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Improvement of Blood Glucose Levels and Variability Using Continuous Glucose Monitoring in Chronic Kidney Disease with Diabetes

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Background: Adequate blood glucose control is important to prevent crucial complications in diabetes. Both hypoglycemia and hyperglycemia can frequently occur in patients with diabetic nephropathy. Blood glucose variability is one of the treatment targets in diabetes. This study aimed to determine the usefulness of continuous glucose monitoring (CGM) for glycemic control and glycemic variability stabilization in patients with diabetic nephropathy. Materials and Methods: This study was conducted a multicenter prospective randomized controlled trial for patients with diabetic nephropathy. Patients aged ≥18 years with type 1 or 2 diabetes, and eGFR <60 ml/min/1.73m^2 or on hemodialysis ≥3 months were included. Patients were divided into self-monitoring blood glucose (SMBG) and CGM groups. Patients in CGM group underwent 7-day CGM three times at 6-week intervals. Patients in the SMBG group were instructed to perform SMBG at least three times a day throughout the study period, and blind-CGM was conducted in the final week. Physicians modified the treatment strategy based on the results of CGM or SMBG. As indicators of glycemic control, the mean glucose levels, glycated hemoglobin A1c (HbA1c), and time in range were measured. As indicators of glycemic variability, standard deviation (SD) and %coefficient variation (%CV) were measured. Results: Differences in glycemic variability were observed according to renal function, and notably, significant glycemic variability was found in patients with advanced CKD and those undergoing hemodialysis through the CGM results. The mean glucose levels, HbA1c, SD, and %CV significantly improved in CGM group compared to SMBG group. Conclusions: CGM could be a useful tool for individualizing treatment strategies in patients with diabetic nephropathy.

Keywords: Continuous glucose monitoring, Glucose control, Glycemic variability, Chronic kidney disease, Hemodialysis

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