1996

Comment on *Small Bowel Necrosis*

Jane Gervasio
Butler University, jgervasi@butler.edu

CURRENT LITERATURE

Treatment of malnourished CAPD patients with an amino acid based dialysate

JD KOPPLE, D BERNARD, J MESSANA, ET AL
Harbor-UCLA Medical Center, California; University Hospital, Boston; University of Michigan, Ann Arbor; Karolinska Institute, Huddinge, Sweden; University of Iowa, Iowa City; Washington University, St. Louis; Baxter Healthcare, McGaw Park, Illinois

ABSTRACT: Nineteen malnourished chronic peritoneal dialysis patients who were ingesting a low protein intake underwent metabolic balance studies to test whether a dialysate that contained amino acids would improve their protein nutrition. Patients lived in the hospital for 35 days while they ate a constant diet and underwent their usual regimen of continuous ambulatory peritoneal dialysis (CAPD). The first 15 days served as a Baseline Phase. For the last 20 days, the usual dialysate was substituted with a dialysate of essentially the same composition except that it contained 1.1% essential and nonessential amino acids and no glucose. Patients received one or two dialysate exchanges with amino acids each day depending on the amount necessary to bring the individual's dietary protein plus dialysate amino acid intake to 1.1 to 1.3 g/kg body weight/day. During Baseline, patients were in neutral nitrogen balance; net protein anabolism was positive, as determined from 15 N-glycine studies. After commencing intraperitoneal amino acid therapy, nitrogen balance became significantly positive, there was a significant increase in net protein anabolism, the fasting morning plasma amino acid pattern became more normal, and serum total protein and transferrin concentrations rose. Patients generally tolerated the treatment well, although some patients developed mild metabolic acidemia. These findings indicate that a dialysate containing amino acids may improve protein malnutrition in CAPD patients ingesting low protein intakes. (Kidney Int 1995;47:1148-57)

COMMENT: This strong piece of research overcomes the limitations of previous studies of the effects of amino acid-based dialysate for CAPD patients by (1) selecting a population of patients who clearly were malnourished and (2) following them metabolically for an extended period. The definition of malnutrition included evidence for muscle wasting, body weight < 90% desirable or serum albumin < normal, and inadequate dietary protein intake. The population thus selected should represent patients with existing malnutrition and no expectation of correction of protein deficits by dietary means alone. In fact, the mean body weight relative to desirable body weight was 91 +/− 13%, and 11 of the 19 patients were ≤ 86% of desirable body weight. The mean albumin concentration was 3.6 g/dL with a range of 2.3 to 3.9. All but one of the 19 patients had multiple objective signs of malnutrition.

The patients received a stable dietary intake and their usual CAPD regimen for 15 days, and then followed with the amino acid treatment regimen. It is not clear that either the patients or the investigators were blinded to the treatment given. Unfortunately, all patients received Baseline Phase treatment first followed by Treatment Phase, leaving the results open to confounding by time-treatment interactions. The small sample size also leaves the possibility of a Type II statistical error in some results, and no power statistics are calculated.

The increases in transport proteins are not unexpected. Albumin, with its 21-day half-life, did not change significantly over the treatment period, while transferrin, with its 14-day half-life, did. The nitrogen balance studies covered 9-day periods at the end of each phase, and allowed 6 to 11 days for adjustment to the level of protein intake before nitrogen balance began. The mean nitrogen balance during the Baseline Phase was +0.5 g/day and + 1.71 g/day in the Treatment Phase, a significant difference. Nitrogen intake increased from 8.32 g/day during Baseline to 13 g/day during Treatment as a result of the 1.1% amino acid dialysate. Sixteen of the 19 subjects underwent protein turnover studies, which showed no difference in protein degradation but a significant increase in net anabolism.

In general, the amino acid solutions were well-tolerated by patients. One undesirable side effect was a mild metabolic acidosis (decrease in the serum carbon dioxide concentration from 25 to 21). Arterial blood gas measurements on seven patients, however, documented normal pH.

This study represents an important treatment option for clinically stable but malnourished end-stage renal disease patients with CAPD as their dialysis treatment modality. While the increase in protein intake may appear limited (mean of 29 g/day) relative to usual TPN levels of intake, malnourished subjects responded favorably over a timeframe of 20 days.

Charlene Compher, MS, RD, CNSD

Small bowel necrosis associated with postoperative jejunal tube feeding

CD SCHUNN, JM DALY
University of Pennsylvania School of Medicine, Philadelphia

ABSTRACT: *Background:* Postoperative enteral nutrition using jejunal tube feeding is widely practiced and usually well tolerated. Functional intestinal complaints occur frequently but generally respond to alteration of the infusion rate or tube feeding formula. Occasionally, however, nonspecific signs of intestinal disturbance progress to a syndrome of abdominal distention, hypotension, and hypovolemic shock resulting in extensive small bowel necrosis. *Study design:* During a six-year period, four patients have been identified retrospectively who had this complication among 1,359 patients receiving jejunal tube feeding. Their clinical course was evaluated critically and compared with 11 cases described in the literature. *Results:* Small bowel necrosis is a rare but highly morbid complication associated with postoperative jejunal tube feeding. Of 14 patients who had small bowel necrosis develop, 12 succumbed to

this complication. The causative mechanism remains unclear, but is most likely the result of several factors. *Conclusions:* Tube feeding should be discontinued immediately and total parenteral nutrition should be considered in patients who have abdominal pain, abdominal distention, increased nasogastric drainage, and signs of intestinal ileus. (J Am Coll Surg 1995;180:410-6)

COMMENT: Small bowel necrosis, a rare but highly morbid clinical condition, is associated with jejunal tube feedings. When to discontinue tube feedings to prevent small bowel necrosis is an important question. Unfortunately, the mechanism of action has not been determined. The authors suggested that low mesenteric blood flow during stress or direct mucosal injury are possible causes. Small bowel necrosis does not have any specific signs or symptoms to indicate when to discontinue enteral feeding. The clinical presentation is difficult to distinguish from other tube feeding problems, which makes the decision to discontinue enteral feedings and possibly begin parenteral nutrition difficult.

The importance of early enteral feedings is well established as it is associated with less septic morbidity and fewer infections than parenteral nutrition. Additionally, literature supporting early nutrition has shown improvement in nitrogen balance, serum albumin, and clinical outcomes. The importance of early enteral feeding cannot be overstated and early discontinuation could compromise patient care. Similarly, feeding a patient with small bowel necrosis would be detrimental.

The authors suggest the discontinuation of tube feedings when the patient presents with abdominal distention, abdominal pain, increased nasogastric drainage, and signs of intestinal ileus. This recommendation may be appropriate for some patients, though each patient must be individually assessed. The presentation of these symptoms in the early fed patient versus the chronically fed patient might be handled differently. In some settings, early fed patients presenting with these symptoms would have their tube feedings discontinued, whereas chronically fed patients might be closely monitored without immediate discontinuation of tube feedings. Furthermore, patients should not receive tube feedings if they are hemodynamically unstable, which includes those receiving crystalloid resuscitation or pressor agents.

In conclusion, when the symptomatology and conditions for small bowel necrosis are suspected, jejunal tube feedings should be discontinued. Unfortunately, some symptoms of small bowel necrosis are not unique and may be indicators of a more benign problem; early discontinuation of enteral feedings may compromise patient care in such cases. Each patient must be clinically assessed and other causes ruled out before enteral nutrition is stopped.

Jane Gervasio, PharmD

A prospective study evaluating the effects of extending total parenteral nutrition line changes to 72 Hours

G Robathan, S Woodger, D Merante
Princess Margaret Hospital, Perth, Australia

ABSTRACT: The use of total parenteral nutrition (TPN) has increased considerably in recent years, resulting in greater demands on human and material resources. Current practice in most hospitals is to replace IV lines for TPN every 24 hours, whereas all other IV lines are changed every 72 hours. A prospective study was conducted in a pediatric hospital to compare the nosocomial infection incidence between 24- and 72-hour TPN line changes. The convenience sample of 279 patients receiving TPN was studied over two consecutive 12-month periods. A statistically significant decrease was found in the incidence of nosocomial septicemia in the 72-hour line change group. A substantial decrease also was demonstrated in the overall cost of TPN management. (J Intravenous Nurs 1995;18:84-7)

COMMENT: Detailed guidelines have been developed to reduce the risk of bloodstream infection in patients receiving IV therapy. Initially, administration sets were universally changed every 24 hours. In 1980 the Centers for Disease Control and Prevention recommended a 48-hour replacement of administration sets for all IV infusions except TPN.[1] In 1987 Maki et al concluded that extrinsic contamination of IV fluids is a rare cause of nosocomial septicemia and recommended a routine 72-hour replacement of IV delivery systems for most infusions including TPN.[2]

The present study compared the incidence of catheter-related infections in TPN pediatric patients undergoing tubing changes on a 24- or 72-hour schedule and supports the earlier findings of Maki et al, as the authors had hypothesized there was no increase in infection when tubing changes were extended to 72 hours. Interestingly, however was the significant decrease in IV-related septicemia in the group receiving the 72-hour tubing changes, which was postulated to be related to the decrease in hub manipulation. The TPN formulations were not identified, and therefore it is unclear whether patients were receiving continuous fat as in a total nutrient admixture or a dextrose/amino acid based solution, which may be an important variable. This study has direct implications for infection control and cost savings in the clinical setting.

Elizabeth Krzywda BSN, RN, CNSN

1. Centers for Disease Control Working Group: Guidelines for prevention of intravascular therapy-related infections. Infect Control 1981;3;62-79.
2. Maki DG, Boticelli JT, LeRoy ML, et al: Prospective study of replacing administration sets for intravenous therapy at 48- vs 72-hour intervals. JAMA 1987;258:1777-81.

Improving central placement rates of peripherally inserted catheters

GD LaRue
Kusler's Option Care, Everett, Washington

ABSTRACT: Recent advances in catheter technology and in the knowledge base of professionals in the practice of intravenous therapy have had a significant impact on patient care and improved outcomes. As professionals learn new techniques and monitor outcomes, they appropriately begin to question some traditional beliefs. One of the items that we monitor in our continuous quality improvement program is the number of malpositioned peripherally inserted central catheters immedi-