CHI Memorial

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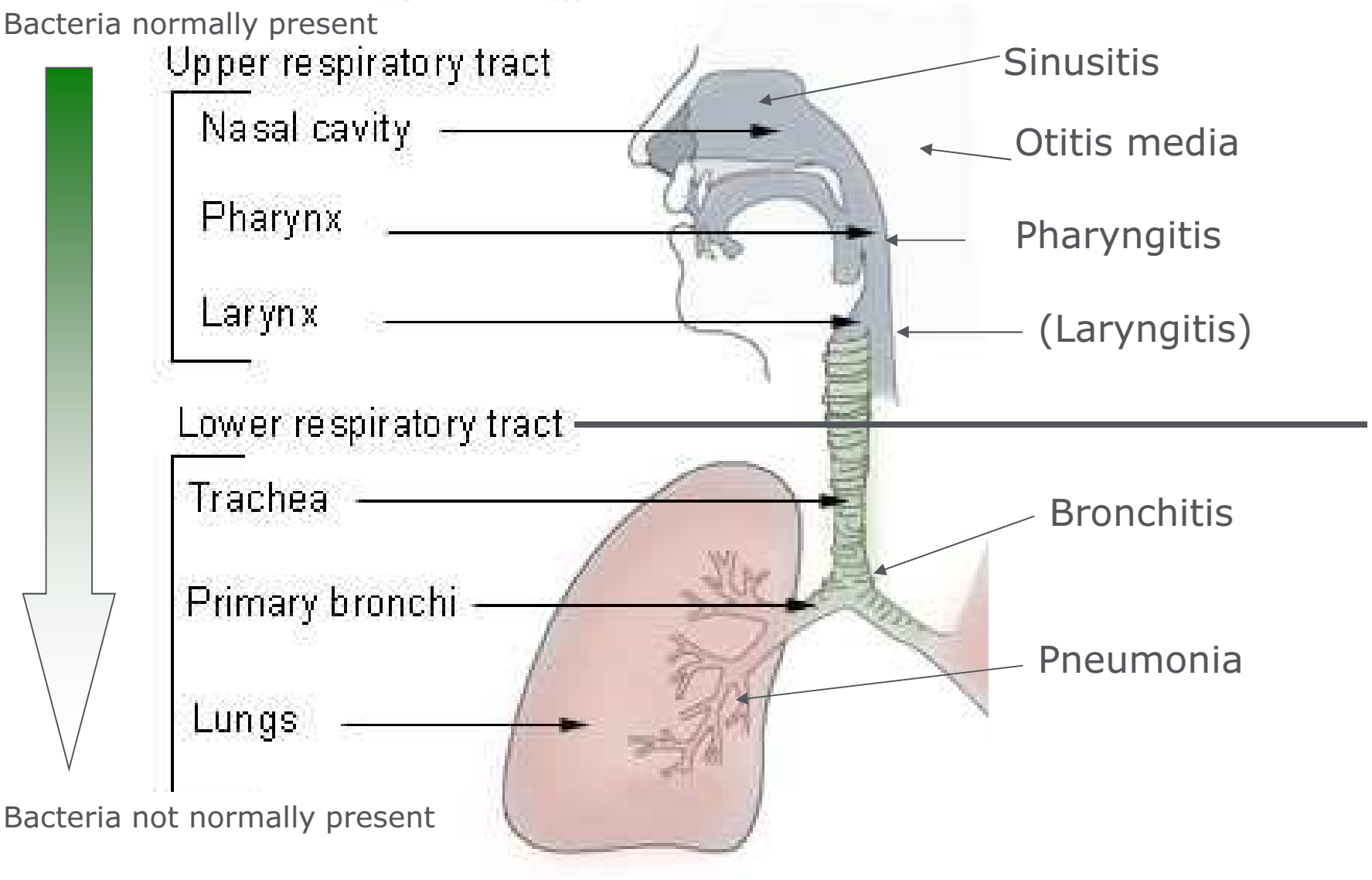
Pneumonia and more…

9/9/16

Conducting Passages



Diagnosis

- Obtaining a sample – challenging (see table)
- Chest X-ray
  - Highly sensitive to rule out pneumonia
- Bronchitis vs. Pneumonia
  - Fever atypical
  - No dyspnea
  - Normal WBC
  - Normal CXR
- COPD Exacerbation

SAMPLE	PROCEDURE	PROS	CONS
Blood culture	-Draw blood via venipuncture	-Easy to obtain for ED/inpatient -Identifies invasive pathogens -Good *specificity*	-Difficult for outpatients -Poor *sensitivity*
Sputum culture	-Deep cough sample -Good sample: many WBCs & few epithelial cells on Gram stain	-Noninvasive -Easy to obtain	-Poor *sensitivity* (can't get to lower airways) -Poor *specificity* (contamination with upper respiratory organisms)
Endotracheal aspirate (ETA)	-Suction of secretions in intubated patient	-Noninvasive & easy to obtain (if you're on a vent) -Moderate *sensitivity*	-Poor specificity (contamination with ET tube colonizers)
Broncho-alveolar lavage (BAL)	-Endoscopy guided or blind (mini-BAL) flexible tube into lower airways	-Good *sensitivity* -Good *specificity*	-Invasive -Requires intubation, sedation, expertise

Common Pathogens - Pneumonia

- Community-acquired
  - *S. pneumoniae*
  - *Legionella pneumophilia*
  - *Chlamydia pneumoniae*
  - *Mycoplasma pneumoniae*
  - *H. influenza/ Moraxella catarrhalis*

- Hospital-acquired (early onset)
  - *S. pneumoniae*
  - *H. influenza*
  - *S. aureus*
  - Antibiotic sensitive GNR (*E.coli, K. pneumoniae, P. mirabilis* etc.)

Common Pathogens

- Hospital-acquired (late onset)
  - *S. aureus*
  - *E. coli*
  - *K. pneumoniae*
  - *E. aerogenes*
  - *P. aeruginosa*

- Healthcare-associated (acquired in long term care facilities):
  - *S. pneumoniae*
  - *H. influenza*
  - *S. aureus*
  - Antibiotic sensitive GNR (*E.coli, K. pneumoniae, P. mirabilis* etc.)
  - *P. aeruginosa* (If risk factors present)

Risk Factors for *P. aeruginosa*:
- **Structural lung disease**
- **Severe COPD w/ frequent abx or steroid use**
- **Recent mechanical ventilation**
- **Recent broad spectrum antibiotic use**

CA is a 60 yo male with a history of HTN, DM who presents to the ED with fevers and cough. In the ED he is intermittently confused. His vitals/labs in the ED: T 101F, WBC 14.2, HR 110, RR 31, O2 sat 93% of 4L NC. His CXR shows a LLL infiltrate. He is admitted to the medical floor of the hospital, to your general medicine team.

A. Augmentin + azithromycin
B. Cefepime + tobramycin
C. Ceftriaxone
D. Clarithromycin
E. Levofloxacin

Regardless of your recommendation above, CA is initiated on ceftriaxone and levofloxacin. He improves and 48 hours later his vital signs are:

- Temp 37.2 (has been afebrile x12 hours)
- HR 100
- RR 16
- BP 110/90

CA's mental status is within normal limits and he is eating normally. Blood cultures on admission are negative, and a sputum culture taken at admission was contaminated with epithelial cells and not processed.

Switch to PO antibiotics

When:

-Hemodynamically stable

-Able to ingest/absorb PO drugs

Duration of Therapy

Continue antibiotics for

-At least 5 days AND

-Until afebrile 48-72 hours AND

-No more than 1 sign of clinical instability:

Temp ≥37.8, HR ≥90, RR ≥24, SBP≤90, unable to take meds/foods PO, altered mental status from baseline

"In general, when switching to oral antibiotics, either the same agent as the intravenous antibiotic or the same drug class should be used. Switching to a different class of agents simply because of its high bioavailability (such as a fluoroquinolone) is probably not necessary for a responding patient. For patients who received intravenous b-lactam–macrolide combination therapy, a switch to a macrolide alone appears to be safe for those who do not have DRSP or gram-negative enteric pathogens isolated."

CAP Treatment Recommendations (IDSA)

- Inpatient, non-ICU treatment
  - Respiratory fluoroquinolone
    - Levofloxacin, moxifloxacin
  - β-lactam plus macrolide
    - Ceftriaxone + azithromycin

- Inpatient, ICU treatment
  - β-lactam + azithromycin OR fluoroquinolone

- When to add vancomycin?
  - Known prior history of MRSA respiratory infection
  - Cavitary lesions on imaging
  - Recent episode of influenza

- Duration of therapy: 5-7 days

Suggested Changes (CAP)

- Non-ICU Treatment
  Preferred
  - CTX + ZMAX

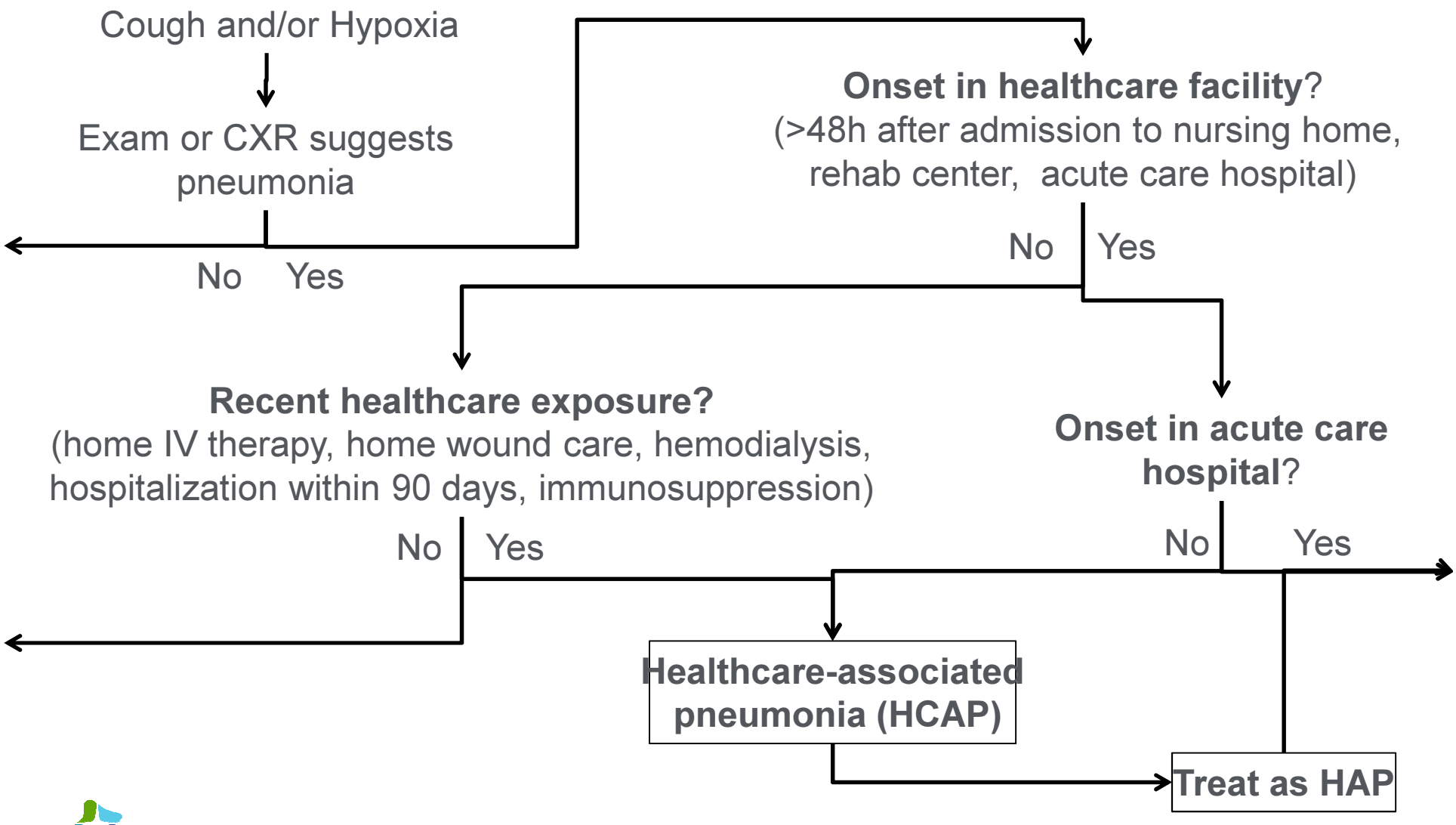
  Alternate (Anaphylaxis to PCN, Severe Cephalosporin allergy)
  - LEV

- ICU Treatment
  Preferred
  - ~~LEV +~~ CTX + ZMAX +/- VANC*

  Alternate (Anaphylaxis to PCN, Severe Cephalosporin allergy)
  - LEV ~~+ AZT~~ +/- VANC*

*CA-MRSA Risk Factors: prior influenza, presence of cavitary disease on chest imaging

HAP/HCAP


Cough and/or Hypoxia
Exam or CXR suggests pneumonia
No
Yes
Onset in healthcare facility?
(>48h after admission to nursing home, rehab center, acute care hospital)
No
Yes
Recent healthcare exposure?
(home IV therapy, home wound care, hemodialysis, hospitalization within 90 days, immunosuppression)
No
Yes
Onset in acute care hospital?
No
Yes
Healthcare-associated pneumonia (HCAP)
Treat as HAP

AS is a 56 year old male who was admitted 13 days ago for coronary artery bypass surgery. Post CABG the patient had slow recovery and remained in the ICU. Two days ago, AS developed a fever (Tmax: 101.5F), hypoxemia requiring intubation, WBC= 14.2, abundant purulent tracheal secretions, and a CXR revealing localized infiltrate in RLL. Scr 1.8mg/dL, Weight = 98kg. A BAL has been sent to the lab. The team would like to initiate empiric antibacterial therapy

Syndromic Antibiogram – PNA

- Included:
  - Sputum, tracheal aspirate, bronch specimens, and pleural fluid
  - 1st isolate per patient per year

- Excluded:
  - *Stenotrophomonas maltophilia*
  - < 5 isolates of an organism

- If Staph spp.
  - FQ considered R

- If MSSA
  - CPM, P/T, MER considered S

Syndromic Antibiogram – PNA (Glenwood)

Regimens	Sensitive (%)
P/T	64
P/T + VANC	89
P/T + VANC + LEV	92
P/T + VANC + TOB	98

Regimens	Sensitive (%)
AZT	40
AZT + VANC	84
AZT + VANC + LEV	90
AZT + VANC + TOB	97

Regimens	Sensitive (%)
CPM	66
CPM + VANC	91
CPM + VANC + LEV	92
CPM + VANC + TOB	97

HAP Treatment Recommendations (2016)

- Monotherapy with antispseudomonal/anti-MSSA agent

- Add MRSA agent if:
  - Patients being treated in units where >20% of S aureus isolates are methicillin resistant **OR**
  - Use of IV abx in the past 90 days **OR**
  - High risk of mortality[1]

- 2nd antipseudomonal agents if:
  - Use of IV abx in the past 90 days **OR**
  - High risk of mortality[1]

[1] Requiring ventilator support due to pneumonia and septic shock

VAP Treatment Recommendations

- Monotherapy with antispseudomonal/anti-MSSA agent

- Add MRSA agent if:
  - Patients being treated in units where **>10-20%** of S aureus isolates are methicillin resistant **OR**
  - Risk factors

- 2 antispseudomonal agents if:
  - **Patient is in a unit where > 10% of gram (-) isolates are resistant to an agent being considered for monotherapy OR**
  - Risk factors

Risk Factors for MDR Organisms

- Use of IV abx in the past 90 days
- >/= 5 days of hospitalization prior to VAP
- Septic shock at time of VAP
- ARDS prior to VAP
- Renal replacement therapy prior to VAP

Order Set Changes (HCAP/HAP/VAP)

- Non-ICU
  - Preferred Regimen
    - CPM + VANC (91%) **OR**
  - Alternate Regimen (Anaphylaxis to PCN, Severe Ceph Allergy)
    - AZT + VANC (84%)
- ICU
  - Preferred Regimen
    - CPM + VANC + TOB (100%) **OR**
  - Alternate Regimen (Anaphylaxis to PCN, Severe Ceph Allergy)
    - AZT + VANC + TOB (97%)

Additional Guideline Recommendations

- Duration of therapy – 7 days (strong recommendation, moderate quality evidence)
  - Exceptions: MRSA, non-glucose fermenting GNR

- Antibiotic therapy should be de-escalated rather than fixed (clinical recommendation)

- Avoid aminoglycoside monotherapy (strong recommendation, low quality evidence)

Automatic ID Consult

- Positive blood cultures:
  - S. aureus
  - Fungi
  - CRE
  - MDR P. aeruginosa

- ASP Rx will contact primary physician to inform them of the automatic ID consult

- Place order in chart

- Notify ID physician of the pending consult

Stewardship updates

- BioFire FilmArray (2nd shift pager)
- Changes to automatic dosing protocol
- Zosyn sensitivities available on ESBL urine isolates
- TheraDoc Stewardship

Thank You!

Questions?

Syndromic Antibiogram – PNA (Hixson)

Regimens	Sensitive (%)
P/T	66
P/T + VANC	94
P/T + VANC + LEV	98
P/T + VANC + TOB	98

Regimens	Sensitive (%)
AZT	38
AZT + VANC	88
AZT + VANC + LEV	94
AZT + VANC + TOB	97

Regimens	Sensitive (%)
CPM	63
CPM + VANC	92
CPM + VANC + LEV	97
CPM + VANC + TOB	100