Rapid Equilibration Rates in Most Small Babies on Acute Peritoneal Dialysis

KEY WORDS: Peritoneal transport; acute kidney injury; children; DP ratios; prescription.

Editor:

Whereas the prescription in chronic peritoneal dialysis (PD) is based on body surface area (BSA) and the results of standardized peritoneal equilibration tests (PETs), in the acute setting there are very little data regarding the peritoneal transport characteristics of children. We report here the D:P creatinine ratios of 7 children undergoing PD for acute kidney injury (AKI) secondary to a variety of illnesses. Manual PD with dwell times of 1 hour and a fill volume of approximately 20mL/kg was used in all patients. After 1 hour, the dialysate was allowed to drain for 20 minutes, and urea, creatinine, and sodium levels were analyzed. This was not a formal PET but was done to get an idea of the peritoneal transport rates with a normal prescription. The D:P creatinine ratios were calculated using the following formula: dialysate creatinine divided by the 1.5-hour serum creatinine. Most patients (except 1) had more than 1 test performed on separate cycles, and the mean is given. The results for patients are shown in Table 1.

Our patients were all less than 2 years old and therefore have been compared with PET curves for this age group (1). Five of the patients would be classified as high/high average transporters whereas 2 would be low/low average. The D:P ratios were calculated using a smaller volume than standard PET, which could account for the high values. Nevertheless,

TABLE 1
Results of Peritoneal Equilibration Tests

Patient	Weight (kg)	Age (months)	Fill volume (mL/kg)	D:P creatinine ratio	D:P Na ratio	D:P K ratio	Fluid used	Etiology
1	2.2	0.4	25	0.83	0.98	0.75	Physioneal 2.5%	Septic shock
2	12	20	16	0.52	0.94	0.80	Physioneal 1.36%%	Hypovolemic shock, gastroenteritis, rhabdomyolysis
3	7.55	6	20	0.78	1.01	0.92	Physioneal 1.36%	Pneumonia, hemolytic anemia
4	8	11	20	0.49	0.92	0.46	Physioneal 1.36%	Hypovolemic shock, gastroenteritis
5	2.7	0.5	18	0.68	0.97	1.2	Dianeal 4.25%	Post-cardiac bypass
6	7.4	8	22	0.94	0.97	0.94	Dianeal 4.25%	Septic shock
7	6.5	6	27	0.67	0.94	0.97	Balsol 4.25% (+4 mmol K)	Septic shock

these are the recommended fill volumes for acute PD recently published in *Peritoneal Dialysis International* (2). We speculate that the underlying disease may affect the D:P ratio by affecting underlying permeability or capillary perfusion. Studies of capillary blood flow in sepsis show shunting past capillary beds and reduced, rather than increased, capillary perfusion (3). Animal studies have shown that a reduction in blood flow does not influence solute transport until blood flow is reduced by 70% (4). Therefore, it seems likely that permeability may be a more important factor in determining membrane permeability in sepsis. This study raises the question of whether a standardized prescription for all patients with acute dialysis is sensible. Larger studies are needed to determine this. In the absence of this data, our results support recent guidelines pertaining to the short dwell times required in acute PD in children because of the rapid equilibration of the D:P ratios on this prescription.

DISCLOSURES

The authors have no financial conflicts of interest to declare.

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