

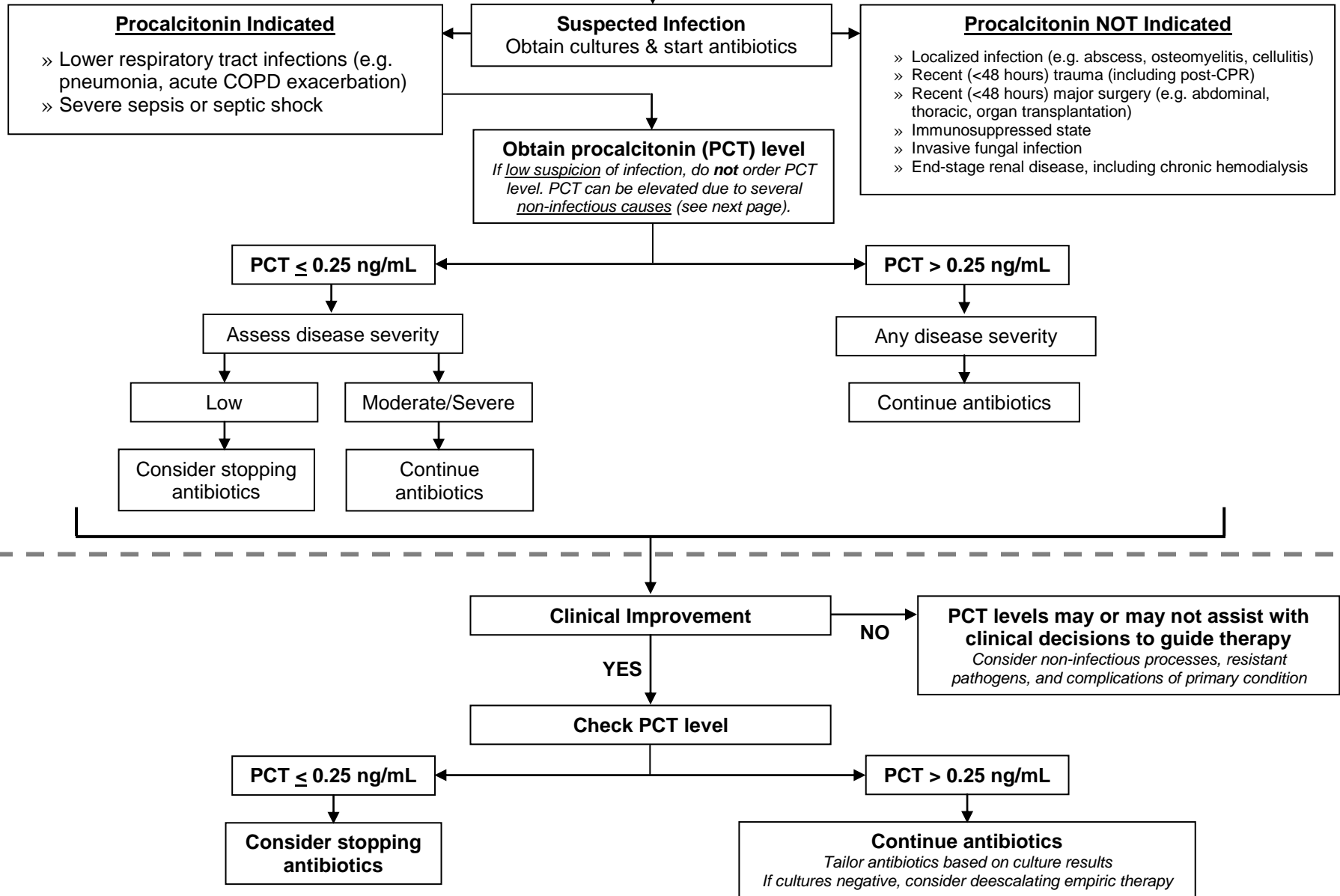
PROCALCITONIN UTILIZATION GUIDELINE

PROCALCITONIN ALGORITHM FOR ANTIBIOTIC DEESCALATION

See next page for additional details.

DECISIONS REGARDING ANTIBIOTIC THERAPY SHOULD NOT BE BASED SOLELY ON PROCALCITONIN LEVELS
Other clinical factors need to be considered, including likelihood of bacterial infection, site of infection, and severity of infection

Day 1
Reassess daily up to 3 days
after starting antibiotics



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ADDITIONAL INFORMATION ON PROCALCITONIN

What is procalcitonin (PCT)?

- ❖ PCT = precursor of calcitonin, mainly produced by thyroid cells under normal conditions
- ❖ Synthesis of calcitonin inhibited by cytokines and endotoxin → leads to increase in PCT levels in presence of bacterial infections
- ❖ Usually undetectable in absence of bacterial infections (see below for non-infectious causes of PCT elevation)

What is the role of PCT in the management of patients with suspected infection?

- ❖ Has been used to predict systemic bacterial infections and to help determine antibiotic duration in patients in the intensive care unit.
- ❖ Comparison to other biomarkers of infectious disease (e.g. WBC count, C-reactive protein):
 - » Levels of PCT tend to rise earlier in the infectious process and decrease rapidly with clinical improvement
 - » Not significantly affected by steroids or non-steroidal anti-inflammatory drugs (NSAIDs)
 - » Attenuated by release of cytokines involved in viral infections (e.g. interferon-gamma)
- ❖ Has been primarily used to decrease antibiotic use in two clinical settings:
 - » Patients presenting to the emergency department, hospital or outpatient clinic with suspected lower respiratory infection or COPD exacerbation (excluding hypoxemic, septic, or clinically unstable patients)
 - » Guide duration of therapy in patients admitted to the intensive care unit

What is the role of PCT in lower respiratory infections?

- ❖ PCT-guided antibiotic therapy is safe and effective in patients presenting to the hospital with suspected lower respiratory infections, including community-acquired pneumonia and COPD exacerbations
- ❖ If PCT is ≤ 0.25 ng/mL, antibiotics can be safely held in these patients if clinically stable and not immunosuppressed
- ❖ If antibiotics are started, they can be safely discontinued if the PCT falls to ≤ 0.25 ng/mL

What is the role of PCT in the intensive care unit?

- ❖ Can be useful in guiding duration of antibiotic therapy in septic patients
- ❖ Should not be used to determine initiation of antibiotics in unstable patients
- ❖ If initially elevated, trending PCT until culture results are available and levels fall below to ≤ 0.25 ng/mL can help determine duration of antibiotic therapy.

What are the limitations of PCT?

- ❖ Not useful to diagnose or monitor localized infections (e.g. cellulitis, osteomyelitis, abscesses).
- ❖ Can be elevated due to several non-infectious causes, including:
 - » Recent major surgery or trauma (within 24-48 hours), including post-cardiac arrest
 - » Dysfunction of gut barrier
 - » Tissue ischemia
 - » Renal failure, especially end-stage renal disease and hemodialysis
 - » Treatment with cytokine-stimulating agents (e.g. OKT3, anti-lymphocyte globulins, alemtuzumab, etc.)
- ❖ Data are lacking to support PCT-guided antibiotic protocols in many infection states, including:
 - » Bacteremia and endocarditis, particularly due to *S. aureus*
 - » Mycobacterial infections
 - » Infections in severely immunocompromised patients, including febrile neutropenia
 - » Central nervous system infection (e.g. meningitis, encephalitis, ventriculitis)

References

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