Selected Summaries

Remember Early Enteral Feeding In Critically III

[Heyland D, *Cook DJ, Winder B, et al. Enternal nutrition in the critically ill patient: A prospective survey. Crit Care Med 1995, 23:1055-1060]*

In a prospective, cohort survey of enteral feeding, authors enrolled 99 consecutive adult patients admitted to two tertiary care medico-surgical intensive care units (1CU) at Ontario, Canada. It was anticipated that patients would stay in the ICU for >3 days. All the patients were followed for 21 days or until they tolerated enteral nutrition, tolerated oral nutrition, were discharged from the ICU, or died. Enternal feed tolerance was defined as receiving 90% of estimated daily energy requirements for >48 h without gastrointestinal dysfunction *(i.e,* high gastric residuals, vomiting, diarrhea, abdominal distention). Seventy-three (74%) of 99 patients were started on enteral feeding an average 3.1 days (range 1 to 18 days) after ICU admission. Twenty six patients were never started on enteral nutrition; of these three (12.5%) patients eventually tolerated oral nutrition. Reasons for not initiating enteral nutrition included absence of bowel sounds (27.0%), high nasogastric drainage (16.9%), contraindication to enteral nutrition (16.7%), and no apparent reason (5.1%). Abdominal surgery, use of vasoactive drugs, and admission to ICUs made initiation of enteral nutrition less likely. Thirty-five (42.9%) of 73 patients started on enteral nutrition achieved tolerance of the regimen. Of 38 patients who did not achieve tolerance, 20 (52.6%) were discharged from ICU, 8 eventually tolerated oral nutrition and 8 died. Once started on enteral nutrition, the most common reasons for decreasing or discontinuing feedings included high gastric residuals (51.0%), mechanical feeding tube problems (15.4%), medical or surgical procedures (5.4%), and vomiting (5.1%). It was concluded that enteral nutrition is not started in all eligible ICU patients. Approximately half of those patients receiving enteral nutrition achieved tolerance of the regimen. Gastrointestinal dysfunction causing intolerance to enteral nutrition is a common reason for not starting, or discontinuing feedings.

Comments

This perhaps is the first published survey of enteral feeding practices in any ICU. Although, similar information on Pediatric ICU (PICU) patients is not available, these findings are equally relevant to PICU patients. The study brings out two points: (*i*) enteral nutrition is not started in all eligible ICU patients, and *(ii)* there are major barriers in starting enteral feeding.

Research on critically ill patients and experimental animal models has clearly established that early enteral nutrition is superior to total parenteral nutrition and is associated with decreased catabolism, maintenance of bowel mucosal integrity, improved wound healing, decreased translocation of gut bacteria and lower risk of nosocomial pneumonia

and sepsis. Supplementation of enteral feed with certain nutrients (arginine, nucleotides and fish oil) which are well tolerated, reduces hospital stay of adult patients substantially(l).

The main reason for not starting enteral feeding in this study as also elsewhere originate from physician's established practice pattern in that it is not considered a treatment option. Many physicians believe that bowel sounds must be present before feeding can be started, whereas it has been shown that 90% of critically ill adult patients tolerate some enteral feedings given in the first few days of ICU admission, regardless of whether bowel sounds are present or absent. Many clinicians also believe that enteral nutrition is contraindicated in patients with Gl hemorrhage, abdominal surgery, *etc*. However, there is no scientific proof to it. It is time that we re-evaluate the list of conditions for which enteral nutrition is contraindicated.

The other barrier to enteral feeding is Gl dysfunction. Large volume gastric residuals or drainage, diarrhea, vomiting, and abdominal distention often interfere with the initiation and tolerance of enteral feeding. Abnormal gastric emptying appears to be a key variable in the ability of patients to tolerate enteral nutrition. Bypassing the stomach with a nasoenteric tube could reduce the frequency of intolerance. Alternatively one may use Gl prokinetic agents. A recent study in critically ill, sedated and mechanically ventilated patients indicates that gastric emptying and tolerance to enteral nutrition can be significantly improved by adding cisapride to enteral feeds(2). It is time that enteral nutrition is considered and initiated in every critically ill patient as early as possible.

REFERENCES

1. Bower RH, Cerra FB, Bershadsky B, *et al*. Early enteral administration of a formula (impact) supplemented with arginine, muckotides and fish oil in intensive care unit patients : Result of a multicenter, prospective, randomized, clinical trial. Crit Care Med 1995, 23: 436-449.
2. Spapen HD, Duinslaeger L, Diltoer M, Gillet R, Bossuyt A, Huyghens LP. Gastric emptying in critically ill patients is accelerated by adding cisapride to a standard enteral feeding protocol : Result of a prospective, randomized controlled trial. Crit Care Med 1995, 23: 481-485.

Beware of Prolonged Dopamine Use

[Berghe GVD, Zegher FD, Lauwers P. Dopamine suppresses pituitary function in infants and children. Crit Care Med 1994, 22: 1747-1753]

Authors evaluated the effect of continuous dopamine infusion (5 µg/kg/min IV) on the dynamics of prolactin, growth hormone, and thyrotropin secretion and on the thyroid axis in a prospective, randomized, controlled, open-labeled, clinical study. The study population consisted of 18 infants (age 12 to 90 days) and 15 children (age 0.3 to 6.7 years) recovering from cardiovascular surgery. Dopamine was infused at 5 µg/kg/min for a median duration of 50

hours (range 21 to 283 hours). Blood sampling was performed every 20 min for 3 h on two consecutive days at the same time. The group was randomized for dopamine withdrawal after 80 minutes of infusion on the first or the second day. Serum prolactin, growth hormone, insulin-like growth factor-1, thyrotropin, thyroxine (T_4), tri-iodothyronine (T_3) and reverse tri-iodothyronine (reverse T_3) concentrations were measured.

In young infants, dopamine suppressed prolactin, growth hormone, and thyrotropin secretion consistently, rebound releases starting within 20 min after dopamine withdraw!. One day later prolactin concentrations were ten times higher, pulsatile growth hormone secretion was augmented, thyrotropin was unchanged, but T_3 was increased by 30% and the T_3/ reverse T_3 ratio was inverted. *In children,* dopamine, suppressed prolactin and thyrotropin (but not growth hormone) secretion, rebound releases starting within 20 min after dopamine withdrawl. One day later, prolactin concentrations were at least twice as high, thyrotropin was increased ten-fold, T_4 was augmented by 14%, T_3 by 30% and the T_3/reverse T_3 ratio had doubled. Authors concluded that dopamine infusion induces or aggravates partial hypopituitarism and the euthyroid sick syndrome in critically ill infants and children.

Comments

This study is the first to document the inhibition of prolactin, growth hormone, and thyrotropin secretion and the suppression of the thyroid axis by therapeutic dopamine infusion in critically ill infants and children. The complete but rapidly reversible suppression of prolactin secretion by dopamine infusion in infants and children may be of clinical importance during the critical postoperative course. Hypoprolactinemia has been associated with poor clinical outcome in preterm infants, possibly through effect on surfactant synthesis, whole body water regulation, and gastrointestinal maturation. Moreover, experimental data suggest that prolactin participates in the regulation of the immune response. The data also suggest that so-called "euthyroid sick syndrome" diagnosed in sick children receiving dopamine may not reflect an adaptive mechanism, but may represent at least in part a condition of iatrogenic hypothyroidism. The study raises the question whether the advantages of low-dose dopamine infusion outweigh the. induced partial or complete deprivation of pituitary-dependent factors modulating the immune response, growth and metabolism.

Should one consider endocrine replacement therapy if prolonged dopamine administration cannot be avoided in the critically ill infants and children ? We have to wait for the answer to this question from future studies. For more on systemic effects of dopamine, readers may find a recent review by Seri(l) very useful.

REFERENCE

1. Seri I. Cardiovascular, renal and endocrine actions of dopamine in neonates and children. J Pediatr 1995, 126: 333-344.

Sunit C. Singhi,
Additional Professor, Department of Pediatrics, Post Graduate Institute of Medical Education and Research, Chandigarh 160 012.