Parapneumonic Effusion/Empyema
Pleural effusion w/suspected pneumonia

Small Effusion?
(< 10 mm on decubitus, or < ¼ thorax filled on PA CXR?)

Yes

Antibiotics & Observe

No

Joint pulm/surg consult within the first 24 hrs of hospital admission

Clinical severity high?
(↑ RR, retractions, splinting, supp O₂ req.)

Yes

Is the patient’s condition critical?
Large effusion with mediastinal shift with respiratory distress and hypoxemia; or The patient requires ICU admission; or > 40% FIO₂ needed to keep SaO₂ > 90%; or Toxic appearing and/or impending respiratory failure

Yes

No

Antibiotics & Observe

Appropriate IV abx ≥ 48 hrs?

Yes

Chest Ultrasound

No

No

Cont. antibiotics, and observe for 48 hours. If no improvement, then consider chest US and pleural drainage

Loculated fluid?

Yes

VATS by the Surgical team (preferred) or Pleural catheter with fibrinolytics by IR

No

Drainage of fluid by Chest tube or VATS by the Surgical team (VATS preferred) or Pleural catheter with fibrinolytics by IR Note: Preferred option is VATS

If VATs was not done, and the pt does not improve within 3 days of pleural catheter placement, then consider VATS

All Patients:
Initial Labs: CBC w/diff, BC, CRP, CXR: PA, Lateral, & Decubitus

Initial antibiotics:
• IV ceftriaxone and clindamycin
• If suspect MRSA or resistant pneumococcus or if pt is critically ill, then add vancomycin

Small Effusion? (≤ 10 mm on decubitus, or < ¼ thorax filled on PA CXR?)

Yes

Antibiotics & Observe

No

VATS by the Surgical team (preferred) or Pleural catheter with fibrinolytics by IR

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Chest Ultrasound

Chest tubes: Remove when drainage falls to < 2cc/kg/shift. Try to remove within 48-72 hrs. No need to go to water seal or clamping before removing

The Seattle Children's Hospital Empyema Algorithm
(For previously healthy children > 12 months old)
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Ongoing and Follow-up Management

The decision has been made to treat the patient with VATS, chest tube/fibrinolytics, or IV antibiotics alone

Continue to treat with IV antibiotics
For 5-14 days

Has the pt been afebrile off of antipyretics for 48 hrs and received at least 5 days of appropriate IV abx or after 10-14 days of IV abx, fever and CRP are decreasing, and the patient is clinically near baseline, e.g., good activity and appetite, T max < 39, and CRP < 5?
Note: avoid around-the-clock antipyretics after the first 72 hrs of appropriate abx therapy

Yes
• Change to PO antibiotics
  • If doing well with PO then D/C home to complete a 10-day course of PO abx (high-dose amoxicillin, Augmentin, a cephalosporin*, or clindamycin)
  * If ≥12, cefditoren is preferred. If <12, cefpodoxime is acceptable.

No
• Continue treatment
• Consider further imaging, including a Chest CT scan, and interventions per surgery and pulmonary service recommendations

Follow-up
• F/U with PCP within 1 week
• F/U with surgery or pulmonary services on a case-by-case basis
• Send pt home with a copy of the last CXR/CT scan
• Repeat CXR in 2 months or sooner if the patient has respiratory symptoms
• Consider Chest CT scan if CXR has not returned to normal 6 months after initial infection (excluding pleural thickening).

Note on fever in patients with parapneumonic effusions:
Fever spikes to 39-40 C for up to 7 days are typical. After 3-5 days of appropriate IV antibiotics, the frequency and height of the fever should begin to decrease. Most patients will have fever for 5-10 days. During the second week of appropriate antibiotic therapy, the fever usually decreases in both frequency and magnitude. While defervesence suggests a good response to therapy, the patient’s overall clinical condition is a better indicator of improvement than is fever response. Avoid around-the-clock antipyretics after the first 72 hrs of appropriate abx., as this may mask fevers and give a false sense of fever resolution.