A Survey of the Mid-South VA Healthcare Network on Ordering Practices and Interpretation of Procalcitonin

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Introduction

Procalcitonin (PCT) is produced in the thyroid and not normally detected in healthy individuals. It rises in response to bacterial infection. Its sensitivity to detect bacterial infection ranges 38%-91%. How and when to use it remains a question and consensus guidelines are not consistent on this topic. The 2016 Surviving Sepsis international guidelines gave a weak recommendation for using PCT to support shortening or discontinuing antibiotics in septic patients, but only in the context of robust clinical assessment of the patient. The 2017 ERS/ATS guidelines for COPD exacerbation do not mention PCT at all, though acknowledge that biomarkers may be helpful in identifying patients who need antibiotic therapy. Several European societies support use of serial PCTs to help guide management. The 2019 IDSA/ATS CAP in adult guidelines discuss PCT but makes no recommendations and states more research is needed. Among guidelines, there is consensus that PCT should not be used to justify withholding antibiotics in patients with CAP. Cutoff thresholds are varied, and only consistent in suggesting that higher levels of PCT suggest bacterial infection. The facilities within the Mid-South Healthcare Network have developed protocols for the use of procalcitonin as an adjunct tool in the management of bacterial infections. However, in the last 5 years due to shifts in consensus recommendations and the onset of the COVID-19 pandemic, clarity on the use and utility of procalcitonin has waned. The purpose of our survey was to get a sense of how practitioners in our VA system view and use procalcitonin as well as identify any noticeable differences in practices based on training level and discipline.

Methods

The Veteran Integrated Services Network VISN-9 Antimicrobial Stewardship Collaborative (ASC) distributed a 15-question survey electronically to clinicians practicing in acute care, ICU, and ED settings at all five VA medical centers in VISN-9 between 1/15/22 to 3/31/22. The survey was directed specifically to medical practitioners (physicians, nurse practitioners, physician assistants, trainees - medical residents and fellows) and clinical pharmacists (including pharmacy residents) involved in daily care of medical patients. Students and surgical providers were not included. Answers were collected anonymously, and no identifying information was collected. Information on demographics (level of training, area of practice [acute care, ICU, or ED], and hospital site) as well as current use of procalcitonin was collected. Specifically, information on practice patterns and opinions on procalcitonin in general was collected as well as in the context of specific clinical scenarios. Responses were tabulated as percentages for the cross-sectional study. Frequency of responses were tabulated overall as well as by level/type of training (medicine attending, medicine trainee, or pharmacist)

Results

99 providers completed the survey with two centers comprising 83% of responses. 44% of respondents were attendings, 39% were trainees and 14% were pharmacists.

Figure 1 demonstrates the variation in comfort level with interpreting and utilizing PCT by discipline

Very comfortable - Pharmacy most
Somewhat - trainees > pharmacy > attendings
Somewhat uncomfortable - attendings > pharmacy > trainees
Very uncomfortable - attendings > trainees > pharmacy

Results revealed that Pharmacists had reported the greatest comfort level with using PCT, and Attending physicians were most uncomfortable among the groups analyzed.

Figure 1: Comfort Level with Procalcitonin

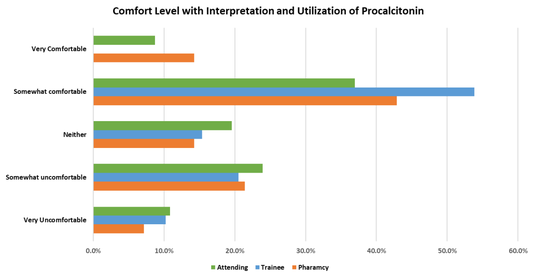


Figure 2: More Trainees than Attendings ordered PCT on admission for suspected infection and there was not much difference among the groups is using PCT on “as needed” basis.

Figure 2: When Do Providers Order Procalcitonin

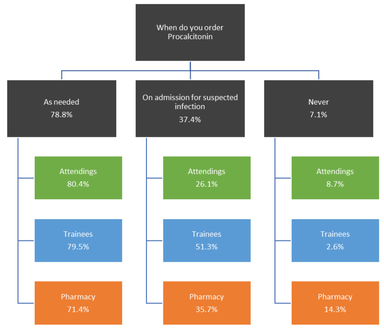
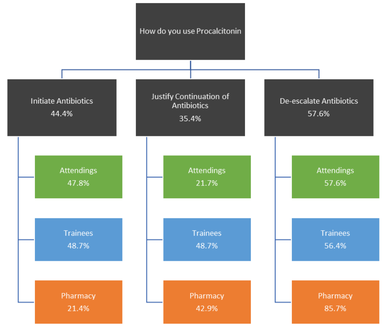


Figure 3: Providers were asked about how they used PCT. (half medicine uses to initiate, quarter pharm) Using PCT to justify initiating antibiotics was similar between Attendings and Trainees, with less than half the %age of Pharmacists using it for this purpose, but more than twice the %age of Trainees vs. Attendings used PCT to justify continuation of antibiotics, with Pharmacists also near double the %age as Attendings. Pharmacists had the highest %age using PCT to de-escalate, with much fewer, but similar %ages of the Attendings and Trainees.

Figure 3: How Providers Use Procalcitonin



Providers were also asked about for what disease states they typically order PCT (Table 1). Overall, the highest percentage of all groups used PCT in Respiratory Sepsis, followed by Non-septic pneumonia, and the lowest %age use among groups for Other suspected infection, non-septic, and Non-infectious Resp disease.

Table 1: Clinical Scenarios Providers Use Procalcitonin

	Pneumonia, Non-Septic	Other Suspected Infection, Non-Septic	Respiratory Sepsis	Non-Respiratory Sepsis	Respiratory Disease, Non-Infectious
Total	55.6%	24.2%	57.6%	32.3%	21.2%
Attendings	52.2%	23.9%	54.3%	30.4%	21.7%
Trainees	61.5%	20.5%	51.3%	28.2%	23.1%
Pharmacy	50.0%	35.7%	85.7%	50.0%	35.7%

28 providers had additional comments at the end of the survey, 23 attendings, 4 trainees, and 1 pharmacist. Table 2 contains selected statements from the respondents

Table 2: Selected Comments From Respondents

“I never know what to do with it because of being taught conflicting things”
“I have been waiting for more data to come out before consistently using procalcitonin as a marker for non-respiratory infections”
“My practice with PCT has changed with COVID and increased concern for bacterial super-infections”
“COVID cases have been helpful. I have also used it to justify abbreviating courses of antibiotics where prior providers had proposed longer courses of treatment”
“It offers minimal benefits.”

Conclusions

The results of this survey confirmed the hypothesis that understanding and use of procalcitonin is highly variable among practitioners. Differences were found between disciplines and training level with pharmacists reporting a higher level of comfort using PCT. The discordance identified is likely multi-factorial stemming from differences in consensus guidelines, local protocols, facility specific education and individual practitioner bias. This survey has several limitations. The distribution of the survey may have led to sample and self-selection biases and the small sample size may preclude generalizability. Additionally, commenters stated that the limited answer choices often did not fully capture complex decision making. While the numbers were small, a gap in clarity is easily identified and unfortunately the larger body of literature does not provide much help in this matter. In response to this survey, the facilities in our network plan to develop uniform guidelines and roll out a cyclical education campaign to provide a steady state of knowledge within our hospitals in hopes to optimize the utility of this diagnostic tool.

References

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