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Procalcitonin- A Biomarker Must Explicate Prudently

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Abstract

Procalcitonin is 116 amino acid peptide that belongs to the calcitonin superfamily of peptides it is an acute-phase reactant protein made by the C cells of the thyroid gland [1]. Outside from the thyroid gland, it is also produced by lungs, kidneys, liver [2] and other tissues in increasing amounts in response to bacterial endotoxin in the bloodstream. This makes PCT a more specific biomarker for infection than acute phase reactants like erythrocyte sedimentation rate or C-reactive protein. Procalcitonin is a useful marker for the diagnosis of systemic inflammatory response that is one of the primary responses to microbial invasion [3] which leads to systemic illness which is known as sepsis. Several studies on plasma procalcitonin have demonstrated its role in the diagnosis of sepsis, prognosis of acute severe pancreatitis and even as a prognostic marker following major surgery [4,5].

Keywords: Procalcitonin; Biomarker; Sepsis; Plasma; Pancreatitis; Prognosis; Diagnosis

Introduction

Procalcitonin is a biomarker required to be assesed in clinical practice to indicate the presence and severity of bacterial infections such as community-acquired pneumonia and sepsis. In the case of sepsis, the suggestion has been made to use procalcitonin serum levels as an antimicrobial stewardship tool. Lower respiratory tract infections are one the most common reasons for antibiotic prescription [6]. An estimated 30 to 85 percent of medical prescriptions are unnecessary or inappropriate [7]. Even if indicated, antibiotic treatment courses exceed recommended durations for majority of the times. The predilection for antibiotic overuse for Lower respiratory tract infections is in part due to the difficulty in distinguishing between viral and bacterial infections. A substantial fraction of Lower respiratory tract infections are viral [8] and do not require treatment with antibiotics. Although, clinical signs and symptoms of bacterial and viral Lower respiratory tract infections are similar and often cannot be distinguished based on clinical features alone. Culture can be helpful, but results from culture or other assays often take days to obtain and, in many cases, a pathogen is not identified. Procalcitonin has good discriminatory value for distinguishing between viral and bacterial infections, and results can be obtained in hours. In patients with community-acquired pneumonia, procalcitonin is about 65 to 70 percent accurate in distinguishing bacterial from viral pathogens [9]. When used as part of an algorithm in combination with clinical judgment in patients with LRTIs, procalcitonin has been shown to reduce unnecessary antibiotic use by about 25 to 50 percent without increasing morbidity or mortality [10]. Hence procalcitonin is a very useful test for lower respiratory infections added to sepsis, thus there are many conditions in which procalcitonin get increased in absence of sepsis as seen in situations of post trauma and surgery ,after cardiac shock, some autoimmune disorder as Kawasaki disease and adult onset Still disease, it may also increase in small cell carcinoma of lung, medullary thyroid cancer, cirrhosis ,pancreatitis, paraneoplastic and ischaemic bowel syndrome [11]. Thus, interpretation of elevation of procalcitonin challenges the diagnostic acumen of physicians. As the limitation of no single cut off range for Procalcitonin to define sepsis with addition to Procalcitonin level monitoring guidance for antibiotic therapy is established only for certain infections as respiratory and not applicable for other infections. Thus, high serum Procalcitonin level should be interpreted cautiously, physicians must incorporate this biomarker with clinical context of the disease and other test which are related with disease progression along with consultancy to laboratory physician. Thus the adage to "treat the patient, not the laboratory test" applies here. As there is no perfect biomarker for infection, so is a need to consider microbiological, immunological, hematological, biochemical and clinical scenario when applying the results of a Procalcitonin assay to the patients.

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