

## CLINICAL SUMMARY

# Preoperative standard oral nutrition supplements vs immunonutrition: results of a systematic review and meta-analysis.

Surgical patients run the risk of infection and other complications in the hospital setting. Pre- and postoperative nutrition has been shown to play a role in minimizing the stresses of hospitalization and surgery.

This study shows that oral nutritional supplements can be an appropriate source of pre-operative nutrition, while immunonutrition is better-suited to postoperative feeding.

Surgery is a catabolic stress that can result in an increased risk of postoperative complications. Nutritional management of surgical patients has been defined by the 2009 A.S.P.E.N./SCCM nutrition support guidelines<sup>1</sup> to include specialized immunonutrition with specific nutrients to help reduce postoperative complications.

Previous published studies and meta-analyses have evaluated the effect of pre- and postoperative immunonutrition (IN) on clinical outcomes in surgical patients. In one meta-analysis, studies were combined that included different controls, ie, standard nutritional supplements and non-supplemented diets.<sup>2</sup> In another meta-analysis, the timing of IN was evaluated, ie, preoperative vs postoperative.<sup>3</sup> And in a third meta-analysis, the nutrient composition of the IN was evaluated in relationship to clinical outcomes.<sup>4</sup> However, data are limited on the preoperative use of standard oral nutritional supplements (ONS).

This paper reports results of a systematic review of randomized controlled trials (RCTs) that evaluated the effect of IN vs standard ONS and IN vs a non-supplemented regular diet. The primary outcome evaluated in this systematic review was infectious complications. Secondary outcomes included wound infections, noninfectious complications, and length of stay (LOS).

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### RESULTS

#### Preoperative IN vs standard ONS (8 RCTs, 561 patients)

When IN was compared to standard ONS, it was not associated with a reduction in rate of wound infection, all infectious complications, non-infectious complications, or length of stay (LOS). See the table at right.

Outcome	OR (95% CI)	P=
Wound infections	0.97 (0.45-2.11)	0.94
All infectious complications	0.71 (0.30-1.68)	0.44
Non-infectious complications	1.25 (0.64-2.43)	0.52
LOS, mean difference	0.07 (-2.29-2.43)	0.96

OR = Odds ratio CI = Confidence interval

#### Preoperative IN vs no ONS (9 RCTs, 895 patients)

In the RCTs that compared IN with non-supplemented standard diets, use of preoperative IN was associated with a statistically significant decrease in infectious complications and LOS. A statistically significant reduction in noninfectious complications and wound infections was not observed.

Outcome	OR (95% CI)	P value
Wound infections	0.69 (0.43-1.10)	0.12
All infectious complications	0.49 (0.30-0.83)	< 0.01
Non-infectious complications	0.81 (0.53-1.23)	0.32
LOS, mean difference	-2.22 (-2.99 to -1.45)	<0.01

OR = Odds ratio CI = Confidence interval

## NUTRITION CONCLUSIONS

These results suggest that there is no significant difference in postoperative clinical outcomes between preoperative IN and standard ONS. Therefore, based on these findings and considering the higher cost and limited retail availability of IN, it seems reasonable to suggest standard ONS as a preoperative choice. On the other hand, previous studies and meta-analyses have demonstrated improved clinical outcomes with the use of postoperative IN. Perhaps this is due to the inclusion of added arginine in IN formulas (compared to standard ONS formulas) and the increased need for arginine in post-surgical patients. Other nutrients in IN formulas, such as omega-3 fatty acids and antioxidants, may act synergistically with arginine to improve clinical outcomes in the postoperative period. Thus, it appears that standard ONS are an appropriate preoperative nutrition support option while IN may be better suited for postoperative nutrition support.

**References:** 1. McClave SA, Martindale RG, Vanek VW, et al. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). *JPEN J Parenter Enteral Nutr.* 2009;33(3):277-316. 2. Drover JW, Dhaliwal R, Weitzel L, Wischmeyer PE, Ochoa JB, Heyland DK. Perioperative use of arginine-supplemented diets: a systematic review of the evidence. *J Am Coll Surg.* 2011;212(3):385-399, 399 e381. 3. Osland E, Hossain MB, Khan S, Memon MA. Effect of timing of pharmaconutrition (immunonutrition) administration on outcomes of elective surgery for gastrointestinal malignancies: a systematic review and meta-analysis. *JPEN J Parenter Enteral Nutr.* 2014;38(1):53-69. 4. Marik PE, Zaloga GP. Immunonutrition in high-risk surgical patients: a systematic review and analysis of the literature. *JPEN J Parenter Enteral Nutr.* 2010;34(4):378-386.