Bone and Mineral Metabolism

VITAMIN D, DIABETES AND ENERGY METABOLISM

Increasing Pediatric Hospitalizations With Severe Vitamin D Deficiency: A Concerning Trend

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Background: Deficiency of vitamin D can lead to multiple health issues in children. Though it can be asymptomatic in early stages, it can lead to symptomatic illnesses if severe/prolonged including seizures and rickets. Deficiency can be prevented by adequate dietary vitamin D intake with/without supplementation in those at higher risk. However, there has been a recent reemergence and increase in the incidence of vitamin D deficiency in European nations, noted as early as 2008 and at least upto 2018. Hence, we performed a 10 year retrospective study of severe vitamin D deficiency in hospitalized patients at a Children's Hospital in USA.

Methods: Electronic medical record was searched to identify patients with the following inclusion criteria: admitted at our hospital between 1/1/2010 and 12/31/2019 and had a 25-OH vitamin D (25-OH D) level <13 ng/mL with/without hypocalcemia or had a diagnosis of rickets. The study was approved by our institutional review board and consent was waived. Patient demographics, medical history and data on laboratory results, treatment given were extracted. We then ran a summative analysis of most of the data collected, analyzed trends for the number of admissions per year and the response time of calcium levels.

Results: Between 1/1/2010 and 12/31/2019, there were 109 hospital admissions with 25-OH D deficiency with or without hypocalcemia. Median 25-OH D level was 9.7 ng/mL. Admissions per year increased from 2010 to 2019 as follows: 2 in 2010, 5 in 2011, 4 in 2012, 6 in 2013, 6 in 2014, 7 in 2015, 12 in 2016, 13 in 2017, 23 in 2018, 25 in 2019. Median patient age was 27 months (range 0,228). Of those </=1 year (n=39), 13% were preterm, 38% were exclusively breastfed and 44% were formula fed. Ninety percent of these infants were not receiving vitamin D supplementation prior to hospitalization. Of the entire cohort of 109 patients, 63% were males and race distribution was as follows: 13% were White, 77% were Blacks and 10% were others. Seventy percent patients were on state sponsored insurance. About 33% had some diet restrictions/peculiarities, 40% had a presenting complaint related to hypocalcemia including seizures, while 44% had hypocalcemia but it was not their primary reason for presentation. Seventy eight percent patients had hypocalcemia. Of the patients with initial calcium <7.5 mg/dL (n=64), it took a median of 72 hours (range 7,468) to improve to >/= 7.5 mg/dL.

Conclusions: Our hospital has witnessed a significant increase in severe vitamin D deficiency in admitted patients between 2010 and 2019. A large proportion of these were Blacks, on state sponsored insurances and infants not on vitamin D supplementation. Greater than 3/4th of patients had hypocalcemia and over 50% patients had hypocalcemia that required a median of 3 days to correct. This is a concerning trend of an often easily preventable morbidity and another health issue that highlights disparities in our health system.

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Lack of Association Between 25-Hydroxyvitamin D Level and Outcomes in Hospitalized Indian Patients With COVID-19

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Vitamin D deficiency (VDD) is thought to play a role in determining the outcomes of COVID-19. India has a high prevalence of VDD. We hypothesized that VDD as measured by serum 25-hydroxyvitamin D (25OHD) <20 ng/mL is associated with severe COVID-19 infection. Outcomes were assessed by the WHO ordinal scale for clinical improvement (OSCI)[1], the need for oxygen therapy, admission to an intensive care unit (ICU), and inflammatory markers. The diagnosis of COVID-19 was proven by RT-PCR on the nasopharyngeal swab for SARS-CoV2. Serum 25OHD and PTH were measured in addition to the standard protocol for COVID-19. Clinical and laboratory data were extracted from electronic medical records and analyzed using SPSS v22.0. Patients with OSCI score < 5 were classified as mild and ≥5 as severe disease. The study was approved by the Institutional Ethics Committee. A total of 410 patients (127 females, 9 pediatric, 17 asymptomatic) were included with a median age of 54 years (6–92 years) with 272(66.3%) having at least one co-morbid condition, including diabetes (190, 46.3%) and hypertension (164,40%). Patients with VDD (197,48%) were significantly younger (46.7±17.1 vs. 57.8±14.7 years) and had lesser prevalence of diabetes and hypertension (39.1% vs 52.4%, 29.4% vs 49.5%). Proportion of severe cases (26,13.2% vs. 31,14.6%), mortality (4, 2% vs. 11, 5.2%), oxygen requirement (68,34.5% vs.92,43.4), ICU admission (29, 14.7% vs. 42, 19.8%), need for inotropes (7,3.6% vs.12,5.7%) was not significantly different between patients with VDD and those with normal 25OHD level. The proportion of severe cases was similar across all 25OHD categories. There was no significant correlation between 25OHD levels and outcome OSCI, inflammatory markers (CRP, IL-6, D-dimer, ferritin, LDH). PTH levels positively correlated with D-dimer (r 0.117, p- 0.019), ferritin (r 0.132, p-0.010) and LDH (r0.124, p-0.018). Amongst VDD patients, 128(64.9%) were treated with cholecalciferol with a median dose of 60000 IU. The proportion of severe cases, oxygen, or ICU admission was not significantly different in the treated vs. untreated group. In conclusion, baseline levels of 25OHD did not determine the severe clinical outcomes of COVID-19 or levels of inflammatory markers. Treatment with cholecalciferol did not make any difference to the clinical outcomes of those with VDD.

Reference: [1]WHO R&D Blueprint, novel Coronavirus. Retrieved from: https://www.who.int/blueprint/priority-diseases/key-action/COVID-19_Treatment_Trial_Design_Master_Protocol_synopsis_Final_18022020.pdf