Amino Acid Solutions for CAPD: Benefits and Rational

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Short-term studies have shown that amino acid based solutions in peritoneal dialysis may supplement in excess the daily losses of amino acids during dialysis with glucose-based solutions. The amino acid solutions produce similar ultrafiltration and solute transport as the standard glucose solutions although the period of effective ultrafiltration is rather short. However, it should be noted that some studies have reported that the transport of small and large solutes may increase in patients using amino acid solutions.

During the early 1980's several investigators have developed and tested different amino acid solutions for peritoneal dialysis. The initial clinical experience from Toronto with amino acid solutions containing large amounts of non-essential amino acids and inadequate amount of buffer were in general discouraging. The patients, who were not always malnourished and tended to have a low energy intake, developed increased BUN levels, acidosis, no improvement in nutritional status or amino acid abnormalities and, in some cases, anorexia.

In 1985 a new 1% amino acid solution, containing an increased buffer amount and amino acids (mainly essential) in proportions which take the amino acid abnormalities in uremic patients into account, became available. The use of this solution resulted in some improvement in amino acid pattern and nutritional parameters, but acidosis and increased BUN levels remained problems. The experiences from these and previous studies showed that: 1) the improvement of the composition of amino acid solutions was beneficial, 2) a further increase of the buffer amount was needed, 3) patients included should have signs of protein malnutrition combined with low dietary protein intake to benefit from intraperitoneal amino acid supply, and 4) energy intake should be sufficient to prevent amino acids to end up as energy source.

For this purpose a new improved 1.1% amino acid solution has been developed containing a further increase of some essential amino acids and an increased amount of lactate (40 mmol/l). This solution has been tested in malnourished patients eating 0.8 g protein/kg/day and 25~30 kcal/kg/day. Preliminary results suggested that this solution may result in improved nutritional parameters, positive nitrogen balance and improved amino acid pattern. However, increased BUN levels and an increased tendency towards acidosis may still remain problems.

Nevertheless, the possibility to use amino acid solutions should be of value in malnourished patients, in particular in those patients in whom attempts to increase the dose of dialysis and measures to increase the dietary intake have failed. Peritoneal dialysis supplemented with amino acid solutions may become an important component of CAPD therapy, thus contributing to reduce the high prevalence of malnutrition in these patients.