Intraperitoneal Nutrition to Support Growth in Infants with ESRD: A Case Study

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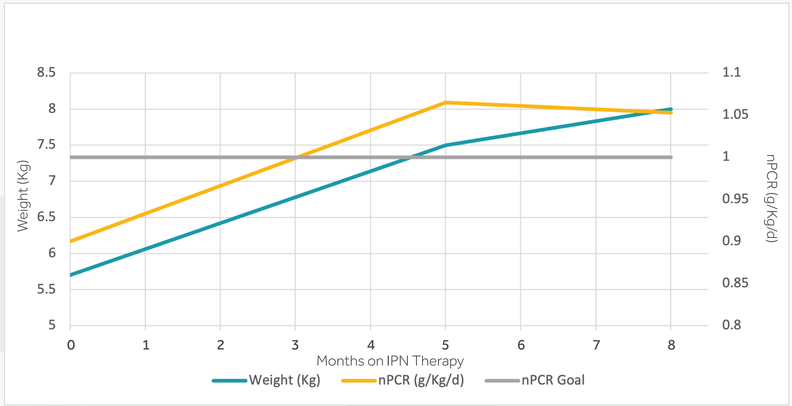
BACKGROUND:

Pediatric End Stage Renal Disease (ESRD) patients face unique nutritional challenges due to increased metabolic demands for growth and the kidney's limited ability to manage metabolic load. These factors contribute to poor growth and development, including neurocognitive and psychosocial impacts. For pediatric patients on peritoneal dialysis (PD), intraperitoneal nutrition (IPN) offers an alternative route for delivering amino acids (AA) and energy directly into the peritoneal cavity during dialysis exchanges. This case describes the administration of IPN for a 9-month-old patient with ESRD.

OBJECTIVE:

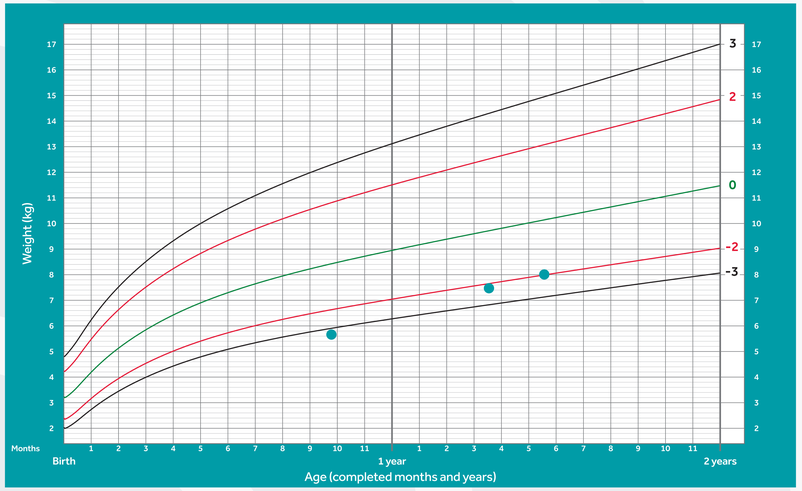
Patients qualify for IPN based on National Kidney Foundation (NKF) criteria for energy and/or protein malnutrition. Protein malnutrition is defined as 3-month average albumin criteria <3.5g/dL or an nPCR/nPNA of <1.0g/kg/d. Energy malnutrition includes >5% weight loss over 3 months, >10% over 6 months, estimated target weight <90th percentile of ideal body weight, or weight-for-length <5th percentile. IPN is prepared as a sterile compounded solution using 20% AA mixed with standard peritoneal dialysis solutions, adjusted to meet ultrafiltration needs. In this case, IPN replaced one 2.5% Dextrose PD 3L solution in the patient's regimen.

Weight and nPCR Response to IPN Therapy



Full Standard Deviation Improvement on IPN Therapy

Weight-for-age Girls: Birth to 2 years



RESULTS:

The patient was a 9-mo female with a baseline weight-for-length well below the 5th percentile (0.5 percentile) and a protein equivalent of nitrogen appearance rate (PNA) of 0.9 g/kg/d. At time of referral the infant was considered too small for renal transplant. The IPN regimen prescribed at start of care was 0.5% AA in a 1.5% Dextrose Low-Ca 3 L PD solution daily which provided 15 g of protein/d. After 2 months of therapy, the AA concentration increased to 0.75% AA (17.5 g protein/d) in 3 L to meet ultrafiltration needs. At 5.5 months of IPN, weight increased from 5.7 kg to 7.5 kg and PNA increased to 1.065 g/kg/d. At 8 months, weight increased to 8 kg and the patient was discharged following kidney transplant.

CONCLUSION:

This case demonstrates that IPN can improve nutritional status and support growth in infants with ESRD on PD, potentially bridging the gap until transplant eligibility. This case study may not be generalizable, and further research into the use of IPN in pediatric patients would be advantageous to supplement existing findings.

REFERENCES:

KDOQI Work Group. KDOQI Clinical Practice Guideline for Nutrition in Children with CKD: 2008 update. Executive summary. Am J Kidney Dis. 2009;53(3 Suppl 2):S11-S104. doi:10.1053/j.ajkd.2008.11.017

Poster presented at the National Kidney Foundation (NKF) Conference; May 6–10, 2026; New Orleans, LA