

Systematic Review and Pediatric Continuous Renal Replacement Therapy Consensus Guidelines for Management of Hyperammonemia in Pediatric Patients

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Background: Hyperammonemia is the excessive accumulation of ammonia in blood and can lead to grave consequences in the form of cerebral edema and severe neurological impairment. In infants and children, common causes of hyperammonemia include urea cycle disorders (UCD) or organic acidemias. In pediatric populations, the management of hyperammonemia has shown to be difficult due to the non-specific clinical symptoms, the age specific etiologies, and the lack of consensus in treatment plan.

Objective: This systematic review assessed the published literature to comprise guidelines for non-renal replacement therapy (NRRT) and renal replacement therapy (RRT) in neonates and children with hyperammonemia.

Methods: A literature search was performed on PubMed/Medline, Embase, and Cochrane databases. Studies reporting increased ammonia in non-renal replacement therapy and renal replacement therapy in pediatric patients were included. The Pediatric Continuous Renal Replacement Therapy (PCRRT) workgroup analyzed the studies to propose recommendations and evaluated the strength of each.

Results: Out of the 118 studies considered for full-text review, 25 studies met the inclusion criteria. There were 23 patients were treated with peritoneal dialysis with 65% success rate, 5 patients were treated with intermittent hemodialysis (HD) with 100% success rate, and 92 patients were treated with continuous RRT (CRRT) with 60% success rate. Additionally, 3 patients were treated with extracorporeal membrane oxygenation (ECMO) combined with CRRT and had 100% success rate.

Conclusion: This review consists of expert guideline recommendations on hyperammonemia requiring RRT in pediatric populations. The panel recommended CRRT as the first line of therapy and recommended HD when rapid ammonia clearance was required. The panel also suggested the use of CRRT combined with ECMO in hemodynamically unstable neonates. Additional studies are required to further strengthen the recommendations made in this review.