UWTASP
tele-antimicrobial stewardship program

PRO(calcitonin)

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Project ECHO®

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The Birth of My Irritation

MEDICAL DIRECTOR'S OFFICE
MEDICAL STAFF WEEKLY UPDATE
UNIVERSITY OF WASHINGTON MEDICAL CENTER

"After decades of research around its use in acute care settings, serum procalcitonin is still not featured prominently in international guidelines. For example, in the Surviving Sepsis Campaign guideline (1), procalcitonin is somewhat recommended to help guide the discontinuation of antimicrobial therapy (i.e., weak recommendation; low-level of evidence to support) and recommended against in guiding the antimicrobial initiation. A recent study [the ADAPT-Sepsis Trial (2)] demonstrated a slight reduction of antimicrobial duration (i.e., 0.88 days shorter compared with clinical evaluation alone), but the authors also observed a higher all-cause 28-day mortality rate when basing antimicrobial usage on procalcitonin (20.9% vs. 19.4%), although the difference was not statistically significant and considered non-inferior."

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Continued…

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MEDICAL STAFF WEEKLY UPDATE
UNIVERSITY OF WASHINGTON MEDICAL CENTER

- *Upon reviewing the utilization and efficacy of procalcitonin within UW Medicine, the laboratory has determined that the costs of performing this assay in-house outweigh the benefits. Procalcitonin is not a major component of clinical care protocols, particularly when compared with lactate and C-reactive protein (e.g., UW Nurse-Initiated Sepsis Protocol), which are significantly less expensive to perform. In addition, for the diagnosis of sepsis, C-reactive protein outperformed procalcitonin (area under the ROC curve: 0.78 vs. 0.70). These data, combined with the significant per-sample cost of maintaining separate instrumentation for the measurement of procalcitonin, have led to the decision to discontinue testing within UW Medicine.*

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What Procalcitonin Cannot Do For You

1. Replace your clinical judgement
2. Tell you definitively what someone's diagnosis is
3. Replace a robust AMS program in your hospital
4. Save you money (maybe)

Question 1: Does that mean it has no clinical utility?
Question 2: What diagnostic test satisfies all of the above criteria?

What I am NOT Arguing For

- That procalcitonin should be sent on every suspected infection
- That procalcitonin should be guiding most antibiotic durations
- That there is no need for better biomarkers
- That procalcitonin should be part of a mandated hospital algorithm

Procalcitonin, the basics

- FDA approved in 2008 for sepsis prognostication
- FDA approved in 2017 for guiding antibiotic management in pneumonia
- Levels increased by IL-6 and TNF-α, decreased by IFN-γ
- Rises within 3-4 hours
- Falls in response to appropriate antibiotics

Common Gripes

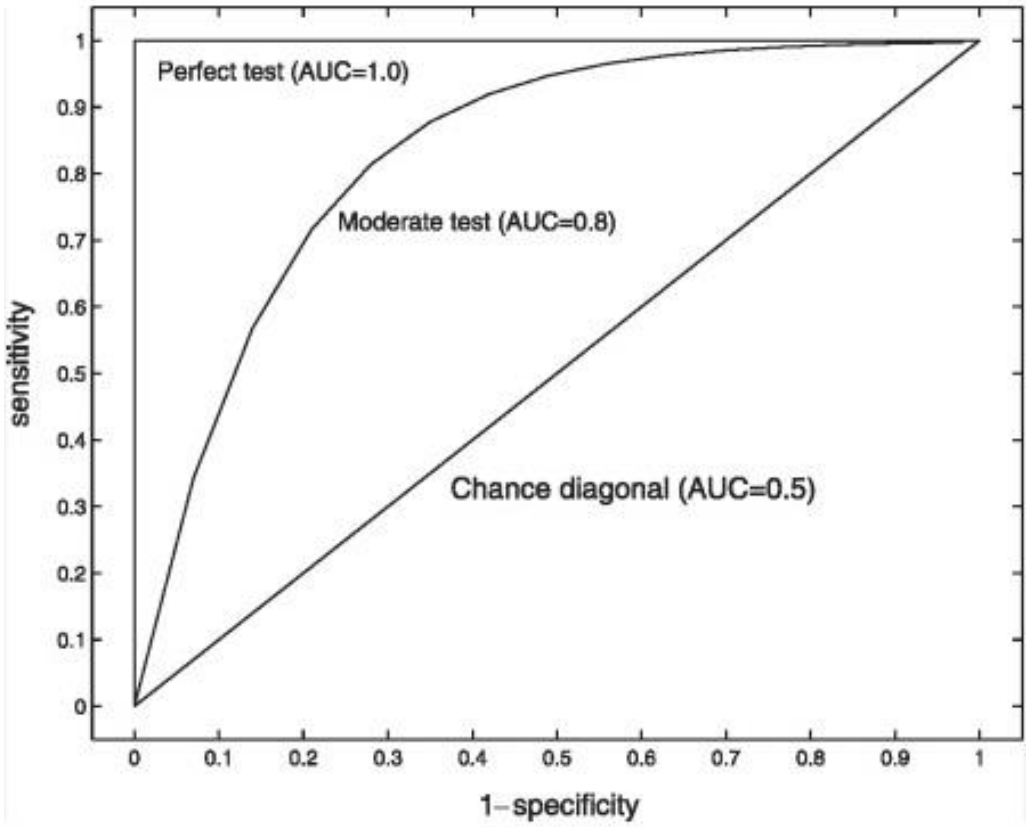
- Objection: It doesn't really reduce antibiotic days or overall usage
  - Answer: Depends on the study, but yes, there is no replacing a good AMS program
- Objection: It's just not a good test
  - Answer: Compared to what?
- Objection: It's too expensive
  - Answer: Again, compared to what?
- Objection: "I don't need procalcitonin to tell me if someone's infected"
  - Answer: Uh…..sure dude

Doesn’t Reduce Antibiotic Usage

- **ProACT** (Huang et al., NEJM 2018): US-based RCT (n = 1,656). Patients presenting to ED with suspected LRTI randomized to PCT-guided or non-PCT guided therapy…**no difference in antibiotic duration**
- **SAPS** (de Jong et al., Lancet ID 2016): Dutch ICU-focused RCT (n = 621). **Reduced antibiotic duration from 9.3 to 7.5 days** and was associated with lower 28-day mortality.
- **PRORATA** (Bouadma et al., Lancet 2010): French ICU-focused RCT (n = 621). **Reduced median antibiotic duration from 10.5 to 5.5 days** in CAP patients.
- **ADAPT-Sepsis** (Dark et al., JAMA 2025): UK-based ICU-focused RCT (n = 2,760). **Reduced antibiotic duration by 0.88 days.** Statistically insignificant signal towards increased mortality

A Moment With the AUROC

- AUROC = 1.0: Perfect test
- AUROC > 0.7: “Decent” test
- AUROC = 0.5: Random results



It’s Just Not a Good Test

- Sepsis:
  - PCT AUROC: 0.85 *(Tan M et al., Journal of Cellular Biochemistry. 2019;120(4):5852-5859)*
  - CRP AUROC: 0.73 *(Tan M et al., Journal of Cellular Biochemistry. 2019;120(4):5852-5859)*
- Bacteremia
  - PCT AUROC: 0.8 *(Kaal AG et al., Clin Microbiol Infect. 2026 May;32(5):749-759)*
  - Leukocytosis AUROC: 0.55 *(Sullivan E et al., J Gen Intern Med. 2025 Feb;40(3):532-537.)*
- Bacterial Meningitis:
  - (serum) PCT AUROC: 0.98 (*Wei TT., Medicine (Baltimore). 2016;95(11))*
  - CSF WBC AUROC: 0.94 *(Hasbun R et al., JAMA. 2022;328(21):2147.)*

It’S JuSt sO eXpEnSiVe!!

- CBC w/ differential: $102
- CRP: $110
- Procalcitonin: $183
- Legionella/Pneumococcal Urine Ag: $219
- Flu/COVID/RSV PCR: $245
- Blood culture: $327
- Sputum culture: $328
- Mycoplasma PCR: $458 (if negative), $871 (if positive)
- Respiratory viral panel: $740
- CXR PA and Lateral: $839

Source: HMC Chargemaster

Let's Talk About Pneumonia

- We SUCK at diagnosing it *(Jones BE et al. Ann Intern Med. 2024)*
- Diagnosis = Respiratory symptoms + compatible imaging + signs of inflammation
- IDSA: *"Don't trust procalcitonin, it is a deceiver of Men"*
- Also IDSA: "*If the patient tests positive for a virus on their $700 PCR and you think that makes sense, DO trust your vibes and withhold antibiotics"*
- European Guidelines: *"We suggest the use of PCT to reduce the duration of antibiotic treatment in patients with sCAP"*
- US Guidelines: *"Mommy and daddy are fighting, come back later"*

I Don’t Need PCT to Tell Who is Infected

- Up to **40%** of patients treated with antibiotics for possible sepsis turn out to have viral or non-infectious conditions- *Pak TR et al., Infectious Disease Clinics of North America. 2022*
- Analysis of 583 PCP’s showed that those with low tolerance for diagnostic uncertainty were significantly more likely to prescribe antibiotics for conditions without an indication- *Liu C et al., Front Public Health. 2021*
- Viral illnesses being diagnosed as bacterial illnesses was the **most-commonly** reported diagnostic error among 726 surveyed pediatricians- *Singh H et al., Pediatrics. 2010*

Bottom Line

- All Tests can be wasteful for harmful if no used thoughtfully
- We need all the help we can get when it comes to diagnosing bacterial infection
- Diagnostic uncertainty is the mortal enemy of AMS
- Procalcitonin is not magical, but it has a role as one of many pieces of data that help us when the clinical picture is not clear (which is A LOT of the time)

The Next Big Thing?

- MeMed BV is a blood test that combines 3 biomarkers (TRAIL, IP-10, and CRP) and spits out a numerical score
- Study of 176 ED patients with suspected LRTI: NPV of 94.6%!

(Li Y et al., Clin Chim Acta. 2026)

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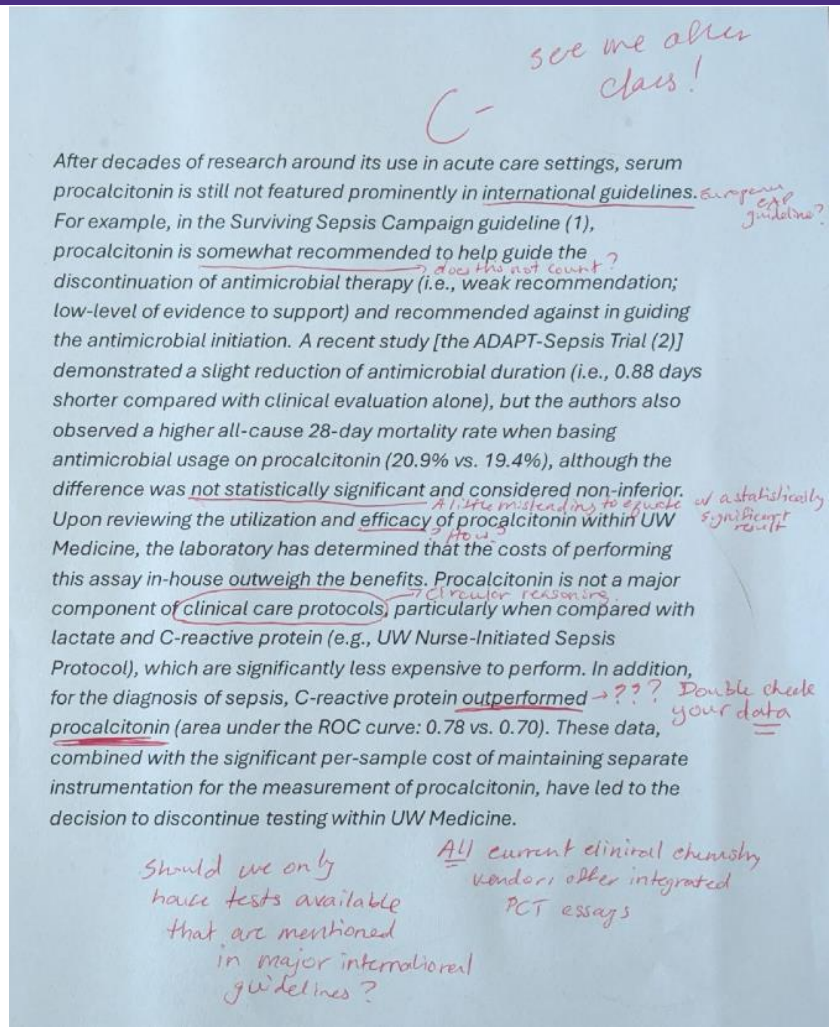
Questions?



C-

see me after class!

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does this not count?

AI is misleading to equate w/ statistically significant result

how?

circular reasoning

??? Double check your data

Should we only have tests available that are mentioned in major international guidelines?

All current clinical chemistry vendors, other integrated PCT essays

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