Evaluation of tryptic podocin peptide in urine sediment using LC-MS-MRM method as a potential biomarker of glomerular injury in dogs with clinical signs of renal and cardiac disorders.

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Streszczenie

The early asymptomatic stage of glomerular injury is a diagnostic challenge in the course of renal and extra-renal disease, e.g., heart insufficiency. It was found that podocin, a podocyte-specific protein present in the urine, may serve as a biomarker in the diagnosis of glomerular disease in humans and animals including glomerulonephritis, glomerulosclerosis, amyloidosis, or nephropathy. Therefore, there is a need of development of the sensitive and straightforward method of urinary podocin identification. In this work, we report our extended research under the glomerular injury investigation in dogs by application of clinical examination and LC-MS-MRM method in the identification of canine podocin in urine samples. The LC-MS-MRM method is based on the identification of podocin tryptic peptide with the ^{218}H-AAEILAATPAAVQLR-OH^{232} sequence. The model peptide was characterized by the highest ionization efficiency of all the proposed model podocin tryptic peptides in a canine urine sediment according to the LC-MS/MS analysis. The obtained results revealed the presence of the model peptide in 40.9% of dogs with MMVD (active glomerular injury secondary to heart disease = cardiorenal syndrome-CRS) and 33.3% dogs with chronic kidney disease. The potential applicability of the developed methodology in the analysis of podocin in canine urine sediments was confirmed.

Słowa kluczowe

podocytes, podocyturia, mass spectrometry, liquid chromatography, myxomatous mitral valve disease, heart insufficiency, kidney disease, cardiorenal syndrome, dog

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