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Optimal management of diabetes in dialysis patients

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Glycemic control is crucial for managing diabetes in patients undergoing dialysis. However, achieving appropriate glycemic control in this population is challenging. Several factors contribute to these difficulties: First, kidney dysfunction can lead to hypoglycemia due to impaired gluconeogenesis and reduced insulin clearance. Second, the metabolism and excretion of anti-diabetic drugs are often altered in kidney dysfunction, resulting in modified pharmacokinetics and potential drug accumulation. Third, hemodialysis (HD) itself can cause glycemic disarrays. During HD sessions, blood glucose (BG) levels may rapidly decline due to glucose diffusion into the dialysate (HD-induced hypoglycemia) in some patients. Conversely, after HD sessions, significant hyperglycemia may occur as a result of counterregulatory hormone activation in response to the rapid BG decline, insulin removal via adsorption to the dialyzer membrane, and post-HD meal intake (HD-associated hyperglycemia).

Another important consideration is the selection of glycemic control indices and targets for patients undergoing HD. HbA1c tends to be underestimated in this population due to renal anemia and the use of erythropoiesis-stimulating agents. As an alternative, glycated albumin (GA) has been proposed, particularly in Japan. A target GA level of < 20% is recommended for glycemic control, with a more relaxed target of < 24% suggested for patients with cardiovascular disease or malnutrition. Additionally, the adoption of continuous glucose monitoring (CGM) systems holds promise for improving glycemic control and overall management in the future.

When diet and exercise prove insufficient, medication may be considered. However, the use of oral hypoglycemic agents is limited. In Japan, only DPP-4 inhibitors, certain glinides, alpha-glucosidase inhibitors, and oral semaglutide are approved for this population. Among these, DPP-4 inhibitors are regarded as first-line therapy due to their low risk of hypoglycemia. GLP-1 receptor agonists, primarily injectable formulations, are another option, although their gastrointestinal side effects necessitate caution in dialysis patients with malnutrition. All insulin formulations are available for dialysis patients. To reduce the risk of hypoglycemia, rapid-acting (bolus) or long-acting (basal) insulin analogs are preferred over regular or NPH insulin, respectively. On HD days, pronounced glycemic variability often requires adjustments in insulin dosages. Looking ahead, randomized clinical trials are needed to determine whether glycemic control with anti-diabetic drugs, including DPP-4 inhibitors, can improve the prognosis of dialysis patients.