Streszczenie w języku angielskim

Introduction

Chronic kidney disease is a growing clinical and epidemiological problem, and patients with end-stage renal disease treated with hemodialysis remain a group particularly burdened by cardiovascular complications and an increased risk of death. Despite advances in renal replacement therapy, this risk cannot be fully explained by traditional cardiovascular risk factors. Increasing attention is therefore being paid to non-traditional risk factors and to changes induced by the hemodialysis procedure itself.

Aim

The aim of this doctoral dissertation was to assess selected non-traditional and hemodialysis-related cardiovascular risk factors in patients with end-stage renal disease, with particular emphasis on the neutrophil-to-lymphocyte ratio, changes in plasma osmolality, and markers of oxidative stress.

Material and methods

In the first retrospective study, 183 hemodialysis patients and 38 individuals with normal renal function were evaluated. The relationship between the neutrophil-to-lymphocyte ratio, CRP concentration, and selected electrophysiological and echocardiographic parameters was analyzed, with particular focus on the spatial QRS-T angle. In the second publication, 46 patients undergoing maintenance hemodialysis were assessed before and after a single hemodialysis session. Plasma osmolality, electrocardiographic parameters, blood pressure, and the subendocardial viability ratio were analyzed. In the third publication, 44 hemodialysis patients were examined before and after a hemodialysis session. Plasma osmolality, selected biochemical parameters, and oxidative stress markers, including TAS/TAC, TOS/TOC, and oxLDL, were assessed.

Results

In the first study, hemodialysis patients had higher NLR values and a wider spatial QRS-T angle compared with the control group. NLR, unlike CRP, was an independent predictor of QRS-T angle widening, and an NLR cut-off value of 4.59 was identified as the best predictor of myocardial electrical inhomogeneity.

In the second publication, a single hemodialysis session was associated with a significant decrease in plasma osmolality, prolongation of the QTc interval, and an increase in

SEVR. Changes in osmolality correlated with changes in electrophysiological and hemodynamic parameters. In multivariable analysis, changes in osmolality were an independent predictor of QTc changes and one of the independent predictors of SEVR changes. Changes in urea concentration did not show a comparable predictive value.

In the third publication, a single hemodialysis session was associated with increased oxidative stress, expressed by an increase in TOS/TOC and oxLDL and a decrease in TAS/TAC. Changes in osmolality correlated with changes in oxLDL and TAS/TAC and, in multivariable regression analysis, were independent predictors of changes in TAS/TAC, TOS/TOC, and oxLDL. In contrast to osmolality, changes in urea concentration had limited value in predicting changes in oxidative stress markers.

Conclusions

The obtained results indicate that cardiovascular risk assessment in hemodialysis patients should include not only traditional clinical and laboratory parameters, but also chronic processes and acute changes induced by the hemodialysis procedure itself. NLR may serve as a simple marker of chronic inflammation associated with myocardial electrical inhomogeneity. Plasma osmolality appears to reflect the biological burden associated with hemodialysis more comprehensively than urea concentration alone, encompassing electrophysiological, hemodynamic, and oxidative changes. The presented series of publications broadens the understanding of the pathophysiology of cardiovascular complications in patients with end-stage renal disease and highlights the need for further research aimed at more precise risk assessment in this patient population.