**Hemodialysis in Neonates and Infants: A Systematic Review**

**Abstract:**

**Background:** Hemodialysis (HD) in neonates and infants is difficult to implement and to maintain due to a lack of machines adapted to neonatal blood flow volumes. Subsequent issues include hemodynamic instability, in addition to difficult vascular access due to smaller blood vessels. Therefore, peritoneal dialysis is initially preferred in neonates and infants. Currently there is a dearth of literature on an important form of renal replacement therapy (HD) in this population. The purpose of this study was to systematically review publications discussing HD in neonates and infants, and to point towards recent innovations in HD that may overcome traditional barriers.

**Methods:** PubMed was searched for “hemodialysis”, along with the Medical Subject Heading term, “infant”. 1,310 potential matches were returned, of which 9 studies met inclusion and exclusion criteria. Pooled descriptive statistics were calculated, weighted according to the number of subjects in each study. Data regarding patient characteristics, hemodialysis indications and parameters, and patient outcomes was recorded.

**Results:** The total number of subjects across the nine selected studies was 104, with a pooled mean age of 3.1 months (range: 2 days to 12 months). Among all subjects there was a 62% survival rate. Common causes for hemodialysis treatment included inborn errors of metabolism, acute kidney injury, and renal dysplasias. The most common complications were mechanical catheter dysfunction, hypotension, and anemia.

**Discussion:** Indications for hemodialysis in reviewed studies were acute renal failure, primary intrinsic renovascular disorders, inborn errors of metabolism, and intoxications, of which metabolic issues and acute renal failure were most frequent. Hemodialysis techniques were adapted to meet the needs of neonates and infants, notably including blood priming of extracorporeal circuits, minimizing extracorporeal circuit volumes, and use of smaller catheters. This paper concludes with a discussion of those techniques that are best suited for neonates and infants.

**Key Words:** hemodialysis; neonates; infants;Renal replacement therapy; Renal transplantation; Survival

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| **Total Patients** | **Average Age** | **Survival Rate** | **Transplant Rate** | **Common Causes for HD** | **Type of HD** |
| 104 | 3.1 months | 62% | 33% | Inborn Errors of Metabolism (42%) | Acute (36.5%) |
|  |  |  |  | Acute Kidney Injury (32%) | Chronic (63.5%) |
|  |  |  |  | Renal Dysplasia (17%) |  |