Część VIII. Streszczenie w języku angielskim.

Abstract

The evolution of knowledge about vitamin D brought to its extraskeletal functions discovery, including effect on the circulatory system. Despite the recognition of 25-OH-D molecular mechanisms action, its protective effect and deficiency consequences in relation to the cardiovascular system remain unclear. Numerous controversies in the assessment of relation between vitamin D and heart diseases, as well as increasing number of patients with HF are observed. Therefore, it seems reasonable to assess the serum concentration of 25-(OH)-D in relation to the etiology, grade of HF, the presence of comorbidities and to assess

serum concentrations of the active form of vitamin D (1α,25-(OH)2-D3), DBP protein and VDR receptor.

Aim of the study

The aim of the study was to assess the serum concentrations of the 25-OH-D, 1α,25-(OH)2-D3, DBP protein and VDR receptor in a group of patients with HF to assess their dependence on degree and etiology of HF , to analyze their correlation with selected biochemical and echocardiographic parameters and to assess long-term prognosis in comparison with the reference group.

Material and methods

The study involved 250 consecutive patients hospitalized in the Invasive Cardiology Department of the University Hospital of Bialystok from 20 Jan 2016 to 21 Jul 2016 meeting the criteria for HF. Patients were divided into three groups with different LVEF according to 2021 ESC HF diagnosis and treatment guidelines: HFpEF (N=46), HFmrEF (N=68), HFrEF (N=136) and in three groups with different etiology of HF: CAD-related HF (N=142), DCM-related HF (N=28) and VHD-related HF (N=42). Serum concentrations of 25-OH-D, 1α,25-(OH)2-D3, DBP and VDR were assesed using ELISA immonuassay. Clinical, echocardiographic and laboratory findings, all-cause and cardiovascular mortality for 31 Dec 2022 were analyzed. The results were subjected to statistical analysis.

Results

Women were 23.2% of the study group (N=58) and 20% of the reference group (N=4), $p<0.001$. The median age was 71 in the study group and 63.5 in reference group, $p=0.02$. Serum 25-(OH)-D concentration below 30ng/mL was found in 91% (N=247) of the total cases, in 91.6% of cases (N=229) in the study group and in 90% of cases (N =18) in the reference group, $p=0.61$. The median serum concentration of 25-(OH-D) in the study group was 14.5ng/mL, and in the reference group 13.28ng/mL, $p=0.68$. There were no significant differences in the concentrations of the tested parameters between the study group and the

control group. In the group of men, the serum concentration of 1α,25-(OH)2-D3 was higher than in the group of women: median 109.2pg/mL vs 80.88pg/mL, p=0.001. The serum concentration of 25-(OH)-D in patients with HFpEF and HFmrEF was higher than in patients with HFrEF (p=0.001, p=0.04, respectively). There were no differences in the serum concentrations of the anayzed parameters in the groups with different etiology of HF. Lower serum 25-(OH)-D levels in the study group correlated with lower LVEF [r=0.301 (95%CI, 0.181-0.412), p<0.001] and higher LVEDd [r={-0.204}(95%CI),{-0.324}–{-0.078}),p=0.002]. A dynamic time trend was found for 25-(OH)-D (Slope= [0.52 {CI95% 0.27-0.76}, p<0.001]) and DBP (Slope= [0.082 {CI 95% 0.025-0.166},p<0.001]). In 25-(OH)-D deficient patients diabetes requiring insulin therapy was more common than in patients with adequate serum 25-(OH)-D concentrations (p<0.001). In the lower quartiles of 25-OH-D concentration, a higher incidence of COPD was found (p=0.006). In long-term observation, 33.33% of patients with HF died, cardiovascular deaths were 71% of all-causes deaths. The survival rate did not depend on the degree of HF (p=0.24), but it depended on the etiology of HF. In patients with VHD-related HF etiology - total mortality was 53.33%, in patients with DCM-related HF- 38.46%, in patients with CAD-related HF 25% (p=0.04).

Conclusions

1. Total 25-hydroxyvitamin D, active form of vitamin D3, VDR receptor and DBP protein serum concentrations do not differ in patients with and without heart failure.
2. Deficiency of 25-hydroxyvitamin D affects the majority of patients with heart failure and its incidence increases with the severity of the disease.

3. Low serum concentration of 25-hydroxyvitamin D affects left ventricle geometry and systolic function by higher end-diastolic diameter and lower left ventricle ejection fraction.
4. Serum concentration of 25-hydroxyvitamin D is related to the season and comorbidities.
5. During the seven-year follow-up, 1 out of 3 patients died, 2 deaths out of 3 were cardiovascular deaths.