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Comparison of a New Procalcitonin Assay from Roche with the Established Method on the Brahms Kryptor

To the Editor:

Procalcitonin (PCT) is a 13-kDa peptide and a precursor of calcitonin. In a healthy population, PCT concentrations are negligible (1). In systemic bacterial and fungal infections, plasma concentrations are raised, whereas concentrations remain fairly low in infections of viral or nonspecific cause (2). Recent studies have demonstrated the potential of PCT as a parameter to guide antibiotic therapy in different groups of patients, i.e., patients with chronic obstructive pulmonary disease experiencing respiratory tract infections (3, 4). The most frequently used medical decision points at which the use of antibiotic therapy is considered are 0.25 μg/L and 0.50 μg/L, depending on the patient population (3, 4).

The first PCT assays were based on manual immunochemistry methods (Brahms PCT LIA). These assays have been replaced by fully automated immunochemistry methods (Brahms Kryptor, Brahms LIAISON, Olympus SphereLight 180). Recently, the PCT assay has been modified for use on a consolidated routine immunochemistry analyzer family, the Roche Elecsys, cobas, and the Roche Modular E170 systems. We evaluated the analytical performance of this new assay by following the EP10 protocol, a document from the Clinical and Laboratory Standards Institute to test precision, linearity, recovery, carryover, and drift. Samples were prepared at different concentrations, from 0.24–2.85 μg/L. Three aliquots of each concentration were assayed on 5 different days, in a specific assay order. The within-run CV ranged from 3.0% for the lowest concentration to 1.3% for the highest concentration. The between-day CV ranged from 6.3% for the lowest concentration to 2.8% for the highest. These levels of imprecision were comparable with those reported for the PCT assay on the Brahms Kryptor (4). The mean recovery was 99%. There was no evidence of nonlinearity or sample carryover. The limit of quantification, i.e., the lowest concentration of analyte that can be quantified with a between-run imprecision of <20%, met the manufacturer’s specification of 0.06 μg/L. In addition, we compared the new PCT assay from Roche on the Modular 170 with the widely accepted PCT assay from Brahms on the Kryptor (5). For analytical comparison, we used 229 samples of patient serum obtained from 195 different patients who were admitted to our hospital for lower respiratory tract infections (81, exacerbation of chronic obstructive pulmonary disease; 114, pneumonia). The patients participated in an ongoing study in our hospital on the etiology of exacerbations of chronic obstructive pulmonary disease, a study approved by the local ethics committee. Samples were also collected from 34 patients after antibiotic treatment. The majority of the serum samples were obtained within 24 h of admission. Samples not immediately analyzed were stored at −80 °C until analysis. PCT concentrations ranged from 0.02 μg/L (limit of detection, i.e., the lowest concentration of analyte that can be reliably measured as being qualitatively present in the sample) to 57 μg/L. PCT concentrations were <0.10 μg/L in 126 samples, ≥0.10 μg/L and <0.25 μg/L in 34 samples, ≥0.25 μg/L and <0.50 μg/L in 19 samples, and ≥0.5 μg/L in 50 samples. Nearly all of these patients, including the 126 patients with PCT concentrations <0.10 μg/L, were treated with antibiotics, reflecting the potential benefit of PCT-guided antibiotic therapy for preventing antibiotic overuse. Confirmation of this possible benefit awaits further study. Methods were compared by orthogonal Deming analysis (\( y = 0.95x - 0.09 \) μg/L, where \( x \) is the PCT assay from Brahms on the Kryptor and \( y \) is the PCT assay from Roche on the Modular instrument; \( S_y/x = 1.02; \ r = 0.99 \) and by medical decision points. No outliers were detected (i.e., distance from the regression line exceeding 10 times the \( S_y/x \) value). The concordance between the 2 assays was 99% and 98% at the cutoff values of 0.25 μg/L and 0.50 μg/L, respectively. Fig. 1 shows the comparative data for the clinically important interval of 0–1.0 μg/L. The predicted medical decision points and 95% CIs for the Roche assay were 0.24 (0.23–0.25) μg/L and 0.49 (0.48–0.51) μg/L, respectively, as calculated by Deming regression analysis.

In conclusion, the new PCT assay on the Roche Modular shows a
good correlation and concordance with the PCT assay on the Brahms Kryptor in a highly relevant patient group. Thus, the PCT assay from Roche allows easy and accurate measurement of serum PCT on an automated clinical immunochemistry analyzer that is fully integrated in standard hospital care.

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References

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Familial Dysalbuminemic Hyperthyroxinemia: A Persistent Diagnostic Challenge

To the Editor:

Familial dysalbuminemic hyperthyroxinemia (FDH)1 is a well-characterized condition associated with increased circulating total thyroxine (T4) concentrations and normal physiological thyroid function. It is caused by mutations in the ALB (albumin) gene that increase the affinity of albumin for T4 by approximately 60-fold. When measured by a technique that minimally disturbs the equilibria between T4 and its serum binding...