



Patients ≥ 2 Months -18 Years Of Age

With Signs And Symptoms Of Community Acquired Pneumonia (*Viral And Bacterial*)

1 Definition

Moderate effusion

- 1-2 cm rim of fluid or > ¼ but less than ½ hemithorax opacified on Chest X-Ray (CXR), upright preferred

Large effusion

- > ½ hemithorax opacified on CXR, upright preferred

Exclusion Criteria

- Immunocompromised
- Cystic Fibrosis
- Sickle Cell
- Infants <2 Months Of Age
- Nosocomially Acquired Pneumonia (>48 hrs)
- Medically Complex Patients
- Suspected Aspiration Pneumonia

2 Diagnostic Testing

CRP: Acute-phase reactants, such as the C-reactive protein (CRP) concentration, should not be used as the sole determinant to distinguish between viral and bacterial causes of CAP

Consider:

- **Respiratory Viral Panel (RVP):** Identification of virus does not exclude other infectious etiologies
- **Sputum Cultures:** If patient is able to produce sputum, consider sputum culture
- **Chest CT scan:** Indicated only in patients with
 - Large body habitus
 - US findings discrepant with clinical findings
 - Presence or location of lung abscess may impact surgical decision making

Routine Chest X-Ray & Daily labs are not recommended

The PICU patient may warrant more frequent diagnostic testing due to the severity of their illness

3 Consider PICU Admission

- FiO₂>40%
- PCO₂>55,
- PEWS ≥ 5,
- Fluid Refractory Shock
- PICU physicians may place Chest Tube without surgery consult

4 Bronchodilator Use

The use of albuterol and other bronchodilators is not routinely indicated, except in the case of acute wheezing or if a significant history of asthma is present

5 Fibrinolysis With tPA

- tPA: 4mg tPA/40ml Saline every day X 3days through Chest Tube
- First dose is at time of Chest Tube insertion, then daily
- Dwell time of tPA is 1 hour. Clamp for 1 hour after tPA.
- Use a 12-14 French Pig Tail to instill tPA

Consults

Consider Consults for:

- **Nutrition:** If unable to tolerate oral feeding
- **Pulmonology:** If invasive intervention and for follow-up after discharge
- **Infectious Disease:** Guidance on length of therapy and transition to oral antibiotics

Complicated Pneumonia¹

Presence of Moderate to Large Effusion or Empyema on CXR

CBCD, CRP, BMP, Blood Culture²

Admit to Inpatient General care or PICU³

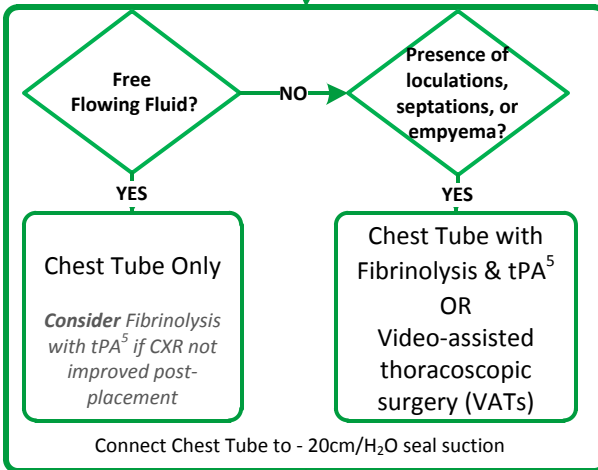
Begin IV Fluids & Antibiotics US within 24hrs

Consult Surgery within 24 hrs. after positive US result¹

Increased airway clearance is not routinely necessary for patients with complicated pneumonia⁴

Insert Chest Tube

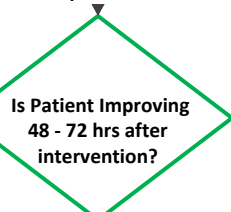
Based on free flowing effusion or presence of loculations, septations, or empyema



Plan of Care

- Continue IVF and Antibiotic Therapy^A
- Oxygen to maintain O₂ saturations ≥ 90% while awake or ≥ 88% while asleep (*brief desats <88 are expected and acceptable*)
- Continuous Pulse Ox monitoring if on oxygen
- Pain management per physician
- Peripheral line access preferred before use of PICC line unless otherwise clinically indicated
- Encourage oral intake :*If patient is not eating, enteral feeds are recommended before TPN*

Repeat CXR



Consider removing Chest Tube:

- Drainage is decreased
- No air leak – if there is an air leak, consider water seal for 4-6 hrs before removing
- Repeat CXR may not be needed unless respiratory distress develops

Consider advancing to ORAL Antibiotics:

- Improving Fever Curve
- Tolerating PO Fluids
- Decreasing Oxygen Requirements
- Chest Tube Removed

Discharge Home:

- Afebrile or if febrile - CRP trending down
- Chest Tube removed
- Off Oxygen
- No Respiratory Distress
- Tolerating PO fluids

Surgical Failure:
Worsening or increased oxygen requirement or respiratory distress 48-72 hrs post surgical intervention

Repeat CXR
Consider repeat CRP

CXR worsening
Consider US or CT Chest

US/ CT positive:
Persistent fluid collection with loculations/septations

Return to Surgery for VATs



Complicated Pneumonia Medication Chart^A

		Drug	Dose and schedule	Max dose
Moderate	Moderate Illness	Ceftriaxone +/-	75 mg/kg/dose q 24hr IV	2000 mg/dose
		Clindamycin ^B	40 mg/kg/day q 8hr IV 30 mg/kg/day q 8hr PO	900mg/dose (IV) 600 mg/dose (PO)
	Moderate Illness with Penicillin Allergy ^C	Levofloxacin +/-	10 mg/kg IV/PO <5yo q 12hr ≥5yo q 24hr	500 mg/dose
		Clindamycin ^B	40 mg/kg/day q 8hr IV 30 mg/kg/day q 8hr PO	900 mg/dose (IV) 600 mg/dose (PO)
Severe				
Severe	Severe Illness	Ceftriaxone AND	75 mg/kg/dose q 24hr IV	2000 mg/dose
		Vancomycin	20 mg/kg q 8hr IV ^D	1250 mg/dose
	Severe Illness with Penicillin Allergy ^C	Levofloxacin AND	10 mg/kg IV/PO <5yo q 12hr ≥5yo q 24hr	500 mg/dose
		Vancomycin	20 mg/kg q 8hr IV ^D	1250 mg/dose
For Atypical Pathogen Coverage Add ^E	Azithromycin	10 mg/kg IV/PO x 1 then 5 mg/kg daily x 4 days	500mg/dose	

^A Known susceptibility should always be used to guide therapy

^B Consider adding clindamycin in patient with presence of loculations, septations, or empyema

Note: CA-MRSA susceptibility to clindamycin ~90% per the CHOA antibiogram and clindamycin penetration into lung tissue is superior to vancomycin. In patients with severe disease, vancomycin is preferred due to increased spectrum of activity.

^C Type 1 penicillin allergy defined by urticaria or anaphylaxis

^D Vancomycin Trough levels and dosing adjustment to be managed by Pharmacokinetics Service

^E If patient on levofloxacin, atypical pathogens are covered and an addition of azithromycin is not needed

- **Do not escalate antibiotic coverage due to persistent fever alone, as fever is expected for 48-72 hours even after starting appropriate antibiotic therapy. Consider further workup prior to alteration of antibiotics.**
- **Patients should be treated for at least 7 days after resolution of fever**
- **Consider ID consult to help guide length of therapy and to offer guidance for transition to oral therapy**

For influenza treatment recommendations please refer to CDC Guidelines