



L a b o r a t o r y *News*

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PROCALCITONIN QUANTITATIVE ASSAY FOR THE DETECTION OF SIGNIFICANT LOCAL & SYSTEMIC BACTERIAL INFECTION

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Procalcitonin (PCT), a prohormone of calcitonin, is secreted by a variety of cell types in response to proinflammatory stimulation, specifically when bacterial in nature. Detection and monitoring of elevated PCT levels is thus useful in the setting of serious bacterial infections such as bacterial sepsis and pneumonia. Effective November 5, 2012, the BRAHMS PCT assay will be available to medical staff and clients on a seven-day per week priority basis. This quantitative test is cleared by the FDA as an aid in the risk assessment of critically ill patients on their first day of ICU admission for progression to bacterial severe sepsis and septic shock. Published studies have also found the PCT assay to be useful in the diagnosis of other significant bacterial infections.

The interpretation of a PCT level depends on the nature of the suspected bacterial infection, and must be made in the context of clinical signs and symptoms and the results of other diagnostic studies. Except in the neonatal period (≤ 72 hours of age), a PCT level of ≤ 0.10 ng/mL confidently rules out a significant local or systemic bacterial infection, while a value > 2.00 ng/mL is highly supportive of bacterial sepsis and/or septic shock. Depending on the circumstances, a PCT value > 0.50 ng/mL is supportive of a significant bacterial infection when consistent with clinical signs and other diagnostic studies. (See **Test Information** for PCT level-specific interpretive commentary.)

The interpretation of neonatal PCT levels is more complex, since PCT levels in healthy neonates are low at birth, rise as much as 20-fold by



24 hours of age, and then drop into the adult reference range by 72 hours of age (Figure 1). The causes of this transient increase are not entirely clear. Interestingly, gestational diabetes has been found to cause a rise of PCT in the neonate. Nevertheless, PCT levels predictably rise above the baseline in response to significant bacterial infections during this early neonatal period much as they do in older patients.

Successful antibiotic therapy leads to a drop in PCT level, with a half-life of approximately 24 hours. Serial PCT measurements are therefore useful in monitoring the effectiveness of treatment. No accepted risk score has been developed for PCT. Non-infectious inflammatory reactions may lead to an increase in PCT, but the return to normal levels in these instances is usually rapid. In general, an elevated PCT is more specific for significant bacterial infection than acute phase reactants such as C-reactive protein (CRP). There is no international PCT standard; PCT levels generated in different labs should therefore not be compared as the methodology and reference intervals may differ.

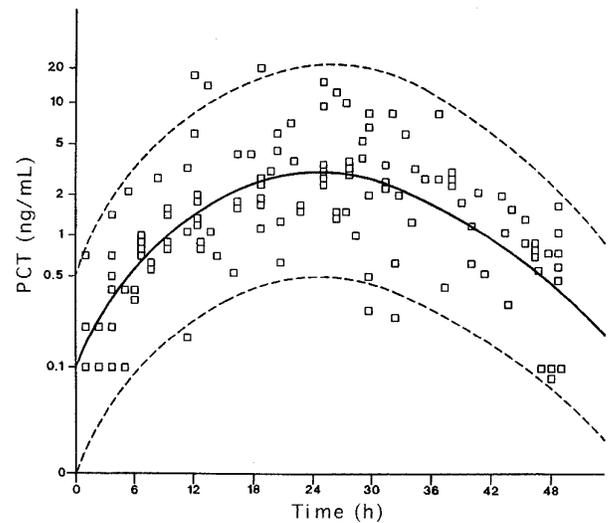


Figure 1
Mean (solid line) and 95% reference intervals (dashed lines) for PCT in 83 healthy neonates from birth to 54 hours of life. (C. Chiesa et al. 1998. *Clinical Infect. Dis.* 26:664; used with permission.)

TEST INFORMATION

Test Name:

Procalcitonin, serum

Test Code:

PCT

- Clinical (Clinical Order Manager): Procalcitonin, Serum
- Hospital (Centricity): Procalcitonin, Serum
- Downtime: Write-In (Form I)

Specimen Requirements:

0.5 mL serum (No serum separator tubes or plasma.)

Storage:

Local, refrigerate serum; Outreach, freeze serum at <-20°C

Available:

Performed 24 hours daily. Results available within 2 hours of receipt.

Reportable Range:

0.05-2,000 ng/mL

Reference Interval in patients >72 hours of age:

0-0.10 ng/mL

Quantitative Interpretation (in patients >72 hours of age):

0-0.10 ng/mL	Significant bacterial infection unlikely.
0.11-0.50 ng/mL	Significant bacterial infection possible; retest in 12-24 hours; consider clinical picture, other diagnostic studies.
0.51-2.00 ng/mL	Significant bacterial infection likely; consider clinical picture and other diagnostic studies.
>2.00 ng/mL	Significant bacterial infection likely; patient is at increased risk for bacterial sepsis and/or septic shock.

CPT Code:

84145

QUESTIONS

Please contact the following at extension 1-6700, 715-221-6700, or 800-222-5835:

Dr. Thomas Novicki or Dr. Thomas Fritsche with clinical and interpretive questions regarding this test and Dr. Joyce Flanagan with technical questions.

SELECTED REFERENCES

1. Chiesa, C., A. Panero, N. Rossi, et al. 1998. Reliability of procalcitonin concentrations for the diagnosis of sepsis in critically ill neonates. *Clin. Infect. Dis.* 26:664.
2. Jensen, J.U., L. Heslet, T.H. Jensen, et al. 2006. Procalcitonin increase in early identification of critically ill patients at high risk of mortality. *Crit. Care Med.* 34:2596.
3. Molnar, Z., and L. Bogar. 2006. Let's go dynamic with procalcitonin! *Crit. Care Med.* 34:2687.
4. Schuetz, P., D.N. Amin, and J.L. Greenwald. 2012. Role of procalcitonin in managing adult patients with respiratory tract infections. *Chest.* 141:1063.
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