Test and council for other viral STI (HIV, HBV, HCV) especially with high risky behavior and anal intercourse (for HCV)
- Examination for genital warts –if needed
- Counseling on abstinence for one week following treatment
- Counseling to return for persistent or recurrent symptoms
- Retesting to evaluate for recurrent infection
- Treatment of sexual partners empirically with abstinence (preferably at the same time) (keep in mind females are usually asymptomatic)
- Case report to public health officials

Syndromic approach to urethral discahrge

Concommitant management of chlamydia & gonorrhea

>>Doxycycline 100mg BID + Ceftriaxone single dose

Antibiotic Therapy (targeting chlamydia)

- **Doxycylcine** (preferred for non-pregnant)

>>**100 mg BID for 7 days** (*patients should be counseled on treatment adherenceIndividuals)*

>>patients of child-bearing age should also have pregnancy testing prior to taking doxycycline

OR

- **Azithromycin** (preferred for pregnant patients)

>> (1 g as a single dose, ideally directly observed)

OR

- **Fluoroquinolones**

>> (levofloxacin 500 mg once daily or ofloxacin 300 mg twice daily, each for seven days)

>> reserved for situations in which other fluoroquinolone-susceptible pathogens need to be covered (eg, epididymitis in individuals who practice insertive anal intercourse).

Antimicrobial Therapy Targeting Gonorrhea (no need to confirm diagnosis)

- Single-agent therapy with **ceftriaxone** is the preferred regimen for treatment of gonococcal infections
  - For individuals who weigh <150 kg: ceftriaxone 500 mg intramuscular (IM) in a single dose
  - For individuals who weigh ≥150 kg: ceftriaxone 1 g IM in a single dose
- Alternative in gonorrhea if ceftriaxone not available:

-Cefexime 800mg single dose

OR

-Gentamycin 240 IM single dose + Azithromycin 2g orally single dose

Test of cure

A test of cure (TOC) for assessing the adequacy of the prescribed antibiotic regimen is **not routinely done** except in the pregnant females or among those with persistent symptoms. In these circumstances, a TOC can be performed at *least three weeks after treatment is completed.*

Partner Managent

- Refer all sex partners for testing and treatment
- Recent exposure: In patients who present within one to two weeks of a potential or known exposure to gonorrhea, diagnostic testing should not be used to inform the decision to treat. Such patients should be treated **empirically**

If partner can not present for clinical evaluation: a single dose of oral cefixime 800 mg (plus presumptive treatment for chlamydia if not ruled out in the index patient) to sex partners.

Report to officials

Sexually trasmitted diseases are notifiable diseases

Report the case to public health officials!

Case List

1- Community Acquired Pneumonia (CAP)
2- Acute bronchitis
3- Septic arthritis
4- Conjunctivitis (bacterial)
5- Perichondritis
6- Otitis Media with effusion
7- Acute Otitis Media (AOM)
8- Otitis Externa (OE)
9- Impetigo
10- Cellulitis
11- Shingles
12- Viral URTI (common cold)
13- Influenza
14- Pharyngitis
15- Epiglottitis
16- Retropharyngeal abscess
17- Gastroenteritis
18- Food poisoning
19- Cystitis (simple)
20- Urethritis (Sexually Transmitted Infection)

THANK YOU.