KSN SEOUL, KOREA 2023
April 27(Thu) - 30(Sun), 2023
Coex, Seoul, Korea

Submission No.: ISJS-9062
Session Title: KSN-KSCN-ISRNM Joint Symposium
Date & Time, Place: April 30 (Sun), 08:30 - 10:10, Room 5

Nutritional Intervention In Patients under Continuous Renal Replacement Therapy

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Continuous renal replacement therapy (CRRT) is a widely used therapeutic tool for critically ill patients with severe Acute kidney injury. A variety of methods can be used to achieve adequate clearance of solute and toxins while achieving precise control of extra cellular fluid volume. These methods use the concepts of diffusion, convection, or a combination of the two with the goal of eliminating uremia, maintaining fluid status, and achieving electrolyte and acid-base balance. It is important for those who provide nutrition support to these critically ill and complex patients to understand the basic concepts of this process as it affects the requirements of the nutrition supplementation that is required.

CRRT can be an indirect source of energy for patients with renal failure. CRRT solutions contain a small amount of glucose, and a substantial glucose load can be delivered with replacement fluids (up to 20L/d). The energy from the dextrose load should be calculated and included as part of the patient's total energy goal from carbohydrate; in other words, to maintain a stable dextrose intake, the dextrose provided in the parenteral nutrition solution or the enteral nutrition (EN) formula should be decreased to account for the energy from dextrose in the replacement fluid. Patients may experience hyperglycemia or inappropriate weight gain if the energy from glucose received during CRRT is not considered. But adjusting the EN feeding rate to provide less energy may also decrease the amount of protein supplied; therefore, supplemental protein powder may be needed. The protein intakes of critically ill patients with acute kidney injury on CRRT may be prescribed 1.5 g/kg/d up to 2.5 g/kg/d. If available, the pre-hospitalization body weight or usual body weight may be preferred over the ideal body weight. Actual body weight should not be considered for a protein prescription.

Patients undergoing CRRT must be given fluid in excess of maintenance needs. Fluid losses can be as high as 20L/d in CRRT; therefore, fluid replacement is important for fluid balance. Fluid therapy adjustments should be determined by daily measurements of intake and output, weight, and serum sodium.

With CRRT, electrolyte clearance may be high, and electrolyte supplementation may be necessary. Serum electrolytes should be measured frequently throughout the therapy period and repleted as needed. Hypophoaphatemia is a common complication of CRRT because the dialysate does not contain phosphorus. When formulating nutrient solutions, it useful to know the type of RRT used and the amount of fluid removed. Premixed dialysate and replacement fluids are available to meet electrolyte and fluid needs but not mineral needs. Standard vitamin and mineral packages should be provided to patients receiving CRRT to meet the Recommended Daily Intake and replace losses in the dialysate.

The effectiveness of CRRT makes it possible to provide nutrition support without the need to restrict protein or fluid to a great degree. But all of these patients are at high risk for malnutrition, nutritional status should be thoroughly assessed. They vary during the course of the disease and an individualized approach to nutritional support is recommended. Communication regarding the nutrition support plan have to formulate during multidisciplinary rounding by the critical care, nephrology, dietitian, nurse, and pharmacy teams.