CRITICAL CARE 12.09.2011 2 COMMENTS

Probiotics Stave Off Infection in TBI Patients

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The use of probiotics in traumatic brain injury patients may result in a decreased infection rate -- particularly for ventilator-associated pneumonia (VAP) -- and require fewer antibiotics, according to a single-center study.

During a 21-day study, 24 out of 43 traumatic brain injury (TBI) patients developed infections; VAP was diagnosed in 43.8% of patients given probiotics, compared with 68.4% in a control group, reported Professor Jing-Ci Zhu, from the Third Military Medical University in Chongqing, China, and colleagues.

Additionally, probiotics patients required antibiotics (cefmetazole, imipenem, and vancomycin) for an average of 11.9 days, compared with 14.1 days for control patients, although the difference was not statistically significant (P=0.154), they noted in *Critical Care*.

TBI is associated with profound immunological dysfunction, and the incidence of VAP can reach 60% in these patients, Zhu and colleagues explained. Probiotics have been useful in managing infectious diseases, or to counteract negative effects on digestive flora from antibiotics.

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Two meta-analyses came up with contradictory results on the value of probiotics for VAP: one demonstrated efficacy while the other showed no benefit (*Crit Care Med* 2010; 38(3): 954-962 and *Clin Nutr* 2007; 26(2): 182-192).

For this prospective, randomized trial conducted between 2009 and 2011, Zhu's group enrolled 52 patients with TBI. Eligibility criteria included a closed head injury alone, admission within 24 hours of trauma, and the capacity to accept a nasogastric feeding tube.

All patients received enteral nutrition within 48 hours of hospital admission and were randomized at a 1:1 ratio into a probiotic group or a control group. VAP was defined as pneumonia occurring more than 48 hours after endotracheal intubation.

The probiotics group received seven sachets of viable probiotics three times a day for a total of 109 bacteria. Each sachet contained *Bifidobacterium longum* (0.5 x 108), *Lactobacillus bulgaricus* (0.5 x 107), and *Streptococcus thermophilus* (0.5 x 107).

All three bacteria are known for having a proven safety profile, the authors explained. Samples for complete blood count, blood gases, liver and renal function, and C-reactive protein (CRP) were collected at several time points, starting at day one and continuing up to day 21. The intention-to-treat analysis was done in 43 patients who completed all 21 days of the trial.

The researchers found that all patients acquired pathogens, but 61.5% of the control patients who developed VAP acquired at least one other kind of pathogen in the latter part of their hospital stay, the authors said. In comparison, only 14.3% in the probiotic group acquired one or more pathogens (P=0.07).

The probiotic patients also spent less time in the ICU, at 6.8 days versus 10.7 days for controls (P=0.034).

The probiotic group showed a significantly higher increase in serum interleukin and interferon-gamma levels. There also was a dramatic decrease in IL-4 and IL-10 concentrations, the authors reported.

With regard to IL-6 and CRP, the probiotics group had significantly lower levels at day 15 compared with controls (P=0.034 and P=0.039 for IL-6 and CRP, respectively). The same held true at day 21 at P=0.042 for IL-6 and P=0.016 for CRP.

However, the 28-day mortality rate was not affected by treatment with probiotics, and neither were ICU mortality scores, they said.

The authors hypothesized that the probiotics attenuated the Th1/Th2 response induced by severe traumatic brain injury. This response renders patients more vulnerable to infections, they explained.

The study had several limitations: first, it was a pilot study with a small number of patients at a single institution. Also, it was not a double-blinded, placebo-controlled trial, although the patients were "all unconscious and unaware of the trial," they pointed out.

The investigators called for larger, multicenter studies to support their clinical outcomes.

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The authors reported no conflicts of interest.

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