

Renal Osteodystrophy Monitoring by Monthly Parathyroid Hormone Determination in Hemodialysis Chronic Kidney Disease-Mineral Bone Disorder Patients

University Hospital Centre Zagreb | Zagreb, Croatia



A major complication of end stage renal disease (ESRD) is renal osteodystrophy or chronic kidney disease mineral bone disorder (CKD-MBD), which leads to both skeletal and extraskeletal complications. Although not preventable in dialysis patients, monitoring and appropriate management may at least relieve the symptoms and pain that patients experience.

Management of CKD-MBD requires careful and consistent control of phosphate, calcium (calcimimetics), vitamin D and parathyroid hormone (PTH), which at excessive levels causes inadequate bone mineralization (i.e. inadequate strengthening of bones) and increased mineral resorption (i.e. the process of breaking down bones). Thus, monitoring the concentration of each of these treatments is essential to ensure therapeutic optimization. This is equally important as the only known resolution to CKM-MBD is a renal transplant, which can often take significant time to secure a match. Fortunately, careful monitoring and management can minimize the symptoms of bone pain and frequency of fractures.

Global guidelines recommend monitoring bone biomarkers in this patient population every 3 to 6 months, with biomarkers including alkaline phosphatase and PTH. However, more frequent monitoring in patients receiving treatment for CKD-MBD, or in those with CKD and known biochemical abnormalities, offers the potential to identify biomarker trends and perform early assessment of treatment efficacy – ultimately mitigating many associated side effects.

Given that CKD-MBD is a major cause of morbidity and mortality in patients undergoing dialysis, the University Hospital Centre Zagreb and Polyclinic Avitum in Zagreb, Croatia, developed and

implemented a best practice for frequent monitoring of bone biomarkers in these patients. Per the protocol, patients on calcimimetics and Vitamin D or its analogs undergo biomarker monitoring every 4 to 5 weeks. Children undergoing dialysis who develop CKD-MBD additionally undergo monthly PTH monitoring. This approach of more frequent monitoring enabled better titration of drug dosing, leading to preserve bone density, while avoiding other potential side effects.

The care team's monthly monitoring also changed the patient experience for the better, with 100% of patients expressing enhanced satisfaction with their level of care, reporting that they felt healthier, happier and less stressed with regularly scheduled checkups. Patients understood that regularly scheduled monitoring permitted therapeutic changes, and several commented on the benefits of this approach.

One patient noted, "In communication with my physician, my therapy was adjusted for better clinical results. Upon changes to my regimen, I am feeling much better." Another said, "I had been previously consuming 15 pills daily. Upon therapeutic change, the number of pills decreased. I am more satisfied because it is easier to follow up on my therapy schedule and consume fewer pills."

There was also demonstrated benefit to clinicians, who reported that the initiative reduced clinical uncertainty, provided higher confidence for decision-making and enhanced clinical satisfaction. Ninety-eight percent of nephrologists involved indicated they felt more secure managing dialysis patients with the increased frequency of PTH checks, which enabled dosage adjustments based on laboratory findings.

"More frequent monitoring of PTH contributes to better calcimimetic and vitamin D analogs titration, slowing the

development of secondary hyperparathyroidism, and helps with prevention of calcium bone loss," said Ninoslav Leko, head of Nephrology for Slavonski Brod General Hospital. "This makes us more confident in providing better and more accurate therapy."

Kresimir Grsic, PhD, a surgeon at University Hospital Centre Zagreb, elaborated on the profound impact to clinician satisfaction due to improved patient experience.

"Thanks to more frequent PTH testing, we achieved better PTH control and have noticed a decreased number of hyperparathyroid patients who needed parathyroid gland surgical removal," Dr. Grsic said.

Importantly, the practice implemented by University Hospital Centre Zagreb yielded a 61% decrease in the annual cost of care due to reduced need for dialysis and bone-saving therapies.

The changes to patients' care have not gone unnoticed. Boris Kduumija, CEO of B. Braun Avitum Clinic Zagreb remarked: "Patients recognize the value of different and better management. Our data confirmed an associated increase in interest and applications for our institutional care and program," he commented. "More frequent PTH testing enabled better results and therapy control. Physicians and patients were both more satisfied, creating overall value of our health system."

The development and initiation of this best practice succeeded in enhancing patient experience and mitigating long-term risk, with the added benefit of reducing overall healthcare costs. Given the achievement of positively impacting patient care and outcomes, this integrated clinical care team was awarded recognition of Achievement by the UNIVANTS of Healthcare Excellence award program.

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