medications and dentists not performing necessary dental treatments on patients on osteoporosis treatment. Both physical and virtual dental education lectures are effective in increasing the level of confidence and in correcting misconceptions on MRONJ risk. Continued engagement of the dental community would be important in reducing fear of MRONJ and facilitate treatment of osteoporosis in the population.

Bone and Mineral Metabolism
PARATHYROID AND RARE BONE DISORDERS

Improving the Accuracy and Reliability of Parathyroid Hormone Levels Through the Mass-Spectrometric Measurement of Full-length PTH and C-Terminal PTH Fragments

Candice Z. Ulmer, PhD[1], Bianca Smith, BS[2], Janet Thonkulpitak, BS[3], Hubert W. Vesper, PhD[1].
[1]Centers for Disease Control and Prevention, Atlanta, GA, USA, [2]Battelle, Columbus, OH, USA, [3]Oak Ridge Institute for Science and Education, Oak Ridge, TN, USA.

Parathyroid hormone (PTH) is a key biomarker for hypo/hyperparathyrioidism as well as chronic kidney disease, one of the leading health conditions in the USA. As a result, the most recent update of the Kidney Disease Improving Global Outcomes (KDIGO) guideline for CKD-MBD management emphasized the role of PTH as one of the key biomarkers of this disorder. The earlier stages of CKD generate few symptoms and only until the kidney is significantly impaired do patients begin experiencing signs of renal failure. Therefore, the measurement of parathyroid hormone (PTH) in serum and/or plasma is critical not only for the correct detection, diagnosis, and prevention of renal failure, but also calcium, phosphate, and vitamin D disorders. Current laboratory methods for PTH show high variability and inaccuracy, thus creating the need for a reference measurement procedure that can help laboratories and assay manufacturers improve their measurement accuracy and reliability to avoid the misclassification of patients. Due to the short half-life of PTH, this 84 amino-acid polypeptide hormone is produced at low circulating levels in normal conditions ranging from 10 - 65 pg/mL. In addition, N-terminal and C-terminal peptides, which have shown to interfere with clinical analyzer platforms, account for over 80% of all circulating PTH levels. Therefore, a highly specific and sensitive method is needed for the accurate detection of full-length PTH and these PTH fragments. There is clinical relevancy in the ability to measure C-terminal PTH fragments as the ratio of these PTH fragments to full-length PTH has been diagnostic for severe or end-stage renal disease, non-dynamic bone disease, and hyperparathyroid-associated bone loss. Bottom-up proteomics approaches that incorporate enzymatic digestion steps during sample preparation will result in the loss of information for the fragments. Therefore, a new, innovative, top-down proteomics method was developed to measure full-length PTH and its breakdown products (fragments) by mass spectrometry (UHPLC-HRMS). This method enabled, for the first time, the detection of full-length PTH at very low concentrations typically observed in patients with hypoparathyroidism as well as C-terminal fragments that may interfere with regular immunoassays typically used in patient care. The highly specific and sensitive method for PTH and related peptides in CKD patient sera demonstrated no interference from the internal standards and other PTH fragments. Therefore, the optimized method was applied for the screening of normal and CKD serum at various stages of disease progression. Preliminary results demonstrated that certain PTH fragments are correlated with eGFR and different stages of chronic kidney diseases (CKD). This method along with the respective findings from this study will help to improve the diagnosis, treatment, and prevention of CKD-MBD.

Bone and Mineral Metabolism
PARATHYROID AND RARE BONE DISORDERS

Interrelationships Between Serum Levels of Procalcitonin and Inflammatory Markers

Kosuke Oka, MD, PhD, Jo Araki, MD, Koichiro Yamamoto, MD, Yoshihisa Hanayama, MD, PhD, Kazuki Tokumasu, MD, Hideharu Hagiya, MD, PhD, Mikako Obika, MD, PhD, Hiroko Ogawa, MD, PhD, Fumio Otsuka, MD, PhD.
Okayama University Grad School, Okayama, Japan.

Various laboratory markers are utilized in general practice to detect inflammation, and procalcitonin (PCT) has also been routinely measured in many patients as a marker of bacterial infection and sepsis. An increase in PCT starts before an increase in C-reactive protein (CRP), and PCT level is useful not only for the diagnosis of bacterial infection, sepsis, as an indicator of the severity and prognosis of systemic inflammatory diseases, and is also useful for determination of the response to individual treatment. PCT is a precursor of calcitonin and PCT is not produced in a healthy state but is produced by various tissues in septic conditions. Since there are many patients with elevated levels of PCT due to nonbacterial causes, the levels of serum PCT have been apt to be used for a marker for the early detection of not only bacterial infection but also many inflammatory and/or febrile disorders including fever of unknown origin (FUO) in the clinical setting of general medicine. Here we attempted to clarify the differences and similarities of inflammatory markers for a clinical setting. We retrospectively reviewed 359 patients in whom serum PCT had been measured. According to our earlier study, the patients were categorized into 7 groups: bacterial, non-bacterial infection, non-specific inflammation, neoplasm, connective tissue disease (CTD), drug-induced diseases, and unidentified causes. Data for 332 PCT-positive cases including cases of bacterial infection (20.5%), non-specific inflammation (20.8%), neoplasm (9.9%), CTD (8.4%), and non-bacterial infection (7.2%) were used for analysis. Serum PCT level was highest in the bacterial infection group (1.94 ng/ml) followed by the non-specific inflammatory group (0.58 ng/ml) and neoplastic diseases group (0.34 ng/ml). Of note, serum PCT level was positively correlated with serum levels of C-reactive protein (R2=0.39), soluble interleukin-2 receptor (sIL-2R; R2=0.48), and ferritin, plasma level of D-dimer level and white blood cell count, whereas it was negatively correlated with serum albumin level (R2=0.27), hemoglobin concentration and platelet count. The result of the strongly positive correlation with serum level of sIL-2R